Lupin Mines Incorporated

A wholly owned indirect subsidary of Elgin Mining Inc.

Lupin Mine Site

Nunavut, Canada

Spill Contingency Plan

(Care and Maintenance)

March 2012

Lupin Mines Incorporated
Elgin Mining Inc.
#201 - 750 West Pender Street
Vancouver, BC V6C 2T7

Document Control

Revision No	Date	Details	Author	Approver
1.0	20/03/12	Reformatted to Lupin Mines standard. Revised to reflect site activities in support of care and maintenance, and exploration. Revised to reflect site inspection frequency, due to personnel present on site. Revised and updated to reflect new ownership and contact information. Updated figures to reflect current site conditions. Revised to reflect air access to site only. Figures revised to reflect current spill kit locations and contents General rewrite for clarity and organization Updated discussion on fuel storage to reflect current conditions on site Removed discussion on landfarming. Added use of proper PPE to response plans Added response plan for propane Removed reference to ANFO. It is believed that no ANFO remains on site. Addressed comments from EC (2009, 2010),	S. Hamm	P. Downey

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Appendices

1 Introduction

Lupin Mines Incorporated (LMI), a wholly owned indirect subsidiary of Elgin Mining Inc. (Elgin), has prepared this Spill Contingency Plan (the Plan) with respect to the requirements within Water Licence Number 2AM-LUP0914 (Water Licence), Part H, Item 1.

The documents "NWT Environmental Protection Act, Spill Contingency Planning and Reporting Regulations", July 22, 1998 and "A Guide to the Spill Contingency Planning and Reporting Regulations", June 2002, were used as guide in preparing this plan.

An annual review of the Plan takes place and revisions are submitted as necessary with the annual report. The current Type A water licence 2AM-LUP0914 for the Lupin Gold Mine (Lupin or the Lupin Mine) is valid until March 31, 2014 and has been kept in good standing.

1.1 Project and Company Information

Elgin is a Canadian based company focused on the exploration and development of the Lupin Mine and Ulu Gold Project, both located in Nunavut, Canada.

Elgin purchased LMI, which owns the Lupin Mine, from MMG Resources Ltd. in July 2011. The Lupin site was an operational underground gold mine from 1982 to 2005 with temporary suspensions of activities between Jan 1998 and April 2000, and again between Aug 2003 and March 2004. The mine resumed production in March 2004 until 2005. Since 2005, the site has remained in care and maintenance.

An exploration program is currently underway at the Lupin site under water licence 2BE-LEP1217. All camp infrastructure required for the exploration program currently exists at the Lupin Mine site, which has previously been screened by the Nunavut Impact Review Board under file 99WR053 and approved by the Nunavut Water Board under water licence 2AM-LUP0914.

Company:	LMI
Project:	Lupin Mine, Nunavut
Company Address:	201 – 750 W Pender St, Vancouver, BC, V6C 2T7
Telephone:	604-682-3366
Email:	shamm@elginmining.com
Attention:	Sharleen Hamm, Manager, Environment

Effective date: 30 March 2012

Distribution List:

Patrick Downey	Chief Executive Officer
Peter Tam	Chief Financial Officer
Michele Jones	Manager, Corporate Affairs
Vivian Park	Manager, Exploration
Sharleen Hamm	Manager, Environment
Karyn Lewis	General Administration

Additional copies of this Plan are available fro

This Plan will be posted in key locations at the site, and all employees and contractors will be made aware of its contents.

1.2 Site Location

The Lupin Mine is located in Kitikmeot Region, Nunavut, 400 km north of Yellowknife, Northwest Territories and 285 km southeast of Kugluktuk. The geographic center of that property is 65° 45'29" N / 113° 13'10W (Figure 1). It is on the western shore of Contwoyto Lake, approximately 60 km south of the Arctic Circle.

1.3 Environmental Policy- Key Components

LMI looks to our employees, contractors and managers to adopt and grow a culture of environmental excellence. Together we achieve this by:

- Promoting environmental stewardship in all tasks. Nothing is too important that it cannot be done in a clean and responsible manner. We strive towards maintaining a zero-incident work place.
- Recognizing that we have a shared responsibility as stewards of the environment in which we operate. We will not walk away from a non-compliant act.
- Identifying, managing and mitigating environmental, business and social risks in an open, honest and transparent manner.
- Planning our work so it is done in the cleanest possible manner and executing work according to plan.
- Continually improving environmental and operational performance by setting and reviewing achievable targets.
- Providing appropriate and necessary resources in the form of training, personnel and capital, including that required for closure planning and reclamation.
- Managing our materials and waste streams, maintaining a high degree of emergency response preparedness and minimizing our operational footprint to maintain environmental protection at all stages of project development.
- Seeking to understand, learn from and mitigate the root causes of environmental incidents and near misses when they do occur.
- Employing systems and technology to achieve compliance, increase efficiency and promote industry best practices in development, operations and environmental stewardship.

1.4 Purpose and Scope

This Plan is designed to provide the necessary background information and plans of action in the event of a failure at the facility or an incident at the Lupin mine site resulting in a spill of a petroleum, allied petroleum product, or chemical during care and maintenance of the site. It is intended to outline the means for responding to failures and material spills within these systems in a way that will minimize potential health hazards, environmental damage and clean-up costs.

The objectives of the Plan are to:

- define the reporting procedures and communication network to be used in the event of a system failure or material spill;
- define procedures for the safe and effective containment and clean up/disposal of a system failure or material spill; and
- define specific individuals and their responsibilities.

The transportation joint venture which is responsible for the winter road, drafts a contingency plan for the road before hauling starts entitled 'Tibbitt to Contwoyto Winter Road Joint Venture Spill Contingency Plan' for winter road personnel and the transportation of supplies via the winter road. During periods of the Lupin winter road spur, a copy will be available on site for reference in the event that the assistance of Lupin personnel is requested for a winter road emergency. The Plan presented herein is limited to the Lupin mine site under care and maintenance and is not intended to cover the response action plans for winter road transportation.

2 Site Information

2.1 General

The Lupin site is completely self-contained with the exception of the transportation requirements for materials/supplies and workforce mobilization. There are two main areas: the residential complex consisting of accommodations, kitchen, and recreation centre; industrial plant complex comprised of milling and maintenance areas, head frame, hoist room, powerhouse, warehouse and office facilities.

During the winter months, the Lupin operation was, and can be serviced by an ice road from Yellowknife, NT. With an operating window of approximately six weeks, the winter road is used to facilitate the re- supply of Lupin with fuel and bulk supplies for the ensuing year. With the termination of mining and milling operations, there is no further requirement for reagents. It is understood that all reagents which remained on site following termination of milling have been returned to manufacturers or sold and shipped off site on the 2005 and 2006 winter roads. A modest amount of fuel was trucked to site in the winters of 2005 and 2006.

Figure 2 shows the general site plan; Figure 3 illustrates the main camp area; Figure 4 shows the water supply and sewage disposal area for the site; and Figure 5 illustrates the tailings disposal areas.

Legend

Project Location

Coordinate System: NAD_1983_UTM_Zone_12N

Map Sources/Notes:
Various Canadian Government Websites - Feb 2012

0 60 120 240 360 480 600 Km

1:15,000,000

Approved By: SH
Prepared By: PW
Project No.: LUP
Date Revised: 26 Mar 2012
File Name: Lup-12-04-01-LocationMap-A.mxd

Project: **Lupin Project**
Location: Kitikmeot Region, Nunavut, Canada

Location Map - Lupin Mine

Lupin Mines Incorporated

ELGIN MINING INC.

Figure: **1**
Rev: 120326

Legend

- Water Body 50k Topo
- Building
- Site Features
- Tanks
- Fuel Storage Containment Area
- Berm Tank Farm
- Berm
- Slope Break
- Roads
- Contour (10m)
- Fuel Pipe
- Proposed Dam
- Road
- Dykes
- Water -Stream, Creek
- Tailings Cell Areas
- Boundary Surface Lease 3594
- Water Body Mine
- Tailings Line
- Water Pipeline (8 in Diam)
- Sewage Pipeline (6 in Diam)

N W E S

Map Sources/Notes:
Topographic features from 1:50,000 goverment topographic data.
Site Layout based on drawing by Morrow Environmental titled "Site Plan", 2005. File A053017R00.

Coordinate System: NAD_1983_UTM_Zone_12N

0 100 200 400 600 800 1,000 1,200 1,400 1,600 Meters

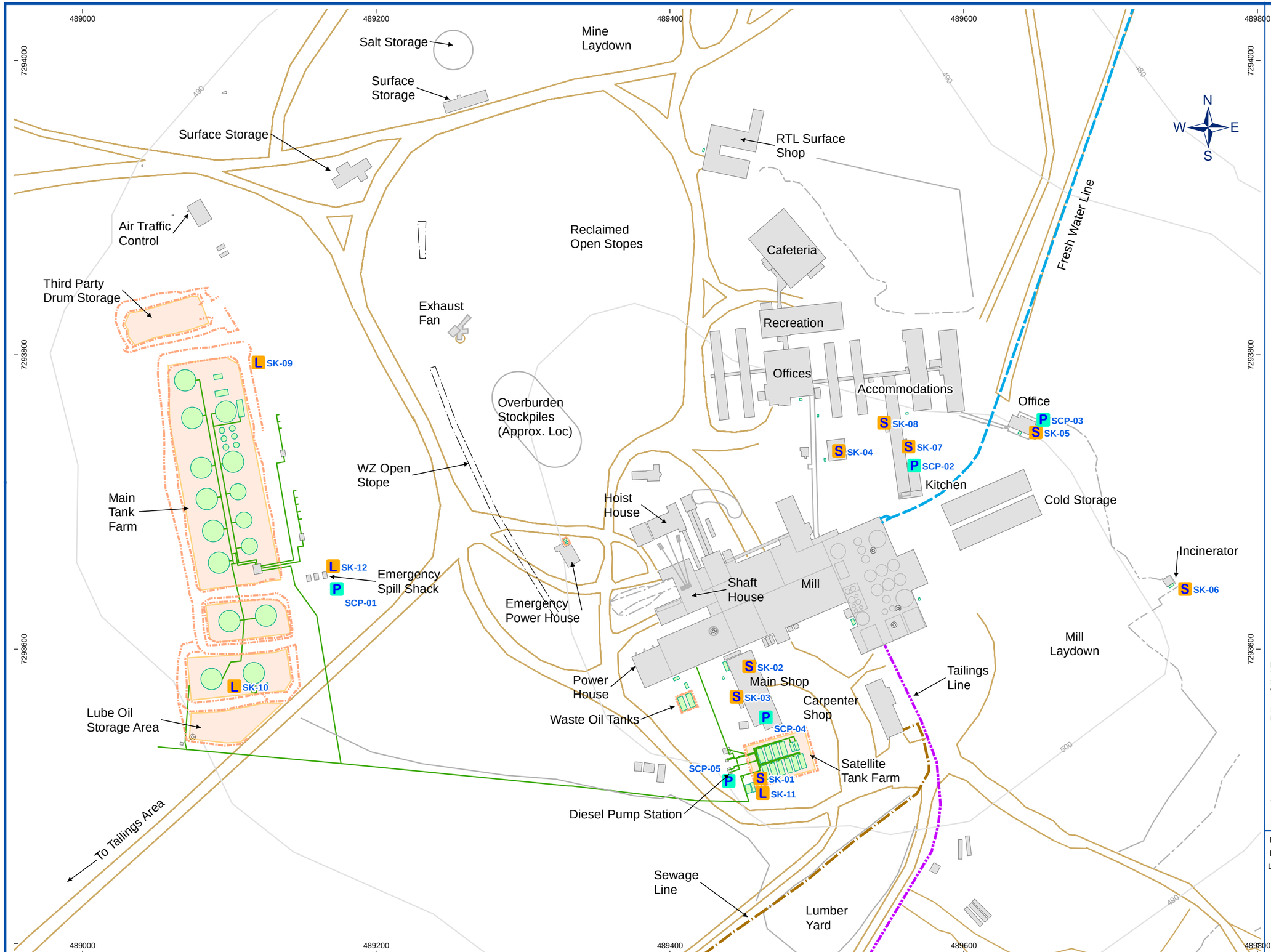
1:30,000

Approved By: SH
Prepared By: PW
Project No.: LUP
Date Revised: 27 Mar 2012
File Name: Lup-12-14-01-SpillContainPlan-WideSite-B.mxd

Project: **Lupin Gold Mine**
Location: Kitikmeot Region, Nunavut, Canada
Lupin Mine Spill Contingency Plan- Water Licence 2AM-LUP0914

Lupin Mine Site Plan

Lupin Mines Incorporated
ELGIN MINING INC.
Figure: 2
Rev: 120327



Legend

- Water Body 50k Topo
- Building
- Sump
- Site Features
- Tanks
- Fuel Storage Containment Area
- Berm Tank Farm
- Berm Burn Pit
- Slope Break
- Roads
- Contour (10m)
- Fuel Pipe
- Tailings Line
- Water Pipeline (8 in Diam)
- Sewage Pipeline (6 in Diam)

Spill Contingency Related Information

- P Location of Spill Contingency Plans
- L Spill Kit- Large
- S Spill Kit-Small

Spill Contingency Plans	
SCP-01	Sea can near main tank farm - Main Spill Shack
SCP-02	Kitchen
SCP-03	Main Camp Office
SCP-04	Shop Office
SCP-05	Diesel Pump Station - Satellite Tank Farm
Spill Kit	
SK-01	Inside Satellite Tank Farm - Fuelling Station
SK-02	Inside Shop
SK-03	Inside Generator Shack
SK-04	Inside Camp Generator Shack
SK-05	Inside basement of Office
SK-06	Beside Incinerator
SK-07	Inside Seacan backup Generator for Accomodation Bldg 1300
SK-08	Inside water tank building
SK-09	Main Tank Farm
SK-10	Jet Fuel Tank Farm
SK-11	Outside Satellite Tank Farm - Fuelling Station
SK-12	Sea can near the main pump shack at the MTF

Map Sources/Notes:
Topographic features from 1:50,000 goverment topographic data.
Site Layout based on drawing by Morrow Environmental titled "Site Plan", 2005. File A053017R00.

Spill Kit and Spill Contingency Plan locations provided by Elgin Mining field staff based on observations in March 2012.

Coordinate System: NAD_1983_UTM_Zone_12N
NTS Map Sheets 076E11 and 076E14

0 25 50 100 Meters

1:2,500

Approved By: SH Prepared By: PW
Project No.: LUP Date Revised: 28 Mar 2012
File Name: Lup-12-14-02-SpillContainPlan-MainCampArea-B.mxd

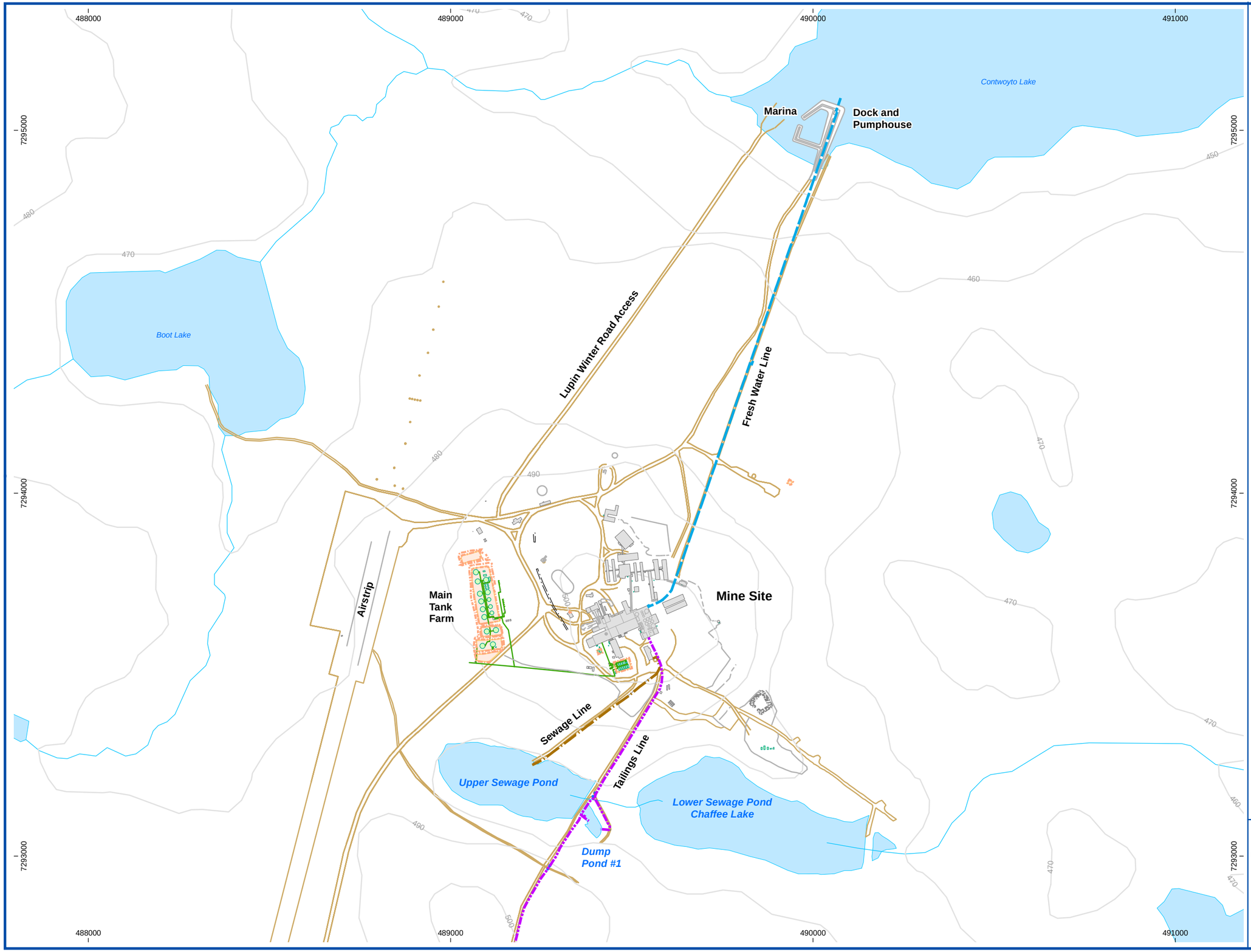
Project: **Lupin Gold Mine**
Location: Kitikmeot Region, Nunavut, Canada
Lupin Mine Spill Contingency Plan- Water Licence 2AM-LUP0914

Lupin Mine
Main Camp Area

Lupin Mines Incorporated

ELGIN MINING INC.

Figure: 3
Rev: 120328



Legend

- Water Body 50k Topo
- Building
- Site Features
- Tanks
- Fuel Storage Containment Area
- Berm Tank Farm
- Berm
- Slope Break
- Roads
- Contour (10m)
- Fuel Pipe
- Tailings Line
- Water Pipeline (8 in Diam)
- Sewage Pipeline (6 in Diam)

N
W E
S

Map Sources/Notes:
Topographic features from 1:50,000 goverment topographic data.
Site Layout based on drawing by Morrow Environmental titled "Site Plan", 2005. File A053017R00.

Spill Kit and Spill Contingency Plan locations provided by Elgin Mining field staff based on observations in March 2012.

Coordinate System: NAD_1983_UTM_Zone_12N
NTS Map Sheets 076E11 and 076E14

0 100 200 400 Meters

1:10,000

Approved By: SH Prepared By: PW
Project No.: LUP Date Revised: 28 Mar 2012
File Name: Lup-12-14-03-SpillContainPlan-WaterSewage-B.mxd

Project: **Lupin Gold Mine**
Location: Kitikmeot Region, Nunavut, Canada
Lupin Mine Spill Contingency Plan- Water Licence 2AM-LUP0914

Lupin Mine Site
Water Supply and Sewage Disposal

Lupin Mines Incorporated

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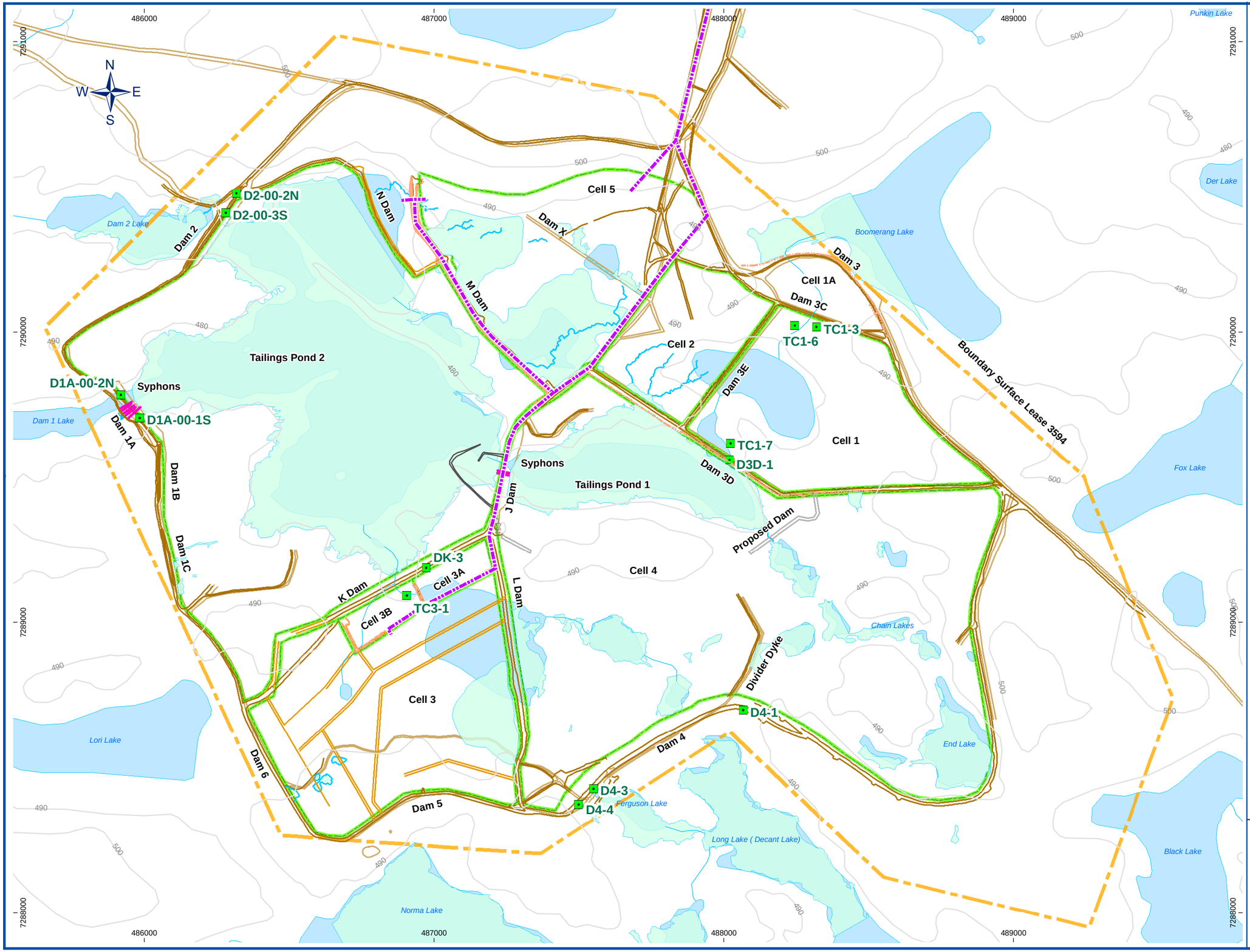
Figure: **4**
Rev: 120328



Legend

- Water Body 50k Topo
- Building
- Site Features
- Tanks
- Fuel Storage Containment Area
- Berm Tank Farm
- Berm
- Slope Break
- Roads
- Contour (10m)
- Fuel Pipe
- Proposed Dam
- Road
- Dykes
- Water -Stream, Creek
- Cell Areas
- Boundary Surface Lease 3594
- Water Body Mine
- Tailings Line
- Siphons
- Location of Thermistor

Map Sources/Notes:
Topographic features from 1:50,000 goverment topographic data.
Site Layout based on drawing by Morrow Environmental titled "Site Plan", 2005. File A053017R00.

Spill Kit and Spill Contingency Plan locations provided by Elgin Mining field staff based on observations in March 2012.

Coordinate System: NAD_1983_UTM_Zone_12N
NTS Map Sheets 076E11 and 076E14

0 100 200 400 600 Meters

1:12,500

Approved By: SH
Prepared By: PW
Project No.: LUP
Date Revised: 28 Mar 2012
File Name: Lup-12-14-04-SpillContainPlan-TailingsArea-B.mxd

Project: **Lupin Gold Mine**
Location: Kitikmeot Region, Nunavut, Canada
Lupin Mine Spill Contingency Plan- Water Licence 2AM-LUP0914

Lupin Mine Site
Mine Tailings Containment Area

Lupin Mines Incorporated

ELGIN MINING INC.

Figure: 5
Rev: 120328

2.2 Site Components

The site components used to support operations consist of facilities for handling tailings transport, storage, sewage handling, mine water disposal, freshwater supply and materials, petroleum and allied petroleum product storage. Due to the current status of the site being in care and maintenance, the majority of these components are not in use. Those components in use are described below.

2.2.1 Tailings Containment Area

While the mine was in operation, the mill tailings slurry was transported approximately six (6) km to the tailing containment area (TCA), via an eight (8) inch diameter insulated pipeline. The total impoundment area of approximately 750 ha consists of four solids retention cells (Cells 1, 2, 3 and 5), and three liquid holding ponds. Cell 4 was originally planned as a solids retention cell but has instead been used as a primary polishing pond. It is separated from Cell 3 by an internal dam.

The main liquid holding ponds (Pond 1, Pond 2) are operated in series and are separated by a constructed dam (J-Dam). Lined perimeter dams contain the liquid in Pond 2, which is discharged via siphons, usually bi-annually, in July/August.

2.2.2 Sewage

All camp sewage is discharged to the two cell Sewage Lakes system for storage, via a six (6) inch insulated pipeline of approximately 500 m in length. Annual decant of the system provides adequate storage capacity and treatment for all current camp needs.

A constructed dam divides the system into two cells, which are operated in series. Discharge to the environment via a siphon system from the second lake takes place annually between June and October.

2.2.3 Water Source/Supply

All water is obtained from Contwoyto Lake, supplied to the site via an eight (8) inch insulated pipeline. A maximum quantity of 1,700,000 m^3/year can be withdrawn for all uses, as stipulated by the Water Licence.

2.2.4 Petroleum Products

Bulk storage facilities for petroleum products have secondary containment in the form of an impermeable liner and berm. There are two bulk fuel tank storage areas on site: the main tank farm (MTF) and the satellite tank farm (STF). The impoundment volume of each facility is sufficient to accommodate 110% of the largest single tank volume that is contained.

The MTF containment measures 230 m long by 58 m wide and contains 14 diesel storage tanks, 1 Jet A tank and 9 individual tanks (Appendix 4).

Oil cubes (1600 litre capacity each) and drums of various other lubricants are also stored adjacent to the MTF, in the lube oils storage area and the third party fuel storage area. Both storage areas are lined and bermed.

The STF tank farm is located adjacent to the powerhouse. The 35 m by 25 m lined and bermed facility contains ten horizontal aboveground storage tanks for diesel and 2 (two) tanks for gasoline.

As of March 18, 2012 there was 2,832,837 L of diesel and 320,571 L of Jet A in the MTF, and 159,355 L of diesel in the STF. A comprehensive inventory of all petroleum products and quantities will be conducted during the snow free period of 2012. Material Safety Data Sheets (MSDS) for known materials on site are provided in Appendix 3.

2.2.5 Allied Petroleum Products

There are tanks on site thought to contain ethylene glycol, as described in Appendix 4. A comprehensive inventory of all allied petroleum products and quantities will be conducted during the snow free period of 2012. MSDS for known materials on site are provided in Appendix 3.

2.2.6 Propane

Typically, 1,000 -1,500 lbs of propane is stored on site in a designated storage area. The MSDS is provided in Appendix 3.

2.2.7 Chemical Products

The major chemical products that were used at the mine and mill (in order of amount) consisted of ANFO, cyanide, lime, lead nitrate, flocculent, ferric sulphate, and zinc dust. Where possible, these reagents were ordered in bulk containers to decrease handling, reduce costs and minimize risk associated with spillage. It is understood that with the cessation of operations, the majority of these materials were shipped off site and returned to the manufacturers.

A comprehensive inventory of chemicals and quantities will be conducted during the snow free period of 2012. MSDS for known materials on site are provided in Appendix 3.

2.3 Receiving Environment

The Lupin Mine is located in the barren land tundra of Nunavut. Typical surrounding terrain consists of glacial till overburden and a thin organic layer with a generous amount of low-lying vegetation. Bedrock outcrops and areas of frost shattering exist along with boulder fields. Due to the isolated location of the mine and air access only, the potential impacts to public access areas are minimal.

Environmentally sensitive areas, in addition to the surrounding tundra include the limited extent of the west shore of Contwoyto Lake where the mine is located, the potential for runoff from the site to the lake, drainage from the sewage lakes system which could enter Contwoyto Lake, and the tailings

containment area which, in the event of an unplanned release, would discharge to either the west or south drainage basins of Contwoyto Lake. The six (6) km tailings line route is no longer in use and not subject to contamination from line spillage.

Most of the larger lakes in the Lupin area are regarded as having fish habitat to some extent. Contwoyto Lake is the largest body of water in the area, containing the greatest water and fisheries resources. Possible sources of contamination of this area include stormwater runoff from the site facilities. The sewage disposal pipeline is located on the south end of the complex, therefore, any spill would report to the sewage lakes drainage basin. Boot Lake, located northeast of the site was the original water supply during construction and is known to be a seasonal fisheries habitat. This area has a potential to be affected in the event of a major petroleum spill from the MTF.

Along the tailings line route several smaller lakes exist with only one larger lake having a known fish habitat. Punkin Lake, located approximately 1.5 km from the site, is situated in a gentle sloping terrain which receives runoff from an approximately 4-5 km^2 area which includes the location of the No.2 Dump station and the tailings line to the north and south (approx. 2 km). As the tailings line is currently not in use, there is no potential for contamination from this source.

There are several small lakes in the immediate vicinity of the TCA that could have been affected by potential spills from the impoundment. These include Norma Lake, Lori Lake, Long Lake and Boomerang Lake, all of which are considered to be fisheries habitat. These areas are adjacent to a series of dams which segregate the TCA into a series of cells: Cells 1A, 1, 2, 3, 5, and N contain; Cell 4 does not contain tailings; Ponds 1 and 2 are polishing ponds so contain tailings supernatant but no tailings.

2.4 Operations System – Component Malfunction Prevention

Under the current ownership, site occupation commenced in September 2011, at which time the entire site was visually inspected. Subsequently, the annual inspection of the TCA was carried out during ice free, open water conditions by a registered geotechnical engineer. As required by the Water Licence, the annual geotechnical report was forwarded to the Nunavut Water Board within 60 days of the inspection.

3 Reporting and Action Procedures

An immediately reportable spill is defined as a release of a substance that exceeds the volumes outlined in Appendix 1 or is likely to be an impending threat to environmental or human health and must be reported to the 24-Hour Spill Report Line.

All other spills are cleaned, tracked and documented. Documentation must be submitted to the appropriate authority upon request or at a pre-determined reporting interval. If there is uncertainty regarding the spill volume, or if the material is a contaminant, then the spill will be reported to the 24-Hour Spill Report Line.

All site personnel are equipped with two-way radios. Supervisors carry emergency telephones. There are several VOIP telephones on site, one of which is a designated emergency line. There is a backup MSAT satellite telephone.

3.1 Training

As part of their site orientation, all personnel on site will be made aware of this Plan, the location on site of copies of the Plan, spill kits and related materials they may encounter. Roles and responsibilities to spill response will also be included as part of orientation and training.

3.2 Initial Reporting and Actions

A person encountering a spill must immediately report the spill to the Camp Manager, the Exploration Manager or the Environmental Manager.

Camp Manager	via Radio, Engenius telephone or 778-372-3266
Exploration Manager (Vivian Park)	via Radio, Engenius telephone or 778-372-3267
Environmental Manager (Sharleen Hamm)	via Radio, Engenius telephone or 403-512-7824

3.1.1 Action

- Report spill to a manager.
- Assess the spill – identify material and volume, and the risk to personnel and the environment.
- If there is no risk, attempt to control the spill – refer to MSDS for product identification and handling.
- If there is a risk, stand clear and prevent others from entering the area.

3.1.2 Reporting

If the spill is immediately reportable, then the Camp Manager, Exploration Manager, Environmental Manager, or an appropriate designate will contact the NU 24-Hour Spill Report Line.

24-Hour Spill Report Line: Tel: 867-920-8130 Fax: 867-873-6924

The Environmental Manager will submit a Detailed Spill report that to a Water Resources Inspector no later than 30 days after the initial report of a spill.

3.1.3 Important contacts

Lupin Mines Incorporated	**Telephone**	**Fax**
24-Hours Site Contact, Lupin Camp	778-372-3264	
Vivian Park, Exploration Manager	778-372-3267, 250-819-5788	
Sharleen Hamm, Environmental Manager	403-512-7824, 604-682-3366	
Karyn Lewis, General Administration	604-682-3366, 778-386-7340	
Patrick Downey, President and CEO	604-682-3366	

Nunavut	**Telephone**	**Fax**
Phyllis Beaulieu, Manager of Licensing, NWB	867-360-6338	867-360 6369
Tara Arko, Technical Advisor, NIRB	867-983-4600	867-983-2594
GN Environmental Protection, Iqaluit	867-975-5910	867-975-5980
GN Department of Environment	867-975-4644	
Manager of Pollution Control and Air Quality	867-975-7748	

Aboriginal Affairs and Northern Development Canada-Land Use and Water Use		
Nunavut Regional Office, Land Admin.	867-975-4275	867-975-4286
Jeff Mercer, Manager, Land Administration	867-975-4283	
Baba Pedersen, Regional Management Officer, Kugluktuk	867-982-4306	867-982-4307
Nunavut Regional Office, Water Resources Management	867-975-4550	867-975-6445
Kevin Robertson, A/Manager of Field Operations	867-975-4295	867-975-6445
Dave Abernethy, A/Manager, Water Resources	867-975-4555	
Jean Allen, Water Management Specialist, Iqaluit	867-975-4738	
Andrew Keim, Water Resources Inspector, Iqaluit	867-975-4289	867-975-6445

Environment Canada	**Telephone**	**Fax**
EA-North – Environment Protection Operations (EPO), Iqaluit	867-975-4631	867-975-4645
Paula Smith, EA Coordinator, Iqaluit	867-975-4631	
Allison Dunn, Senior EA Coordinator, Iqaluit	867-975-4639	
Carey Ogilvie, Head, EA-North, EPO, Yellowknife	867-669-4737	
Ron Bujold, EA Officer, EPO, Yellowknife	867-669-4744	867-873-8185

Department of Fisheries and Oceans		
Eastern Arctic Area, Iqaluit	867-979-8000	867-979-8039
Lyndon Kivi, Senior Habitat Biologist	807-468-6441 ext. 29	807-468-6973

Derrick Moggy, Habitat Team Leader, Eastern Arctic	705-522-9909	

Others

Kitikmeot Inuit Association, Kugluktuk	867-982-3310	867-982-3311
Kugluktuk Hunters and Trappers Association	867-982-4908	867-982-4047

Regardless of the size of the spill, a Spill Report Form (Appendix 2) will be completed, with the original retained at site, and a copied delivered to:

Environmental Manager	Sharleen Hamm
General Administration	Karyn Lewis

After the spill has been reported to management, and the assessment is complete, then remedial action by a response team composed of employees and contractors, coordinated by the Camp Manager, Exploration Manager or Environmental Manager will commence according to the appropriate action plan.

4 Spill Response Resources

A wide variety of spill control/recovery equipment and materials for dealing with spills, as illustrated on

Figure 1 Location Map, Lupin Mine.

4.1 Response Equipment

All equipment is stored in such a manner as to be readily available on short notice.

Table 1 Spill Response Equipment List

#	Equipment		
3	FORD	F350	CREW CAB 4X4
1	FORD	F250	EXT CAB 4X4
1	GMC	K2500	SUBURBAN
1	GMC	K1500	SUBURBAN
1	FORD	L9000	TANDEM DECK
1	FORD	F350	REG CAB DRW 4X4
1	FORD	F700	SERVICE TRUCK
1	VOLVO	5350B	ROCK TRUCK 6X6
1	KOMATSU	HM 300	ROCK TRUCK 6X6
1	KOMATSU	WA250 PT	LOADER
1	KOMATSU	WA250	LOADER
1	CATERPILLAR	966 G	LOADER
1	CATERPILLAR	966 C	LOADER
1	KOMATSU	PC 200-7	EXCAVATOR
1	CASE	580 C	BACK HOE
1	KOMATSU	D61 EX 15	DOZER W/RIPPER
1	JOHN DEERE	350	DOZER
1	CATERPILLAR	14 H	GRADER
1	GROVE	RT 522	20 TON R/T CRANE
1	JLG		MAN LIFT

Emergency spill containment and recovery materials and supplies are available for immediate mobilization at any time. Spill kits include:

- Small Kits (5 gal)
  - 1 pair of safety goggles;
  - 1 pair nitrile gloves;

- 1 disposal bag;
- 10 sorbent pads; and
- 2 sorbent socks.

- Large Kit (45 gal)
  - 50 sorbent pads;
  - 3 5x120” sorbent booms;
  - 5 3x48” sorbent socks;
  - 1 20 lb bag of granular absorbent;
  - 1 neoprene drain cover;
  - 5 disposal bags;
  - 1 shovel;
  - 2 pairs of safety goggles;
  - 2 pairs of nitrile gloves; and
  - 2 Tyvex suits.
- Emergency Spill Shack
  - pick axes;
  - shovels;
  - torches;
  - hoses;
  - containers (clean, open barrels with handles);
  - industrial absorbent (60 ft^3);
  - oil sorb towels; and
  - flotation booms.

4.2 Response Team

The spill response team, assembled by the Camp Manager or Exploration Manager, will be composed of employees and contractors.

5 Petroleum and Chemical Products

5.1 Response Information

The measures outlined in the response plans intend to minimize the potential impact to water and land following a petroleum or chemical spill. The immediate action is to preserve health and limit environmental damage. The Plans deal with the procedures/methods of spill containment, termination, remedial measures and clean-up of spills related to those products used during the exploration program.

5.1.1 Spill Containment, Recovery and Disposal

A spill could occur in one or a combination of the following areas: on land, snow, ice or in the water. Various proven practical methods of containment and recovery are well documented for use in northern climates; these are summarized below. For additional technical information, consult the Environment Canada Report *EPS 9/SP/2*, December 1986 and the *Field Guide for Oil Spill Response in Arctic Waters*, Environment Canada (1998).

The initial action is to prevent any direct health risk to response personnel. Persons not directly associated with the clean-up operations are to be directed to leave the immediate area. The area will be isolated and limited to traffic as directed by the response team.

Containment on Land

The greatest potential for the possibility for a spill on land is related to refueling the drill rig and heaters at the drill sites. All petroleum and hazardous waste products in the camp area are held within lined and bermed containment areas.

Petroleum products spilling onto snow covered ground may be contained by the construction of snow dykes. For fast initial containment of smaller spills, the dykes can be built manually with shovels. Larger spills may require the use of heavy equipment such as graders and bulldozers.

The impermeability of dykes may be ensured by lining with a polyethylene liner, plastic tarpaulin or similar synthetic material. Alternatively, in freezing temperatures, water may be sprayed or poured over the dykes to further enhance the barrier to the spilled material. This method assumes that water is available or may be accessed from the spill site. Synthetically lined dykes are more effective than just snow or snow and ice-lined dykes.

During warmer months, containment dykes may be constructed from sand or gravel if these materials are available in an unfrozen form. Again, for smaller spills, the dykes can be fashioned manually with shovels where for larger spills, trucks or other heavy equipment (front-end loaders) will normally be required to transport and handle sand and gravel.

Trenching or ditching can be used as a method for containing and/or intercepting the flow of liquid spills on land. Ice, snow, loose sand, gravel and surface layers of organic material can usually be scraped or dug away until the underlying frozen substrate is reached. This can be effective in re-directing flow or simple containment prior to pumping or absorbing the spilled material. Trenching in solid frozen ground or rocky substrate is normally neither practical nor possible.

Containment on Snow

Containment on snow is readily achieved and is very effective due to its absorbent quality. Liquid spills will become immobile within the snow pack and easily removed for transport for recovery or disposal. Snow is readily fashioned into dykes or dams. Whenever possible, the snow pack should be left in place to avoid contaminating the underlying substrate.

Containment on Ice

Spills that occur on ice, from either direct spillage or migration to the ice, are greatly affected by the strength of the ice. If the spill does not penetrate the ice, and the ice is safe to work on, then the methods of containment are similar to that on land. Where the spill has penetrated the ice, the situation should be handled similar to that on open water. If, as in petroleum spills, the material floats, then every effort should focus on the recovery of the material using pumping/suction methods, and absorbents.

Containment on Open Water

A spill occurring on or into open water is very difficult to contain and every effort should be made to prevent the material from entering the water. If in the case of petroleum products, the material floats, then immediate deployment of surface booms should take place to control the spread of material. Pumping is the method of choice for removal of contained material.

5.1.2 Recovery

Spilled petroleum products contained within a dyked or trenched area should be recovered by pumping into a standby tanker, portable storage tank or drums dependent on volume involved, or use of an independent vacuum truck. Pump and suction hoses should be screened to prevent snow, ice or debris from clogging the line or pump.

Any remaining material may be absorbed by use of a variety of natural and commercially available products, such as 3M brand Conweb and Phase III brand Oil Sponge Remedial.

The availability of shovels, rakes and pitchforks are invaluable in any spill clean-up and recovery operation. The use of heavy equipment for larger spill situations such as front-end loaders and haul

trucks, make the removal of material easier. It also ensures that all materials, including absorbent sand, snow, etc. have been removed from the spill site.

5.1.3 Disposal

Petroleum products such as oil that has been recovered by pumping into portable tanks, drums or a standby tanker can often be reclaimed and reused. Water and debris can be separated from the pure fuel by gravimetric means in a tank. In this manner disposal can be minimized and financial losses reduced.

In-situ combustion may be used as a final means of disposal after every effort has been made to remove the spilled fuel/oil. Approval for burning of petroleum products must be obtained prior to combustion. Burning should never be carried out on land where combustible organics are present and the oil has migrated into the soil. Removal is the method of choice in this case.

The most efficient means of igniting diesel oil for in-situ combustion is with a large size portable propane torch. Other highly flammable products such as gasoline or alcohol, or combustible products, such as wood may also be used to promote ignition of the spilled product. Spilled oil should be ignited where it has pooled naturally or been contained by dykes, trenches or depressions. Oil which has collected in slots in river ice may also be disposed of by in-situ combustion if sufficient holes are drilled in the ice (but not through to the water). Once holes are drilled, the oil which collects in the holes may be ignited.

Liquid oil wastes (which cannot be reclaimed), debris and oil residues left after in-situ combustion will be contained and disposed of off-site at an approved waste receiving facility.

Spilled chemical products will be recovered and reused wherever possible. Materials unable to be used will be collected and stored in containers and shipped off site for disposal, accompanied by an appropriate Waste Manifest.

5.1.4 Other Concerns

Oil-soaked Snow

In the event that an oil/petroleum spill occurs during the winter, impacted snow will be collected and contained as outlined above in section 5.1.1. In the event that large quantities of snow become oil soaked, the appropriate heavy equipment will be used to collect, transport and re-locate the material to the main fuel tank farm or another lined and bermed containment area. Where deemed necessary, the oil impacted snow will be covered to mitigate the potential for wind blown dispersion. In most cases, oil soaked snow would be allowed to melt, and the oil content would be pumped into separate containers and/or collected using hydrophobic oil absorbent materials, Once contained, impacted snow can be disposed of as per methodologies outlined on the appropriate spill contingency action sheet(s).

Fire

In the event that the accident/incident is in combination with a fire, extinguishing the fire may be required prior to initiating efforts to stop the spillage.

In order to control the resulting runoff (in cases where water is used), and the subsequent spreading of the spilled material, any indication of slope away from the area of the spill should be dyked for containment.

Petroleum and chemical fires have the potential to generate toxic fumes under poor combustion conditions. Approaching and dealing with any fire from upwind is recommended as well as caution with regard to breathing the vapours generated from the fire. Appropriate personal protective equipment (PPE) will be worn at all times.

Fuel Tank Farms

In the event of any emergency at the tank farms relating to fire, flooding or spills, all electrical power shall be shut off as quickly as possible within the tank farm area to minimize further damage. For the STF, this procedure can be initiated through the powerhouse and electrical departments. There is currently no power to the MTF.

5.2 Detailed Response Plans

The following section contains the response plans for spills of material known to currently be present and accessible on site that will be used during care and maintenance activities at the Lupin Mine. As mentioned previously, a current, comprehensive list of materials present on site is not available. IN 2012, LMI plans to conduct a materials inventory and will update this accordingly.

Detailed response plans for each of the materials listed in previous sections are provided in the tables below.

Table 2 Detailed Response Plan for Diesel Fuel

24 HOUR SPILL REPORT LINE	(867) 920-8130
INITIAL SPILL RESPONSE	• The Camp Manager, Exploration Manager, or Environmental Manager shall be informed of the incident and the response team action initiated. Spill reported via 24 hour emergency spill line, above; • Use proper PPE • STOP the flow of diesel fuel if possible; • ELIMINATE open flame ignition sources; • CONTAIN flow of oil by dyking, barricading or blocking flow by any means available. Use earth-moving equipment if nearby; • If flow has reached flowing natural stream, mobilize team to deploy river boom, skimmer and absorbent booms. • A detailed spill report shall be submitted
HAZARDS	• Slightly toxic by ingestion, highly toxic if aspirated, drying of skin on contact; • Flammable, treat as combustible. • Contains BTEX, known human carcinogens.
ACTION FOR FIRE	• Use CO_2, dry chemical, foam or water spray (fog), although water may spread the fire; • Use fog streams to protect rescue team and trapped people; • Use water to cool surface of tanks; • Divert the diesel fuel to an open area and let it burn off under control; • If the fire is put out before all diesel fuel is consumed, beware of re-ignition; • Where diesel fuel is running downhill, try to contain it as quickly as possible; • Rubber tires are almost impossible to extinguish after involvement with a fire. Have vehicles with burning tires removed from the danger area.
RECOVERY	• Recovered soils from contaminated fuel can be soaked up by sand and peat moss or snow if available, by natural products such as Phase III Oil Sponge Remedial, or by synthetic absorbents such as 3M Brand, Graboil or Conwed; • If necessary, contaminated soil should be excavated; • Diesel fuel entering the ground can be recovered by digging sumps or trenches; • Diesel fuel on a water surface should be recovered by skimmers and absorbent booms.
DISPOSAL	• Incineration under controlled conditions; obtain prior approval. • Dispose of offsite at an approved facility.
PROPERTIES	• Chemical composition: mixture of hydrocarbons in the range C_9 to C_{18}; • Clear to yellow, bright oily liquid with hydrocarbon odour; • Mostly insoluble, floats on water.
ENVIRONMENTAL CONCERNS	• BTEX components toxic to fish and other aquatic organisms; • Harmful to waterfowl; • May create unsightly film on water.
CONTAINERS	• Storage tanks and day tanks.

Table 3 Detailed Response Plan for Jet A fuel and Gasoline

24 HOUR SPILL REPORT LINE	(867) 920-8130
INITIAL SPILL RESPONSE	• The Camp Manager, Exploration Manager, or Environmental Manager shall be informed of the incident and the response team action initiated. Spill reported via 24 hour emergency spill line, above; • Use proper PPE • STOP the flow of fuel if possible; • ELIMINATE all possible sources of IGNITION, eg. extinguish cigarettes, shut off motors (from a remote location if surrounded by vapours); • EVACUATE personnel from danger area; • CAREFULLY CONSIDER the hazards and merits of trying to contain the spill. Contain only if safe to do so, and obvious benefit of containment is apparent (ie. contain if flowing towards a creek or water body). Only if every effort is made to contain gasoline, or other considered approaches not feasible, is evaporation a suitable course of management. Allowing gasoline to evaporate required prior approval from appropriate authorities. • If spilled in an enclosed area, VENTILATE vapours. • A detailed spill report shall be submitted
HAZARDS	• EXTREME FIRE HAZARD, highly flammable; • Forms explosive mixture with air; is heavier than air and can migrate considerable distances to sources of ignition and flashback; • Easily ignited by flame or spark; • Avoid contact with oxidizing materials (eg. Lead Nitrate, acids); • Moderately toxic by ingestion, highly toxic if aspirated. • Contains a small amount of Benzene which is a suspect human carcinogen.
ACTION FOR FIRE	• Use CO_2, dry chemical, foam or water spray (fog), although water may spread the fire; • Use jet streams to wash away burning gasoline; • Use fog streams to protect rescue team and trapped people; • Use water to cool surface of tanks; • Divert to an open area and let it burn off under control; • If the fire is put out before all fuel is consumed, beware of re-ignition; • Where fuel is running downhill, try to contain it at the bottom prior to reaching lakes or streams; • Rubber tires are almost impossible to extinguish after involvement with a fire. Have vehicles with burning tires removed from the danger area.
RECOVERY	• Unburned fuel can be soaked up by sand and peat moss and snow when available, or by synthetic absorbents such as 3M Brand, Graboil or Conwed; • If necessary, contaminated soil should be excavated; • Fuel entering the ground can be recovered by digging sumps or trenches.
DISPOSAL	• Evaporation; • Incineration under controlled conditions; obtain prior approval. • Dispose of offsite at an approved facility.
PROPERTIES	• Chemical composition: mixture of hydrocarbons; Gasoline C_4-C_{12}, Jet A C_9-C_{16} • Light green, clear, amber coloured liquids; • Volatile; • Not soluble, floats on water
ENVIRONMENTAL CONCERNS	• Moderately toxic to fish and other aquatic organisms; • May create unsightly film on water.
CONTAINERS	• Tank at MTF. Drum shipping and storage is in limited quantities.

Table 4 Detailed Response Plan for Lubricating and Hydraulic Oils

24 HOUR SPILL REPORT LINE	(867) 920-8130
INITIAL SPILL RESPONSE	• The Camp Manager, Exploration Manager or Environmental Manager shall be informed of the incident and the response team action initiated. Spill reported via 24 hour emergency spill line, above; • Use proper PPE • STOP the flow of oil if possible; • ELIMINATE open flame ignition sources; • CONTAIN flow of oil by dyking, barricading or blocking flow by any means available. Use earth-moving equipment if nearby; • A detailed spill report shall be submitted
HAZARDS	• Low toxicity by ingestion, mildly irritating to eyes • Combustible, low fire hazard; • Avoid contact with oxidizing materials (eg. Lead Nitrate, acids).
ACTION FOR FIRE	• Use CO_2, dry chemical, foam or water spray (fog), although water may spread the fire; • Use fog streams to protect rescue team and trapped people; • Use water to cool surface fire exposed containers; • Divert the oil to an open area and let it burn off under control; • If the fire is put out before all oil is consumed, beware of re-ignition; • Rubber tires are almost impossible to extinguish after involvement with a fire. Have vehicles with • Burning tires removed from the danger area.
RECOVERY	• After containment, recover as much oil as possible by pumping into drums; • Residual oil may be burned in-situ, upon approval; • Remaining unburned oil can be soaked up by sand, peat moss and snow when available, or by synthetic absorbents such as 3M Brand, Graboil or Conwed; • If necessary, contaminated soil should be excavated; • Oil on a water surface should be recovered by skimmers and absorbent booms.
DISPOSAL	• Incineration under controlled conditions, prior approval required; • Ship to offsite to an approved facility
PROPERTIES	• Chemical composition: mixture of hydrocarbons and conventional industrial oil additives; C_{20}-C_{66} • Generally viscous liquids, light to dark amber colours; • Not soluble, floats on water.
ENVIRONMENTAL CONCERNS	• Moderately toxic to fish and other aquatic organisms; • Harmful to waterfowl; • May create unsightly film on water and shorelines.
CONTAINERS	• Transported and stored in steel drums or cubes (these are self-contained units with an 8 drum capacity)

Table 5 Response Plan for Ethylene Glycol Spill

24 HOUR SPILL REPORT LINE	(867) 920-8130
INITIAL SPILL RESPONSE	• The Camp Manager, Exploration Manager, or Environmental Manager shall be informed of the incident and the response team action initiated. Spill reported via 24 hour emergency spill line, above; • Use proper PPE • STOP the flow of Antifreeze at source if possible; • ELIMINATE open flame ignition sources; • CONTAIN flow of liquid by dyking, barricading or blocking flow by any means available; • PREVENT antifreeze from entering any flowing streams. • A detailed spill report shall be submitted
HAZARDS	• Inhalation of mist may cause irritation of nose, throat and headache; • Moderately toxic by ingestion, can be fatal; • Avoid contact with strong oxidizing agents • Flammable, decomposition products include carbon dioxide and/or carbon monoxide.
ACTION FOR FIRE	• Use alcohol type or all purpose foam for large fires; CO_2, dry chemical or water spray (fog) for small fires. Do not force solid streams into the burning liquid.
RECOVERY	• Ethylene glycol antifreeze can be soaked up by peat moss or snow when available, or by synthetic absorbents such as Hazorb; • Small spills may be washed with copious amounts of water for dilution; • Access to spilled or recovered ethylene glycol by mammals should be prevented.
DISPOSAL	• Only incinerate in a furnace under controlled conditions where approved by appropriate federal, provincial and local regulations; • Ship to offsite to an approved facility
PROPERTIES	• Chemical composition: 96% ethylene glycol ($C_2H_6O_2$) • 4% water and rust inhibitors • Clear, syrupy liquid normally contains a dye for identification in water sources; • 100% soluble in water; • Flammable.
ENVIRONMENTAL THREAT	• Low to moderate toxicity for fish and other aquatic organisms; • Attractive smell and taste to some mammals, and toxic by ingestion.
CONTAINERS	• Storage tanks.
SUPPLIER	• DOW Chemical of Canada Ltd., Van Waters & Rogers Ltd.

Table 6 Response Plan for Lime Spill

24 HOUR SPILL REPORT LINE	(867) 920-8130
INITIAL SPILL RESPONSE	• The Development Manager or designate shall be informed of the incident and the response team action initiated. Spill reported via 24 hour emergency spill line, above; • Use proper PPE for respiratory protection and body (coveralls, face shield, rubber gloves) when dust is anticipated as a hazard; • STOP spill of lime/lime slurry at source if possible; • PREVENT hydrated lime from contacting water; • If lime does contact water, contain solution to as small an area as possible. • A detailed spill report shall be submitted
HAZARDS	• Dry chemical prone to dusting • Skin irritant and mild burns - alkaline; dusts and mists may cause irritation of eyes, mouth, nose throat and possibly lungs; • Unslaked lime (CaO) reacts with water to form hydrated lime, releasing heat.
ACTION FOR FIRE	• No special precautions; • Use extinguishing media appropriate for surrounding fires.
RECOVERY	• Spills of hydrated lime on dry surfaces can simply be shoveled into containers and re-used if appropriate; • Spills of lime on wet surfaces or exposed to rain should be shoveled into waterproof containers as soon as possible to minimize the quantity of lime being dissolved; • Pump liquids into containers and use sorbets to contain and recover spilled solutions.
DISPOSAL	• Hydrated lime and all lime solutions should be disposed of in Cell 4 or Pond 1.
PROPERTIES	• Chemical formula $Ca(OH)_2$; • Unslaked lime (pebble lime, CaO) also used which is not hydrated, therefore reacts with water to form slaked lime; • White or white/grey solid, crystalline powder, odourless; • Strong alkaline; • Slightly soluble in water, less than 1%.
ENVIRONMENTAL CONCERNS	• Toxic to fish and other aquatic life at higher concentrations in the order of 50 mg/l and greater.
CONTAINERS	• Transported and stored in lined paper bags (25 kg) which are palletised and double stretch wrapped (54 bags/pallet);
SUPPLIER	• Continental Lime

Table 7 Response Plan for Propane Leak

24 HOUR SPILL REPORT LINE	(867) 920-8130
INITIAL SPILL RESPONSE	• The Camp Manager, Exploration Manager or Environmental shall be informed of the incident and the response team action initiated. Spill reported via 24 hour emergency spill line, above; • Use proper PPE • STOP propane leak at source if possible; • MAINTAIN ventilhation • PREVENT propane from contacting heat or fire; remove sources of ignition (non-intrinsically safe devices) • If propane does contact an ignitions source, retreat to safety, fight fire, maintain ventilation • A detailed spill report shall be submitted
HAZARDS	• Extremely flammable, high pressure gas • If in a fire or heated, pressure increase will occur and the container may explode • Vapours are heavier than air, so may travel and cause backflash • At high concentrations, can displace oxygen and cause asphyxiation • Contact with rapidly expanding gas may cause burns or frostbite • Likely route of exposure is inhalation or dermal contact
ACTION FOR FIRE	• Move containers from fire area, if this can be done safely • Utilize fire extinguishers • Apply water spray to keep exposed containers cool • If none of these can be done safely, then retreat and let fire burn. Fight fire from a protected area/safe distance
RECOVERY	• N/A
DISPOSAL	• N/A
PROPERTIES	• Colourless, odourless, volatile, flamable gas
ENVIRONMENTAL CONCERNS	• Sludges and tank scale may contain NORMs. Empty containers should be returned to supplier for proper handling and disposal • May release CO_2 and smoke when heated
CONTAINERS	• Pressurized canisters
SUPPLIER	• Superior Propane, Yellowknife

6 Systems Components Failures

The following section contains the response plans for the major System Components of the mine site at the Lupin Mine.

6.1 System Components

The mill tailings line, paste backfill system, mine water discharge lines and sewage discharge lines are no longer in service. As such, response plans to deal with these systems have been omitted from the Plan. If they are put back in service at some future point, a revision to the Plan will be submitted. The following system components remain in place:

- Mill Tailings Containment (Retaining Dams); and
- Sewage Disposal Facility (dams only; pipeline is not in use).

6.1.1 Tailings Containment Engineering Failure

Originally, all waste was to be contained within the TCA. As mine capacity increased, it became necessary to expand the TCA and discharge effluent. Currently, waste is not being deposited into the TCA; however effluent discharge occurs as needed (typically every 2-3 years).

Historically, the tailings slurry was pumped from the mill to one of two solids retention cells (Cell 3 or Cell 5), where the solids settled. Each spring, usually beginning in late June, the build-up of meltwater and tailings water was decanted from Cells 5 and 3 into Cell 4. Water was held in this cell for a one-year period, where cyanide undergoes natural degradation due to exposure to sunlight, air, and agitation by wind action. The following year, water was released from Cell 4, through a gated culvert, into Pond 1, where it was held for a further one-year period, before being siphoned into Pond 2. If necessary, the water was treated with ferric-sulphate during the siphoning process to precipitate arsenic in Pond 2. More recently, lime has been added to Pond 1 to control pH levels prior to discharge. Depending on the water level and water quality in Pond 2, water can be released to the environment after 15 July, annually.

6.1.2 Sewage System Failure (Dams)

The sewage system is contained by two (2) low dams and natural relief. The system operates as a ‘closed system’ from October to June (i.e. no discharge of effluent from the lakes). Camp discharge enters the upper lake.

Any seepage from the upper lake would report to the lower lake and be addressed to prevent any structural damage to the dam itself. Seepage from the lower lake would be contained by construction of a catchment basin and, if water quality did not meet Water Licence limits, the solution would be pumped back into the lower lake.

Appropriate response team action would have repairs completed to the satisfaction of management and the system returned to the upper lake within a reasonable time frame.

Table 8 Detailed Response Plan for Tailings Containment Engineering Failure

24 HOUR SPILL REPORT LINE	(867) 920-8130
INITIAL SPILL RESPONSE	• Notify Camp Manager, Exploration Manager or Environmental Manager (or designate) immediately via radio, phone or in person; • The response team action shall be initiated. Spill reported via 24 hour emergency spill line, above; • Use proper PPE; • Any of the tailings containment area 'Cells' can be dewatered to Pond No.1 in the event flow cannot be controlled at the failure site. • If the tailings solution approaches a flowing natural stream, mobilize team to contain tailings solution from entering stream. Contact should be made with AANDC Water Resources and Environment Canada, Department of Fisheries and Oceans for further direction. • A detailed spill report shall be submitted
HAZARDS	• The mill tailings contained chemicals used in the process and must be handled with these taken into account. The material would have been diluted with raw water during the care & maintenance period and should not be a hazard. Samples will be taken to check this assumption.
ACTION FOR FIRE	• Non-flammable
RECOVERY	• Ground contamination; any tailings solids that have escaped from the containment areas onto surrounding tundra shall be removed and disposed of at the tailings containment area; • Solutions, where contained shall be pumped back into the tailings containment area; • If required, esker material and/or crushed wasted rock shall be used to fill any depressions left after excavation of the spill material. • Water contamination; these areas are difficult to mitigate as movement of contaminated material (and water) may continue long after initial incident; • Local authorities should be contacted regarding advice for cleanup or additional work to be carried out.
DISPOSAL	• Contaminated materials are to be disposed of at the Tailings Containment in the un-reclaimed tailings cell or solutions pumped directly to Pond No.1.
PROPERTIES	• The mill tailings contained a mixture of mill reagents and finely ground rock which has had the precious metal content removed. Reagents used included sodium cyanide, lime, lead nitrate, zinc metal and flocculent; • Appearance is of dark grey solids suspended in a clear water base solution
ENVIRONMENTAL CONCERNS	• Solution might be mildly harmful to fish, other aquatic organisms and wildlife; • Might be mildly harmful to waterfowl; • Solids portion known to generate acid through oxidation processes if left exposed to weathering and open environment.
CONTAINERS	• N/A
SUPPLIER	• N/A

Table 9 Response Plan for Sewage System Failure

24 HOUR SPILL REPORT LINE	(867) 920-8130
INITIAL SPILL RESPONSE	• Notify Camp Manager, Exploration Manager, or Environmental Manager immediately via radio, phone or in person; • Use proper PPE • The response team action initiated. Spill reported via 24 hour emergency spill line, above; • Seepage from the second sewage lake will be contained within a constructed catchment basin, checked for water quality and pumped back to the containment if water quality is not consistent with Water Licence requirements. Seepage from the first sewage lake to the second lake will be monitored for water quality during repair activities. • A detailed spill report shall be submitted
HAZARDS	• The sewage stream from the site contains grey water from all sources (drys, all accommodation and shower facilities, kitchen and all washroom facilities on site. • There are no chemicals used in the process; • Due to the nature of the source, health risks are associated with bacterial infections and disease that may be transmitted through exposure.
ACTION FOR FIRE	• Non-flammable
RECOVERY	• Ground contamination; any sewage material that has escaped from the containment areas onto surrounding tundra shall be removed, where possible and disposed of within the sewage lake or buried with esker if necessary; • If required, esker material and/or crushed wasted rock shall be used to fill any depressions left after excavation of the spill material. • Solutions, where contained shall be pumped back into the sewage lakes containment; • Water contamination; these areas are difficult to mitigate as movement of contaminated material (and water) may continue long after the initial incident; • Local authorities should be contacted regarding advice for cleanup or additional work to be carried out. AANDC Water Resources, Env. Can., Dept. of Fisheries and Oceans.
DISPOSAL	• Contaminated materials are to be stored until disposal within the repaired sewage lakes containment system is possible.
PROPERTIES	• The mine site sewage system contains a mixture of camp waters including camp drys, accommodation washroom facilities and kitchen. • Water accounts for greater than 90% of the component which is used during day to day activities; • The remainder is organic solids which readily settle in the disposal system.
ENVIRONMENTAL CONCERNS	• Solution only mildly toxic to fish and other aquatic organisms due to the low dissolved oxygen that may occur at certain times of the year; • Effluents could contain minor amounts of nutrients (nitrogen components) that may promote plant growth in downstream water bodies.
CONTAINERS	• N/A
SUPPLIER	• N/A

Appendices

Appendix 1 Reportable Spill Quantities

TDG Class	Substance for NWT 24 Hour Spill Line	Immediately Reportable Quantities
1 2.3 2.4 6.2 7 None	Explosives Compressed gas (toxic) Compressed gas (corrosive) Infectious substances Radioactive Unknown substance	Any amount
2.1 2.2	Compressed gas (flammable) Compressed gas (non-corrosive, non-flammable)	Any amount of gas from containers with a capacity greater than 100 L
3.1 3.2 3.3	Flammable liquids	> 100 L
4.1 4.2 4.3	Flammable solids Spontaneously combustible solids Water reactant	> 25 kg
5.1 9.1	Oxidizing substances Miscellaneous products or substances excluding PCB mixtures	> 50 L or 50 kg
5.2 9.2	Organic peroxides Environmentally hazardous	> 1 L or 1 kg
6.1 8 9.3	Poisonous substances Corrosive substances Dangerous wastes	> 5 L or 5 kg
9.1	PCB mixtures of 5 or more ppm	> 0.5 L or 0.5 kg
None	Other contaminants (e.g. crude oil, drilling fluid, produced water, waste or spent chemicals, used or waste oil, vehicle fluids, waste water, etc.)	> 100 L or 100 kg
None	Sour natural gas (i.e. contains H2S) Sweet natural gas	Uncontrolled release or sustained flow of 10 minutes or more

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

Appendix 2 Spill Reporting Form

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

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

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			

Appendix 3 Material Safety Data Sheets

The following Material Safety Data Sheets (MSDS) are provided herein:

- Diesel Fuel
- Jet A Fuel
- Gasoline
- Lubricating and Hydraulic oils (Ralube 40 CF, Duron)
- Ethylene Glycol (Antifreeze)
- Lime (CaO, $Ca(OH)_2$)
- Propane

Material Safety Data Sheet

DIESEL FUEL

1 . Product and company identification

Product name : DIESEL FUEL

Synonym : Seasonal Diesel, #1 Diesel, #2 Heating Oil, #1 Heating Oil, D50, D60, P40, P50, Arctic Diesel, Farm Diesel, Marine Diesel, Low Sulphur Diesel, LSD, Ultra Low Sulphur Diesel, ULSD, Mining Diesel, Naval Distillate, Dyed Diesel, Marked Diesel, Coloured Diesel, Furnace special, Biodiesel blend, B1, B2, B5, Diesel Low Cloud (LC).

Code : W104, W293; SAP: 120, 121, 122, 125, 126, 129, 130, 135, 287, 288

Material uses : Diesel fuels are distillate fuels suitable for use in high and medium speed internal combustion engines of the compression ignition type. Mining Diesel has a higher flash point requirement, for safe use in underground mines.

Manufacturer : PETRO-CANADA
P.O. Box 2844
150 – 6th Avenue South-West
Calgary, Alberta
T2P 3E3

In case of emergency : Petro-Canada: 403-296-3000
Canutec Transportation: 613-996-6666
Poison Control Centre: Consult local telephone directory for emergency number(s).

2 . Hazards identification

Physical state : Bright oily liquid.

Odour : Mild petroleum oil like.

WHMIS (Canada) :

Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

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

Emergency overview : WARNING!

COMBUSTIBLE LIQUID AND VAPOUR. CAUSES EYE AND SKIN IRRITATION.

Combustible liquid. Severely irritating to the skin. Irritating to eyes. Keep away from heat, sparks and flame. Do not get in eyes. Avoid breathing vapour or mist. Avoid contact with skin and clothing. Use only with adequate ventilation. Wash thoroughly after handling.

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation : Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.

Ingestion : Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract.

Skin : Severely irritating to the skin.

Eyes : Irritating to eyes.

Potential chronic health effects

Chronic effects : No known significant effects or critical hazards.

Carcinogenicity : Diesel engine exhaust particulate is probably carcinogenic to humans (IARC Group 2A).

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

2 . Hazards identification

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Medical conditions aggravated by over-exposure : Avoid prolonged or repeated skin contact to diesel fuels which can lead to dermal irritation and may be associated with an increased risk of skin cancer.

See toxicological information (section 11)

3 . Composition/information on ingredients

Name	CAS number	%
Kerosine (petroleum), hydrodesulfurized / Fuels, diesel / Fuel Oil No. 2	64742-81-0 / 68334-30-5 / 68476-30-2	95 - 100
Fatty acids methyl esters	61788-61-2 / 67784-80-9 / 73891-99-3	0 - 5

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

4 . First-aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

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

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

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

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

5 . Fire-fighting measures

Flammability of the product : Combustible liquid

Extinguishing media

Suitable : Use dry chemical, CO_2, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Products of combustion : Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), sulphur compounds (H2S), smoke and irritating vapours as products of incomplete combustion.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

5 . Fire-fighting measures

Special remarks on fire hazards : Flammable in presence of open flames, sparks and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. This product can accumulate static charge and ignite.

Special remarks on explosion hazards : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Runoff to sewer may create fire or explosion hazard.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

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

Methods for cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapour or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by earthing and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination. Ensure the storage containers are grounded/bonded.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Kerosine (petroleum), hydrodesulfurized	**ACGIH TLV (United States). Absorbed through skin.** TWA: 200 mg/m³ 8 hour(s).
Fuels, diesel	**ACGIH TLV (United States). Absorbed through skin.** TWA: 100 mg/m³, (Inhalable fraction and vapour) 8 hour(s).
Fuel oil No. 2	**ACGIH TLV (United States). Absorbed through skin.** TWA: 100 mg/m³, (Inhalable fraction and vapour) 8 hour(s).

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

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

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

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended: nitrile, neoprene, polyvinyl alcohol (PVA), Viton. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

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

9 . Physical and chemical properties

Physical state : Bright oily liquid.

Flash point : Diesel fuel: Closed cup: ≥40°C (≥104°F)
Marine Diesel Fuel: Closed Cup: ≥60°C (≥140°F)
Mining Diesel: Closed Cup: ≥52°C (≥126°F)

Auto-ignition temperature : 225°C (437°F)

Flammable limits : Lower: 0.7%
Upper: 6%

Colour : Clear to yellow (This product may be dyed red for taxation purposes).

Odour : Mild petroleum oil like.

Odour threshold : Not available.

pH : Not available.

Boiling/condensation point : 150 to 371°C (302 to 699.8°F)

Melting/freezing point : Not available.

Relative density : 0.80 to 0.88 kg/L @ 15°C (59°F)

Vapour pressure : 1 kPa (7.5 mm Hg) @ 20°C (68ºF).

Vapour density : 4.5 [Air = 1]

Volatility : Semivolatile to volatile.

Evaporation rate : Not available.

Viscosity : Diesel fuel: 1.3 - 4.1 cSt @ 40°C (104°F)
Marine Diesel Fuel: 1.3 - 4.4 cSt @ 40°C (104°F)

Pour point : Not available.

Solubility : Insoluble in cold water, soluble in non-polar hydrocarbon solvents.

10 . Stability and reactivity

Chemical stability : The product is stable.

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

Materials to avoid : Reactive with oxidising agents and acids.

Hazardous decomposition products : May release COx, NOx, SOx, H2S, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Kerosine (petroleum), hydrodesulfurized	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
	LC50 Inhalation Vapour	Rat	>5000 mg/m³	4 hours
Fuels, diesel	LD50 Dermal	Mouse	24500 mg/kg	-
	LD50 Oral	Rat	7500 mg/kg	-
Fuel oil No. 2	LD50 Oral	Rat	12000 mg/kg	-

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Diesel engine exhaust particulate is probably carcinogenic to humans (IARC Group 2A).

11 . Toxicological information

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Kerosine (petroleum), hydrodesulfurized	A3	-	-	-	-	-
Fuels, diesel	A3	3	-	-	-	-
Fuel oil No. 2	A3	3	-	-	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1202	DIESEL FUEL	3	III		-
DOT Classification	Not available.	Not available.	Not available.	-		-

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Combustible liquid
Irritating material

Canada

WHMIS (Canada) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

15 . Regulatory information

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.

International regulations

Canada inventory : All components are listed or exempted.

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

Europe inventory : All components are listed or exempted.

16 . Other information

Label requirements : COMBUSTIBLE LIQUID AND VAPOUR. CAUSES EYE AND SKIN IRRITATION.

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

Health	2
Flammability	2
Physical hazards	0
Personal protection	H

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

References : Available upon request.
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Date of printing : **7/6/2010.**

Date of issue : 6 July 2010

Date of previous issue : 7/3/2009.

Responsible name : **Product Safety - JDW**

Indicates information that has changed from previously issued version.

For Copy of (M)SDS : Internet: www.petro-canada.ca/msds

Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228

For Product Safety Information: (905) 804-4752

Notice to reader

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

Material Safety Data Sheet

JET A/A-1 AVIATION TURBINE FUEL

1 . Product and company identification

Product name : JET A/A-1 AVIATION TURBINE FUEL

Synonym : Jet A-1; Jet A-1-DI; Aviation Turbine Kerosene (ATK); JP-8; NATO F-34; Jet F-34; Turbine Fuel, Aviation, Kerosene Type (CAN/CGSB-3.32)

Code : W213, SAP: 149

Material uses : Used as aviation turbine fuel. May contain a fuel system icing inhibitor. In the arctic, Jet A-1 may also be used as diesel fuel and heating oil.

Manufacturer : PETRO-CANADA
P.O. Box 2844
150 – 6th Avenue South-West
Calgary, Alberta
T2P 3E3

In case of emergency : Petro-Canada: 403-296-3000
Canutec Transportation: 613-996-6666
Poison Control Centre: Consult local telephone directory for emergency number(s).

2 . Hazards identification

Physical state : Clear liquid.

Odour : Kerosene-like.

WHMIS (Canada) :

Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-2A: Material causing other toxic effects (Very toxic).

The WHMIS classification of Jet A/A-1 is B3.
The WHMIS classification of Jet A/A-1-DI, JP-8, Jet F-34 and NATO F-34, which all contain FSII (Diethylene Glycol Monomethyl Ether), is B3, D2A.

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

Emergency overview : COMBUSTIBLE LIQUID AND VAPOUR. MAY CAUSE EYE AND SKIN IRRITATION. POSSIBLE BIRTH DEFECT HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE BIRTH DEFECTS, BASED ON ANIMAL DATA.

Combustible liquid. Slightly irritating to the eyes and skin. Keep away from heat, sparks and flame. Avoid exposure - obtain special instructions before use. Do not breathe vapour or mist. Avoid contact with eyes, skin and clothing. Contains material which may cause birth defects, based on animal data. Avoid exposure during pregnancy. Use only with adequate ventilation. Wash thoroughly after handling.

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation : Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.

Ingestion : Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract.

Skin : Slightly irritating to the skin.

Eyes : Slightly irritating to the eyes.

Potential chronic health effects

Chronic effects : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

2 . Hazards identification

Teratogenicity : Contains material which may cause birth defects, based on animal data.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Medical conditions aggravated by over-exposure : Repeated skin exposure can produce local skin destruction or dermatitis.

See toxicological information (section 11)

3 . Composition/information on ingredients

Name	CAS number	%
Complex mixture of petroleum hydrocarbons (C9-C16)*(Kerosene)	8008-20-6	99.9
Fuel System Icing Inhibitor (FSII) (if added**): (Diethylene Glycol Monomethyl Ether)	111-77-3	0.1 - 0.15
Anti-static, antioxidant and metal deactivator additives	Not applicable	<0.1

*Aromatic content is 25% maximum (benzene: nil).
**Please note that Jet A-1-DI, JP-8, Jet F-34 and NATO F-34 all contain Fuel System Icing Inhibitor.

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

4 . First-aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

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

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

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

5 . Fire-fighting measures

Flammability of the product : Class II - combustible liquid (NFPA).

Extinguishing media

Suitable : Use dry chemical, CO_2, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Products of combustion : Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), smoke and irritating vapours as products of incomplete combustion.

5 . Fire-fighting measures

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Special remarks on fire hazards : Flammable in presence of open flames, sparks, and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. This product can accumulate static charge and ignite. May accumulate in confined spaces.

Special remarks on explosion hazards : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Containers may explode in heat of fire.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

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

Methods for cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Avoid exposure during pregnancy. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapour or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by earthing and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination. Ensure the storage containers are grounded/bonded.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Kerosene	**ACGIH TLV (United States).** TWA: 200 mg/m³

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

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

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

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended: polyvinyl alcohol (PVA), Viton. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

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

9 . Physical and chemical properties

Physical state : Clear liquid.

Flash point : Closed cup: ≥38°C (≥100.4°F) [Tag. Closed Cup]

Auto-ignition temperature : 210°C (410°F)

Flammable limits : Lower: 0.7%
Upper: 5%

Colour : Clear and colourless.

9 . Physical and chemical properties

Odour : Kerosene-like.

Odour threshold : Not available.

pH : Not available.

Boiling/condensation point : 140 to 300°C (284 to 572°F)

Melting/freezing point : Not available.

Relative density : 0.775 to 0.84 (Water=1)

Vapour pressure : 0.7 kPa (5.25 mm Hg) @ 20°C (68ºF).

Vapour density : 4.5 [Air = 1]

Volatility : Volatile.

Evaporation rate : Not available.

Viscosity : 1.0 - 1.9 cSt @ 40ºC (104ºF)

Pour point : <-51ºC (<-60°F)

Solubility : Insoluble in water. Partially miscible in some alcohols. Miscible with other petroleum solvents.

10 . Stability and reactivity

Chemical stability : The product is stable.

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

Materials to avoid : Reactive with oxidising agents, acids and alkalis.

Hazardous decomposition products : May release COx, NOx, SOx, aldehydes, acids, ketones, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Kerosene	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
	LC50 Inhalation Vapour	Rat	>5000 mg/m³	4 hours
Diethylene Glycol Monomethyl Ether	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	4000 mg/kg	-
	LC50 Inhalation Vapour	Rat	>50000 mg/m³	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Kerosene	A3	3	-	-	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

11 . Toxicological information

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1863	FUEL, AVIATION, TURBINE ENGINE	3	III		-
DOT Classification	Not available.	Not available.	Not available.	-		-

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Combustible liquid

Canada

WHMIS (Canada) : Class B-3: Combustible liquid with a flash point between 37.8°C (100°F) and 93.3°C (200°F).
Class D-2A: Material causing other toxic effects (Very toxic).

The WHMIS classification of Jet A/A-1 is B3.
The WHMIS classification of Jet A/A-1-DI, JP-8, Jet F-34 and NATO F-34, which all contain FSII (Diethylene Glycol Monomethyl Ether), is B3, D2A.

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.

International regulations

Canada inventory : All components are listed or exempted.

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

Europe inventory : All components are listed or exempted.

16 . Other information

Label requirements : COMBUSTIBLE LIQUID AND VAPOUR. MAY CAUSE EYE AND SKIN IRRITATION. POSSIBLE BIRTH DEFECT HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE BIRTH DEFECTS, BASED ON ANIMAL DATA.

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

Health	*	2
Flammability		2
Physical hazards		0
Personal protection		H

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

References : Available upon request.
TM/MC Marque de commerce de Petro-Canada - Trademark

Date of printing : **11/20/2009.**

Date of issue : 20 November 2009

Date of previous issue : No previous validation.

Responsible name : **Product Safety - DSR**

Indicates information that has changed from previously issued version.

For Copy of (M)SDS : Internet: www.petro-canada.ca/msds

Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228

For Product Safety Information: (905) 804-4752

Notice to reader

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

Material Safety Data Sheet

GASOLINE, UNLEADED

1 . Product and company identification

Product name : GASOLINE, UNLEADED

Synonym : Regular, Unleaded Gasoline (US Grade), Mid-Grade, Plus, Super, WinterGas, SummerGas, Supreme, SuperClean WinterGas, RegularClean, PlusClean, Premium, marked or dyed gasoline, TQRUL, transitional quality regular unleaded, BOB, Blendstock for Oxygenate Blending

Code : W102E, SAP: 102 to 117

Material uses : Unleaded gasoline is used in spark ignition engines including motor vehicles, inboard and outboard boat engines, small engines such as chain saws and lawn mowers, and recreational vehicles.

Manufacturer : PETRO-CANADA
P.O. Box 2844
150 – 6th Avenue South-West
Calgary, Alberta
T2P 3E3

In case of emergency : Petro-Canada: 403-296-3000
Canutec Transportation: 613-996-6666
Poison Control Centre: Consult local telephone directory for emergency number(s).

2 . Hazards identification

Physical state : Clear liquid.

Odour : Gasoline

WHMIS (Canada) :

Class B-2: Flammable liquid
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

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

Emergency overview : WARNING!

FLAMMABLE LIQUID AND VAPOUR. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. CONTAINS MATERIAL WHICH CAN CAUSE HERITABLE GENETIC EFFECTS.

Flammable liquid. Irritating to eyes, respiratory system and skin. Keep away from heat, sparks and flame. Avoid exposure - obtain special instructions before use. Do not breathe vapour or mist. Avoid contact with eyes, skin and clothing. Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure. Contains material which can cause heritable genetic effects. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation : Inhalation of this product may cause respiratory tract irritation. Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.

Ingestion : Ingestion of this product may cause gastro-intestinal irritation. Aspiration of this product may result in severe irritation or burns to the respiratory tract. Ingestion of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.

2 . Hazards identification

Skin : Irritating to skin.

Eyes : Irritating to eyes.

Potential chronic health effects

Chronic effects : This product contains an ingredient or ingredients, which have been shown to cause chronic toxic effects. Repeated or prolonged exposure to the substance can produce blood disorders.

Carcinogenicity : Contains material which can cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : Contains material which can cause heritable genetic effects.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Medical conditions aggravated by over-exposure : Repeated or prolonged contact with spray or mist may produce chronic eye irritation and severe skin irritation. Repeated skin exposure can produce local skin destruction or dermatitis.

See toxicological information (section 11)

3 . Composition/information on ingredients

Name	CAS number	%
Gasoline	86290-81-5	85-100
Ethanol	64-17-5	0.1-1
Benzene	71-43-2	0.5-1.5
Toluene	108-88-3	15-40*

**Montreal: may vary from 3-40%*
**Edmonton: may vary from 1-5%*

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

4 . First-aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

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

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

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

5 . Fire-fighting measures

Flammability of the product : Flammable liquid (NFPA) .

Extinguishing media

Suitable : Use dry chemical, CO_2, water spray (fog) or foam.

Not suitable : Do not use water jet.

Special exposure hazards : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Products of combustion : Carbon oxides (CO, CO2), nitrogen oxides (NOx), polynuclear aromatic hydrocarbons, phenols, aldehydes, ketones, smoke and irritating vapours as products of incomplete combustion.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Special remarks on fire hazards : Extremely flammable in presence of open flames, sparks, shocks, and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. Rapid escape of vapour may generate static charge causing ignition. May accumulate in confined spaces.

Special remarks on explosion hazards : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Containers may explode in heat of fire. Vapours may form explosive mixtures with air.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

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

Methods for cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapour or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical

7 . Handling and storage

(ventilating, lighting and material handling) equipment. Use non-sparking tools. Take precautionary measures against electrostatic discharges. To avoid fire or explosion, dissipate static electricity during transfer by earthing and bonding containers and equipment before transferring material. Empty containers retain product residue and can be hazardous. Do not reuse container.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination. Ensure the storage containers are grounded/bonded.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Gasoline	**ACGIH TLV (United States).** TWA: 300 ppm 8 hour(s). STEL: 500 ppm 15 minute(s).
Ethanol	**ACGIH TLV (United States).** STEL: 1000 ppm 15 minute(s).
Benzene	**ACGIH TLV (United States). Absorbed through skin.** TWA: 0.5 ppm 8 hour(s). STEL: 2.5 ppm 15 minute(s).
Toluene	**ACGIH TLV (United States).** TWA: 20 ppm 8 hour(s).

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

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

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

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: A NIOSH-approved air-purifying respirator with an organic vapour cartridge or canister may be permissible under certain circumstances where airborne concentrations are expected to exceed exposure limits. Protection provided by air-purifying respirators is limited. Use a positive-pressure, air-supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstances where air-purifying respirators may not provide adequate protection.

8 . Exposure controls/personal protection

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended: polyvinyl alcohol (PVA), Viton. Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

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

9 . Physical and chemical properties

Physical state : Clear liquid.

Flash point : Closed cup: -50 to -38°C (-58 to -36.4°F) [Tagliabue.]

Auto-ignition temperature : 257°C (494.6°F) (NFPA)

Flammable limits : Lower: 1.3% (NFPA)
Upper: 7.6% (NFPA)

Colour : Clear to slightly yellow or green, undyed liquid. May be dyed red for taxation purposes.

Odour : Gasoline

Odour threshold : Not available.

pH : Not available.

Boiling/condensation point : 25 to 220°C (77 to 428°F) (ASTM D86)

Melting/freezing point : Not available.

Relative density : 0.685 to 0.8 kg/L @ 15°C (59°F)

Vapour pressure : <107 kPa (<802.5 mm Hg) @ 37.8°C (100°F)

Vapour density : 3 to 4 [Air = 1] (NFPA)

Volatility : Not available.

Evaporation rate : Not available.

Viscosity : Not available.

Pour point : Not available.

Solubility : Hydrocarbon components virtually insoluble in water. Soluble in alcohol, ether, chloroform and benzene. Dissolves fats, oils and natural resins.

10 . Stability and reactivity

Chemical stability : The product is stable.

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

Materials to avoid : Reactive with oxidising agents, acids and interhalogens.

Hazardous decomposition products : May release COx, NOx, phenols, polycyclic aromatic hydrocarbons, aldehydes, ketones, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Gasoline	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	13600 mg/kg	-
Ethanol	LD50 Dermal	Rabbit	>15800 mg/kg	-
	LD50 Oral	Mouse	3450 mg/kg	-
	LC50 Inhalation Vapour	Rat	8850 mg/m³	4 hours
Benzene	LD50 Dermal	Rabbit	>8240 mg/kg	-
	LD50 Oral	Rat	930 mg/kg	-
	LC50 Inhalation Vapour	Rat	13228 ppm	4 hours
Toluene	LD50 Dermal	Rabbit	12125 mg/kg	-
	LD50 Oral	Rat	636 mg/kg	-
	LC50 Inhalation Vapour	Rat	7585 ppm	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Gasoline	A3	2B	-	-	-	-
Ethanol	A3	-	-	-	-	-
Benzene	A1	1	A	+	Proven.	+
Toluene	A4	3	D	-	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : There is a wealth of information about the teratogenic hazards of Toluene in the literature; however, based upon professional judgement regarding the body of evidence, WHMIS classification as a teratogen is not warranted.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1203	GASOLINE	3	II		-
DOT Classification	Not available.	Not available.	Not available.	-		-

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Flammable liquid
Irritating material
Carcinogen

Canada

WHMIS (Canada) : Class B-2: Flammable liquid
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

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.

International regulations

Canada inventory : All components are listed or exempted.

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

Europe inventory : All components are listed or exempted.

16 . Other information

Label requirements : FLAMMABLE LIQUID AND VAPOUR. CAUSES RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. CONTAINS MATERIAL WHICH CAN CAUSE HERITABLE GENETIC EFFECTS.

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

Health	*	2
Flammability		3
Physical hazards		0
Personal protection		H

16 . Other information

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

References : Available upon request.
™ Trademark of Suncor Energy Inc. Used under licence.

Date of printing : **4/21/2010.**

Date of issue : 9 April 2010

Date of previous issue : No previous validation.

Responsible name : **Product Safety - RS**

Indicates information that has changed from previously issued version.

For Copy of (M)SDS : Internet: www.petro-canada.ca/msds

Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228

For Product Safety Information: (905) 804-4752

Notice to reader

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

Material Safety Data Sheet

RALUBE ™ 40 CFS

1 . Product and company identification

Product name : RALUBE ™ 40 CFS

Code : RL40CFS, 490-777

Material uses : An SAE 40 grade, 13 TBN railway diesel engine oil designed for use in General Electric and EMD powered units. It is also suitable as a general purpose diesel engine oil where API “CF” quality is required.

Manufacturer : Petro-Canada Lubricants Inc.
2310 Lakeshore Road West
Mississauga, Ontario
Canada L5J 1K2

In case of emergency : Suncor Energy: 403-296-3000
Canutec Transportation: 613-996-6666
Poison Control Centre: Consult local telephone directory for emergency number(s).

2 . Hazards identification

Physical state : Viscous liquid.

Odour : Hydrocarbon.

WHMIS (Canada) : Not controlled under WHMIS (Canada).

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.

Emergency overview : No specific hazard.

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Skin : Slightly irritating to the skin.

Eyes : Slightly irritating to the eyes.

Potential chronic health effects

Chronic effects : No known significant effects or critical hazards.

Carcinogenicity : Not listed as carcinogenic by OSHA, NTP or IARC.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Medical conditions aggravated by over-exposure : Repeated or prolonged contact with spray or mist may produce chronic eye irritation and severe skin irritation. Repeated skin exposure can produce local skin destruction or dermatitis.

See toxicological information (Section 11)

3 . Composition/information on ingredients

Name	CAS number	%
Mixture of severely hydrotreated and hydrocracked and/or solvent-refined base oil (petroleum).	Mixture	-

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

3 . Composition/information on ingredients

The base oil may be a mixture of the following CAS#s: 8042-47-5, 64741-95-3, 64742-01-4, 64742-46-7, 64742-47-8, 64742-53-6, 64742-54-7, 64742-55-8, 64742-62-7, 72623-83-7, 72623-84-8, 72623-85-9, 72623-86-0, 72623-87-1, 178603-64-0, 178603-65-1, 178603-66-2, 445411-73-4

4 . First-aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

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

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

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

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

5 . Fire-fighting measures

Flammability of the product : May be combustible at high temperature.

Extinguishing media

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

Not suitable : None known.

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

Products of combustion : Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), metal oxides, smoke and irritating vapours as products of incomplete combustion.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Special remarks on fire hazards : Low fire hazard. This material must be heated before ignition will occur.

Special remarks on explosion hazards : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

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

Methods for cleaning up

6 . Accidental release measures

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapour or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

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

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Mixture of severely hydrotreated and hydrocracked and/or solvent-refined base oil (petroleum).	**ACGIH TLV (United States). Notes: (Mineral oil)** TWA: 5 mg/m³, (Inhalable fraction) 8 hour(s).

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

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

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: organic vapour filter

8 . Exposure controls/personal protection

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended: neoprene, nitrile, polyvinyl alcohol (PVA), Viton®.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

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

9 . Physical and chemical properties

Physical state : Viscous liquid.

Flash point : Open cup: 267°C (512.6°F) [Cleveland.]

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

Flammable limits : Not available.

Colour : Brown.

Odour : Hydrocarbon.

Odour threshold : Not available.

pH : Not available.

Boiling/condensation point : Not available.

Melting/freezing point : Not available.

Relative density : 0.8845 kg/L @ 15°C (59°F)

Vapour pressure : Not available.

Vapour density : Not available.

Volatility : Not available.

Evaporation rate : Not available.

Viscosity : 142.2 cSt @ 40°C (104°F), 14.8 cSt @ 100°C (212°F), VI=104

Pour point : -27°C (-17°F)

Solubility : Insoluble in water.

10 . Stability and reactivity

Chemical stability : The product is stable.

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

Materials to avoid : Reactive with oxidising agents, acids and alkalis.

Hazardous decomposition products : May release COx, NOx, SOx, methacrylate monomers, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Mixture of severely hydrotreated and hydrocracked and/or solvent-refined base oil (petroleum).	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-

Conclusion/Summary : Not available.

11 . Toxicological information

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Mixture of severely hydrotreated and hydrocracked and/or solvent-refined base oil (petroleum).	A4	-	-	-	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.

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

13 . Disposal considerations

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

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	Not regulated.	-	-	-		-
DOT Classification	Not available.	Not available.	Not available.	-		-

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Not regulated.

Canada

WHMIS (Canada) : Not controlled under WHMIS (Canada).

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.

International regulations

Canada inventory : All components are listed or exempted.

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

Europe inventory : All components are listed or exempted.

16 . Other information

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

Health	1
Flammability	1
Physical hazards	0
Personal protection	B

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

References : Available upon request.
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Date of printing : **1/25/2011.**

Date of issue : 25 January 2011

Date of previous issue : 8/17/2010.

Responsible name : **Product Safety - DSR**

Indicates information that has changed from previously issued version.

For Copy of (M)SDS : The Canadian Controlled Products Regulations (CPR) (Under the Hazardous Products Act, part of the WHMIS legislation) only apply to WHMIS Controlled (i.e., hazardous) products. Therefore, the CPR and the 3-year update rule specified therein do not apply to WHMIS Non-Controlled products. Although this is true, customarily Petro-Canada reviews and updates Non-Controlled product MSDS if a customer requests such an update. These Non-Controlled product updates are given a lower priority than Controlled products but are handled as soon as practicable. If you would like to verify if the MSDS you have is the most current, or you require any further information, please contact:

Internet: lubricants.petro-canada.ca/msds

16 . Other information

Lubricants:
Western Canada, telephone: 1-800-661-1199; fax: 1-800-378-4518
Ontario & Central Canada, telephone: 1-800-268-5850; fax: 1-800-201-6285
Quebec & Eastern Canada, telephone: 1-800-576-1686; fax: 1-800-201-6285

For Product Safety Information: (905) 804-4752

Notice to reader

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

Material Safety Data Sheet

DURON ™ XL SYNTHETIC BLEND 15W-40 HEAVY DUTY ENGINE OIL

1 . Product and company identification

Product name : DURON ™ XL SYNTHETIC BLEND 15W-40 HEAVY DUTY ENGINE OIL

Code : DXL15, 420-059

Material uses : DURON XL Synthetic Blend 15W-40 is a superior quality heavy duty engine oil meeting global standards for high speed 4-stroke diesel engines. It can also be used in other applications including a wide range of compression and spark ignition engines, wet clutch transmissions and hydraulic systems.

Manufacturer : Petro-Canada Lubricants Inc.
2310 Lakeshore Road West
Mississauga, Ontario
Canada L5J 1K2

In case of emergency : Suncor Energy: 403-296-3000
Canutec Transportation: 613-996-6666
Poison Control Centre: Consult local telephone directory for emergency number(s).

2 . Hazards identification

Physical state : Viscous liquid.

Odour : Mild petroleum oil like.

WHMIS (Canada) : Not controlled under WHMIS (Canada).

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.

Emergency overview : No specific hazard.

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Skin : Slightly irritating to the skin.

Eyes : Slightly irritating to the eyes.

Potential chronic health effects

Chronic effects : No known significant effects or critical hazards.

Carcinogenicity : Not listed as carcinogenic by OSHA, NTP or IARC.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Medical conditions aggravated by over-exposure : Repeated or prolonged contact with spray or mist may produce chronic eye irritation and severe skin irritation. Repeated skin exposure can produce local skin destruction or dermatitis.

See toxicological information (Section 11)

3 . Composition/information on ingredients

Name	CAS number	%
Mixture of severely hydrotreated and hydrocracked base oil (petroleum).	Mixture	-

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

3 . Composition/information on ingredients

The base oil may be a mixture of the following CAS#s: 8042-47-5, 64742-46-7, 64742-47-8, 64742-53-6, 64742-54-7, 64742-55-8, 72623-84-8, 72623-85-9, 72623-86-0, 72623-87-1, 178603-64-0, 178603-65-1, 178603-66-2, 445411-73-4

4 . First-aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

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

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

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

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

5 . Fire-fighting measures

Flammability of the product : May be combustible at high temperature.

Extinguishing media

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

Not suitable : None known.

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

Products of combustion : Carbon oxides (CO, CO2), nitrogen oxides (NOx), sulphur oxides (SOx), calcium oxides (CaOx), aldehydes, smoke and irritating vapours as products of incomplete combustion.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Special remarks on fire hazards : Low fire hazard. This material must be heated before ignition will occur.

Special remarks on explosion hazards : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

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

Methods for cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

6 . Accidental release measures

Large spill : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapour or mist. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

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

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Mixture of severely hydrotreated and hydrocracked base oil (petroleum).	**ACGIH TLV (United States). Notes: (Mineral oil)** TWA: 5 mg/m³, (Inhalable fraction) 8 hour(s).

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

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

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: organic vapour filter

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended: neoprene, nitrile, polyvinyl alcohol (PVA), Viton®.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

8 . Exposure controls/personal protection

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

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

9 . Physical and chemical properties

Physical state : Viscous liquid.

Flash point : Open cup: 233°C (451.4°F) [Cleveland.]

Auto-ignition temperature : Fire Point: 247°C (476.6°F)

Flammable limits : Not available.

Colour : Light amber.

Odour : Mild petroleum oil like.

Odour threshold : Not available.

pH : Not available.

Boiling/condensation point : Not available.

Melting/freezing point : Not available.

Relative density : 0.8695 kg/L @ 15°C (59°F)

Vapour pressure : Not available.

Vapour density : Not available.

Volatility : Not available.

Evaporation rate : Not available.

Viscosity : 112.8 cSt @ 40°C (104°F), 15.6 cSt @ 100°C (212°F), VI=143

Pour point : -48°C (-54.4°F)

Solubility : Insoluble in water.

10 . Stability and reactivity

Chemical stability : The product is stable.

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

Materials to avoid : Reactive with oxidising agents, acids, halogens and halogen compounds.

Hazardous decomposition products : May release COx, H2S, SiOx, aldehydes, alkyl mercaptans, sulfides, methacrylate monomers, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Mixture of severely hydrotreated and hydrocracked base oil (petroleum).	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
	LC50 Inhalation Dusts and mists	Rat	>5.2 mg/l	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

11 . Toxicological information

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Mixture of severely hydrotreated and hydrocracked base oil (petroleum).	A4	-	-	-	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.

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

13 . Disposal considerations

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

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	Not regulated.	-	-	-		-
DOT Classification	Not available.	Not available.	Not available.	-		-

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Not regulated.

Canada

WHMIS (Canada) : Not controlled under WHMIS (Canada).

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.

International regulations

Canada inventory : All components are listed or exempted.

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

Europe inventory : At least one component is not listed in EINECS but all such components are listed in ELINCS.
Please contact your supplier for information on the inventory status of this material.

International lists : **Australia inventory (AICS)**: All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Korea inventory: All components are listed or exempted.
Philippines inventory (PICCS): All components are listed or exempted.

16 . Other information

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

Health	1
Flammability	1
Physical hazards	0
Personal protection	B

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

References : Available upon request.
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Date of printing : **10/26/2011.**

Date of issue : 26 October 2011

Date of previous issue : 6/14/2011.

Responsible name : **Product Safety - RS**

Indicates information that has changed from previously issued version.

For Copy of (M)SDS : The Canadian Controlled Products Regulations (CPR) (Under the Hazardous Products Act, part of the WHMIS legislation) only apply to WHMIS Controlled (i.e., hazardous) products. Therefore, the CPR and the 3-year update rule specified therein do not apply to WHMIS Non-Controlled products. Although this is true, customarily Petro-Canada reviews and updates Non-Controlled product MSDS if a customer requests such an update. These Non-Controlled product updates are given a lower priority than Controlled products but are handled as soon as practicable. If you would like to verify if the MSDS you have is the most current, or you require any further information, please contact:

Internet: lubricants.petro-canada.ca/msds

Lubricants:
Western Canada, telephone: 1-800-661-1199; fax: 1-800-378-4518
Ontario & Central Canada, telephone: 1-800-268-5850; fax: 1-800-201-6285
Quebec & Eastern Canada, telephone: 1-800-576-1686; fax: 1-800-201-6285

16 . Other information

For Product Safety Information: (905) 804-4752

Notice to reader

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

Material Safety Data Sheet

PETRO-CANADA ANTIFREEZE

1 . Product and company identification

Product name : PETRO-CANADA ANTIFREEZE

Synonym : Universal Antifreeze, Radiator Antifreeze, Diesel Antifreeze, Petro-Canada Antifreeze-Coolant, Petro-Canada Heavy Duty Antifreeze-Coolant, Pre-Mix Antifreeze, Petro-Canada Premium Radiator Antifreeze, Diesel Engine Coolant, Pre-Mixed Radiator Antifreeze/Coolant Petro-Canada.

Code : W269

Material uses : Used as an engine antifreeze coolant.

Manufacturer : PETRO-CANADA
P.O. Box 2844
150 – 6th Avenue South-West
Calgary, Alberta
T2P 3E3

In case of emergency : Petro-Canada: 403-296-3000
Canutec Transportation: 613-996-6666
Poison Control Centre: Consult local telephone directory for emergency number(s).

2 . Hazards identification

Physical state : Clear viscous liquid.

Odour : Odourless.

WHMIS (Canada) :

Class D-1B: Material causing immediate and serious toxic effects (Toxic).
Class D-2A: Material causing other toxic effects (Very toxic).

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

Emergency overview : CAUTION!

MAY BE HARMFUL IF SWALLOWED. MAY CAUSE EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. POSSIBLE BIRTH DEFECT HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE BIRTH DEFECTS, BASED ON ANIMAL DATA. POSSIBLE DEVELOPMENTAL HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE ADVERSE DEVELOPMENTAL EFFECTS, BASED ON ANIMAL DATA.

May be harmful if swallowed. Slightly irritating to the eyes and skin. Avoid exposure - obtain special instructions before use. Do not breathe vapour or mist. Do not ingest. Avoid contact with eyes, skin and clothing. Contains material that may cause target organ damage, based on animal data. Contains material which may cause birth defects, based on animal data. Contains material which may cause developmental abnormalities, based on animal data. Avoid exposure during pregnancy. Wash thoroughly after handling.

Routes of entry : Dermal contact. Eye contact. Inhalation. Ingestion.

Potential acute health effects

Inhalation : Inhalation of this product may cause respiratory tract irritation.

Ingestion : Harmful if swallowed. Ingestion of this product may cause gastro-intestinal irritation, nausea, vomiting, abdominal pain, and diarrhea. Ingestion of this product may cause Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.

Skin : Slightly irritating to the skin.

Eyes : Slightly irritating to the eyes.

Potential chronic health effects

2 . Hazards identification

Chronic effects : Contains material that may cause target organ damage, based on animal data.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : Contains material which may cause birth defects, based on animal data.

Developmental effects : Contains material which may cause developmental abnormalities, based on animal data.

Fertility effects : No known significant effects or critical hazards.

Target organs : The substance may be toxic to kidneys and liver. Repeated or prolonged exposure to the substance can produce target organs damage. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

3 . Composition/information on ingredients

Name	CAS number	%
Ethylene glycol	107-21-1	45 - 99

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

4 . First-aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

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

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

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

5 . Fire-fighting measures

Flammability of the product : Non-flammable.

Extinguishing media

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

Not suitable : None known.

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

5 . Fire-fighting measures

Products of combustion : Carbon oxides (CO, CO2), smoke and irritating vapours as products of incomplete combustion.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Special remarks on explosion hazards : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

6 . Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilt material. Avoid breathing vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).

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

Methods for cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Approach the release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product. Note: see section 1 for emergency contact information and section 13 for waste disposal.

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Avoid exposure during pregnancy. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapour or mist. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

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

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Ethylene glycol	**ACGIH TLV (United States).** CEIL: 100 mg/m³, (aerosol)

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

8 . Exposure controls/personal protection

Engineering measures : If user operations generate dust, fumes, gas, vapour or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

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

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: organic vapour filter

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended: neoprene, nitrile, polyvinyl chloride (PVC). Consult your PPE provider for breakthrough times and the specific glove that is best for you based on your use patterns. It should be realized that eventually any material regardless of their imperviousness, will get permeated by chemicals. Therefore, protective gloves should be regularly checked for wear and tear. At the first signs of hardening and cracks, they should be changed.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

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

9 . Physical and chemical properties

Physical state : Clear viscous liquid.
Flash point : Not available.
Auto-ignition temperature : Not available.
Flammable limits : Not available.
Colour : Yellow.
Odour : Odourless.
Odour threshold : Not available.
pH : Not available.
Boiling/condensation point : 129°C (264.2°F)
Melting/freezing point : -37°C (-34.6°F)
Relative density : 1.06 to 1.09
Vapour pressure : 0.008 kPa (0.06 mm Hg)
Vapour density : 2.1 [Air = 1]
Volatility : Not available.
Evaporation rate : Not available.
Viscosity : Not available.
Pour point : Not available.

9 . Physical and chemical properties

Solubility : Soluble in water, methanol and diethyl ether.

10 . Stability and reactivity

Chemical stability : The product is stable.

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

Materials to avoid : Reactive with oxidising agents, acids and alkalis.

Hazardous decomposition products : May release COx, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Ethylene glycol	LD50 Dermal	Rabbit	9530 mg/kg	-
	LD50 Oral	Rat	4700 mg/kg	-
	LC50 Inhalation Dusts and mists	Rat	2725 mg/m³	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Ethylene glycol	A4	-	-	-	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilt material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	Not regulated.	-	-	-		-
DOT Classification	UN3082	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Ethylene glycol based coolant)	9	III		**Special provisions** In single containers of 5000 lbs capacity or less this product is exempt from DOT regulations (not regulated).

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Target organ effects

Canada

WHMIS (Canada) : Class D-1B: Material causing immediate and serious toxic effects (Toxic).
Class D-2A: Material causing other toxic effects (Very toxic).

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.

International regulations

Canada inventory : All components are listed or exempted.

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

Europe inventory : Not determined.

16 . Other information

Label requirements : MAY BE HARMFUL IF SWALLOWED. MAY CAUSE EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. POSSIBLE BIRTH DEFECT HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE BIRTH DEFECTS, BASED ON ANIMAL DATA. POSSIBLE DEVELOPMENTAL HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE ADVERSE DEVELOPMENTAL EFFECTS, BASED ON ANIMAL DATA.

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

Health	*	2
Flammability		0
Physical hazards		0
Personal protection		H

16 . Other information

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

References : Available upon request.
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Date of printing : **9/14/2011.**

Date of issue : 11 March 2010

Date of previous issue : No previous validation.

Responsible name : **Product Safety - RS**

Indicates information that has changed from previously issued version.

For Copy of (M)SDS : Internet: www.petro-canada.ca/msds

Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228

For Product Safety Information: (905) 804-4752

Notice to reader

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

GRAYMONT

MATERIAL SAFETY DATA SHEET

SECTION I - CHEMICAL PRODUCT AND COMPANY INFORMATION

Product Name: **HIGH CALCIUM QUICKLIME**	**WHMIS – CLASSIFICATION: D2A: MATERIALS CAUSING OTHER TOXIC EFFECTS E: CORROSIVE MATERIAL**

MANUFACTURER'S AND SUPPLIER'S NAME:

GRAYMONT (NB) INC	4634, Route 880, Havelock, New Brunswick, E4Z 5K8.
GRAYMONT (PA) INC.	194, Match Factory Place, Bellefonte, Pennsylvania, 16823
GRAYMONT (QC) INC.	25 – 206, rue De Lauzon, Boucherville, Québec, J4B 1E7.
GRAYMONT (WESTERN CANADA) INC.	#260 – 4311, 12th Street N.E., Calgary, Alberta, T2E 4P9
GRAYMONT (WESTERN US) INC.	3950 South, 700 East, Suite 301, Salt Lake City, Utah, 84107
GRAYMONT (WI) INC.	Foot of Hill Avenue, Superior, Wisconsin, 54880

EMERGENCY TEL. No.: (613) 996 – 6666 CANUTEC (Canada) (800) 424 – 9300 CHEMTREC (US)

Chemical Name	Chemical Family	Chemical Formula
Calcium oxide	**Alkaline earth oxide**	**Complex mixture - mostly CaO**
Molecular Weight	Trade Name and Synonyms	Material Use
CaO = 56.08	**High Calcium Quicklime, Lime, Quicklime, Calcium Oxide, Burnt Lime, Unslaked Lime, Fluxing Lime.**	**Neutralization, Flocculation, Flux (met.), Caustic agent, absorption**

SECTION II - COMPOSITION AND INFORMATION ON INGREDIENTS

Hazardous Ingredients	Approximate Concentration	C.A.S. Number	Exposure limits (mg/m^3)					
			OSHA PEL	ACGIH TLV	RSST VEMP	MSHA PEL	NIOSH REL	NIOSH IDLH
(Complex Mixture)	**(% by weight)**		**(TWA) 8/40h**	**(TWA) 8/40h**	**(TWA) 8/40h**	**(TWA) 8/40h**	**(TWA) 10/40h**	
Calcium Oxide	**90 to 100**	**1305-78-8**	**5**	**2**	**2**	**5**	**2**	**25**
Crystalline Silica, Quartz	**0 à 0.1 Or 0.1 à 1 (Note 1)**	**14808-60-7**	**$30/(\%SiO_2)+2$ (T) $10/(\%SiO_2)+2$ (R)**	**0.025 (R)**	**0.1 (R)**	**$30/(\%SiO_2)+2$ (T) $10/(\%SiO_2)+2$ (R)**	**0.05 (R)**	**50**

(**Note 1**) : Concentration of crystalline silica in a series of lime products will vary from source to source. It was not detected on some samples (< 0.1% w/w). Therefore two ranges are being disclosed. (**Note 2**) : **ACGIH TLV** Version 1973 has been adopted by the Mine Safety Health Administration (**MSHA**) as the regulatory Exposure Standard. (**Note 3**): (**T**) Total Dust; (**R**): Respirable Dust.

SECTION III - PHYSICAL AND CHEMICAL DATA

Physical State	Odor and Appearance		Odor Threshold (p.p.m.)	Specific Gravity
Gas ☐ Liquid ☐ Solid ☑	**Slight earthy odor - White crystalline substance**		**Not applicable**	**3.25 - 3.38**
Vapor Pressure (mm)	Vapor Density (Air = 1)	Evaporation Rate	Boiling Point (°C)	Melting Point (°C)
Not applicable	**Not applicable**	**Not applicable**	**2850**	**2570 - 2625**
Solubility in Water (20°C)	Volatiles (% by volume)	pH (25 °C)	Bulk Density (kg/m^3)	Coefficient of water/oil distribution
0.125g/100g Solution	**Not applicable**	**Sat. soln CaO 12.45**	**720 - 1200**	**Not applicable**

SECTION IV - FIRE OR EXPLOSION HAZARD DATA

Flammability

Yes ☐ No ☑ If yes, under which conditions?

Extinguishing Media

Quicklime does not burn. Use extinguisher appropriate for material burning.

Special Fire Fighting Procedures

Avoid using water unless necessary for other materials, in which case, flood to absorb heat generated. (Contact with water will evolve heat and could cause ignition of paper, cardboard, etc.). Wear self-contained breathing equipment approved by NIOSH.

Flash point (° C) and Method	Upper flammable limit (% by volume)	Lower flammable limit (% by volume)
Not applicable	**Not applicable**	**Not applicable**
Auto Ignition Temperature (°C)	TDG Flammability Classification	Hazardous Combustion Products
Not applicable	**Non-flammable**	**None**

Dangerous Combustion Products **None**

EXPLOSION DATA

Sensitivity to Chemical Impact	Rate of Burning	Explosive Power	Sensitivity to Static Discharge
Not applicable	**Not applicable**	**Not applicable**	**Not applicable**

SECTION V - REACTIVITY DATA

Chemical Stability Yes ☐ No ☑	If no, under which conditions?	**Absorbs moisture and carbon dioxide in the air to form calcium hydroxide and calcium carbonate.**
Incompatibility to other substances Yes ☑ No ☐	If so, which ones?	**Boron tri-fluoride, chlorine tri-fluoride, ethanol, fluorine, hydrogen fluoride, phosphorus pentoxide; water and acids (violent reaction with generating heat and possible explosion in confined area).**
Reactivity Yes ☑ No ☐	If so, under which conditions?	**Reacts violently with strong acids. Reacts with water to form calcium hydroxide. The heat generated when mixed with water or moist air is sufficient enough to ignite surrounding materials such as paper, wood or cloth.**
Hazardous Decomposition Products		**None.**
Hazardous Polymerization Products		**Will not occur.**

SECTION VI - TOXICOLOGICAL PROPERTIES

Route of Entry

☑ Skin Contact ☐ Skin Absorption ☑ Eye Contact ☑ Acute Inhalation ☐ Chronic Inhalation ☑ Ingestion

Effects of Acute Exposure to Product

Skin	**Severe irritation or burning of mucous and skin. Dehydration of tissues.**
Eyes	**Severe eye irritation and burning, intense watering of the eyes, possible lesions, possible blindness when exposed for prolonged period. (Draize >80).**
Inhalation	**If inhaled in form of dust: nose, oral cavity and throat irritation, cough, sneezing, inflammation of breathing passages, ulceration and perforation of nasal septum, bronchitis, possible pneumonia.**
Ingestion	**If ingested, burning and edema of digestive tracts, abundant salivation, difficulties in swallowing and breathing, vomiting blood, drop in blood pressure (indicates perforation of esophagus or stomach).**

Effects of Chronic Exposure to Product:

Contact dermatitis. Following repeated or prolonged contact, this product can cause redness, desquamation and fissures. This product may contain trace amounts of crystalline silica. Excessive inhalation of respirable crystalline silica dust may result in respiratory disease, including silicosis, pneumoconiosis and pulmonary fibrosis.

LD_{50} of Product (Specify Species and Route) **3059 mg/kg (Mouse/Intraperitoneal)**	Irritancy of Product **Severe to moist tissues**	Exposure limits of Product **Unavailable**
LC_{50} of Product (Specify Species) **Unavailable**	Sensitization to Product **None**	Synergistic materials **None reported**

SECTION VI - TOXICOLOGICAL PROPERTIES (Cont'd)

☑ Carcinogenicity ☐ Reproductive effects ☐ Tératogenicity ☐ Mutagenicity

Quicklime is not listed as a carcinogen by ACGIH, MSHA, OSHA, NTP, DFG, RSST or IARC. It may, however, contain trace amounts of Crystalline Silica listed carcinogens by these organizations.

Crystalline Silica, which inhaled in the form of quartz or crystobalite from occupational sources, is classified by IARC as carcinogenic to humans. (Group 1)

Silica, crystalline (Airborne particles of respirable size) is regulated under California's Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Crystalline silica is listed as a chemical known to the State to cause cancer.

NIOSH considers crystalline silica to be potential occupational carcinogen as defined by the OSHA carcinogen policy [29 CFR 1990]. (Ca).

NTP lists respirable Crystalline Silica as known to be human carcinogens based on sufficient evidence of carcinogenicity in humans. (K).

ACGIH lists respirable Crystalline Silica (quartz) as suspected human carcinogen. (A2).

DFG lists respirable Crystalline Silica as a substance that causes cancer in man (1)

RSST lists respirable Crystalline Silica (quartz) as suspected human carcinogen.

SECTION VII - PREVENTIVE MEASURES

Personal Protective Equipment (PPE)	**Wear clean, dry gloves, full length pants over boots, long sleeved shirt buttoned at the neck, head protection and approved eye protection selected for the working conditions.**
Gloves (Specify)	**Gauntlets Cuff style.**
Respiratory (Specify)	**NIOSH approved respirator. Up to 10 mg/m^3: (APF = 5) Any quarter-mask respirator. Up to 20 mg/m^3: (APF = 10) Any particulate respirator equipped with an N95, R95 or P95 filter except quarter-mask respirator. Any supplied-air respirator. Up to 25 mg/m^3: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode. Any powered, air purifying respirator with a high-efficiency particulate filter. For respirable quartz levels that exceed or are likely to exceed an 8-hr TWA of 0.1 mg/m^3, a NIOSH approved (N/R/P95) dust respirator is recommended. For respirable quartz levels that exceed or are likely to exceed an 8-hr TWA of 0.5 mg/m^3, a NIOSH approved HEPA (N/R/P100) filter respirator is recommended. For respirable quartz levels that exceed or are likely to exceed an 8-hr TWA of 5.0 mg/m^3, a NIOSH approved positive pressure (SAR), full face respirator or equivalent is recommended.**
Eyes (Specify)	**ANSI, CSA or ASTM approved safety glasses with side shields. Tight fitting dust goggles should be worn when excessive (visible) dust conditions are present. Do not wear contact lenses without tight fitting goggles when handling this chemical.**
Footwear (Specify)	**Resistant to caustics.**
Clothing (Specify)	**Fully covering skin. Remove when wet or contaminated. Change daily.**
Other (Specify)	**Evaluate degree of exposure and use PPE if necessary. After handling lime, employees must shower. If exposed daily, use oil, Vaseline, silicone base crème etc. to protect exposed skin, particularly neck, face and wrists.**

SECTION VII - PREVENTIVE MEASURES (Cont'd)

Engineering Controls (e.g. ventilation, enclosed process, specify)

Enclose dust sources; use exhaust ventilation (dust collector) at handling points, keep levels below Max. Concentration Permitted.

Leak and Spill Procedure

Limit access to trained personnel. Use industrial vacuums for large spills. Ventilate area.

Waste Disposal

Transport to disposal area or bury. Review Federal, Provincial and local Environmental regulations.

Handling Procedures and Equipment

Avoid skin and eye contact. Minimize dust generation. Wear protective goggles and in cases of insufficient ventilation, use NIOSH approved dust respirator. An eye wash station and safety shower should be readily available where this material or its water dispersions are used. Contact lenses should not be worn when working with this chemical.

Storage Requirements

Keep tightly closed containers in a cool, dry and well ventilated area, away from acids. Keep out of reach of children.

Special Shipment Information

Quicklime is neither regulated by the Transportation of Dangerous Goods (TDG) Regulations (Canada) nor by the Hazardous Materials Regulations (USA) unless this material is offered or intended for transportation by aircraft.

SECTION VIII - FIRST AID MEASURES

Skin

Carefully and gently brush the contaminated body surfaces in order to remove all traces of lime. Use a brush, cloth or gloves. Remove all lime-contaminated clothing. Rinse contaminated area with lukewarm water for 15 to 20 minutes. Consult a physician if exposed area is large or if irritation persists.

Eyes

Immediately rinse contaminated eye(s) with gently running lukewarm water (saline solution is preferred) for 15 to 20 minutes. In the case of an embedded particle in the eye, or chemical burn, as assessed by first aid trained personnel, contact a physician.

Inhalation

Move source of dust or move victim to fresh air. Obtain medical attention immediately. If victim does not breathe, give artificial respiration.

Ingestion

If victim is conscious, give 300 ml (10 oz) of water, followed by diluted vinegar (1 part vinegar, 2 parts water) or fruit juice to neutralize the alkali. Do not induce vomiting. Contact a physician immediately.

General Advise

Consult a physician for all exposures except minor instances of inhalation.

SECTION IX - REGULATORY INFORMATION

Superfund Amendments and Reauthorization Act of 1986 (**SARA Title III**). / The Emergency Planning and "Community Right-to-Know" Act (**EPCRA**). / Comprehensive Environmental Response, Compensation and Liability Act (**CERCLA**). / Resource Conservation and Recovery Act (**RCRA**).

Component Calcium Oxide has been reviewed against the following regulatory listings:

- **SARA Section 302 – Emergency Planning Notification. Extremely Hazardous Substances (EHS) List and Threshold Planning Quantity (TPQ). (40 CFR, Part 355, Section 30): Not listed.**
- **SARA Section 304 – Emergency Release Notification. Extremely Hazardous Substances (EHS) and Reportable Quantity (RQ) List. (40 CFR, Part 355, Section 40): Not listed.**
- **SARA Section 311/312 – Hazard Categories (40 CFR, Part 370): This product is regulated under CFR 1910.1200 (OSHA Hazard Communication) as Immediate (Acute) Health Hazards – Irritant.**
- **SARA Section 313 – Toxics Release Inventory (TRI). Toxic Chemical List (40 CFR, Part 372). Not listed.**
- **CERCLA – Hazardous Substance (40 CFR, Part 302): Not listed in Table 302.4.**
- **RCRA – Hazardous Waste Number (40 CFR, Part 261, Subpart D): Not listed.**
- **RCRA – Hazardous Waste Classification (40 CFR, Part 261, Subpart C): Not classified.**

CWA 311. - Clean Water Act List of Hazardous Substances.

Calcium Oxide has been withdrawn from the Clean Water Act (CWA) list of hazardous substances. (11/13/79) (44FR65400)

California Proposition 65.

Component Calcium Oxide does not appear on the above regulatory listing. This product may contain small amounts of crystalline silica. Silica, crystalline (Airborne particles of respirable size) is regulated under California's Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Crystalline silica is listed as a chemical known to the State to cause cancer.

Transportation - Hazardous Materials Regulations (USA) & Transportation of Dangerous Goods (TDG) Regulations (Can).

Calcium Oxide is listed in both table 172.101 of Title 49 CFR 172 and in schedule 18 D.G. List (Chapter 34 TDG ACT, SOR/DORS 93-525). Application of requirements is restricted to material offered or intended for transportation by aircraft. - Calcium oxide. By aircraft only. Class 8 - Corrosives. PIN UN1910. Packing group III. Maximum net quantity per package - passenger vehicles, 25kg.

Toxic Substances Control Act (TSCA).

All naturally occurring components of this product are automatically included in the USEPA TSCA Inventory List per 40 CFR 710.4 (b). All other components are listed on the USEPA TSCA Chemical Substances Inventory. Calcium Oxide is subject to inventory update reporting (IUR).

Canadian Environmental Protection Act 1999 (CEPA) – Substances Lists (DSL/NDSL).

Calcium Oxide is specified on the public Portion of the Domestic Substances List (DSL).

ANSI/NSF 60 - Drinking Water Treatment Additives.

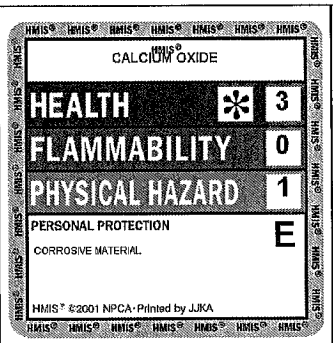
Quicklime has been investigated with respect to elements identified by EPA as toxic and it has been classified for use in direct contact with drinking water. (In accordance with Standard ANSI/NSF 60). For a list of classified products, refer to Underwriters Laboratories Inc.'s Online Certifications Directory.

FDA - U.S. Food and Drug Administration, Department of Health and Human Services.

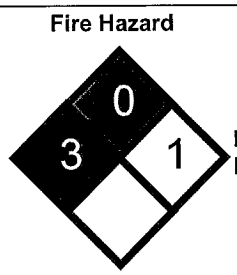
Calcium Oxide has been determined as "Generally Recognized As Safe" (GRAS) by FDA. See 21CFR184.1210. (CFR Title 21 Part 184 - - Direct food substances affirmed as generally recognized as safe).

SECTION X - OTHER INFORMATION

Hazardous Materials Identification System (U.S.)



National Fire Protection Association (U.S.) NFPA 704



WHMIS – Classification:	WHMIS – Classification:
"E" Corrosive Material.	**"D2A": Materials causing other toxic effects.**
Symbol: 	Symbol: 

Additional Information/Comments:

The technical data contained herein is given as information only and is believed to be reliable. GRAYMONT makes no guarantee of results and assumes no obligation or liability in connection therewith.

Sources Used:

NFPA, NLA, TDG, CSST, RSST, (LSRO-FASEB), Hazardous Products Act, Environment Canada, Enviroguide, OSHA, ACGIH, IARC, NIOSH, CFR, NTP, HSDB, EPA SRS, RTECS, DFG, Chemistry and Technology of Lime and Limestone (John Wiley and Sons, Inc.), Lime and Limestone (WILEY-VCH).

SECTION XI - PREPARATION INFORMATION

Prepared by:	Telephone number:	Date :
GRAYMONT (QC) INC. **Quality Assurance & Technical Services**	**(450) 449-2262**	**June 2011**

An electronic version of this MSDS is available at: www.graymont.com under the PRODUCTS section.

GRAYMONT

MATERIAL SAFETY DATA SHEET

SECTION I - CHEMICAL PRODUCT AND COMPANY INFORMATION

Product Name: **HIGH CALCIUM HYDRATED LIME**	**WHMIS – CLASSIFICATION: D2A: MATERIALS CAUSING OTHER TOXIC EFFECTS E: CORROSIVE MATERIAL**

MANUFACTURER'S AND SUPPLIER'S NAME:

GRAYMONT (NB) INC	4634, Route 880, Havelock, New Brunswick, E4Z 5K8.
GRAYMONT (PA) INC.	194, Match Factory Place, Bellefonte, Pennsylvania, 16823
GRAYMONT (QC) INC.	25 – 206, rue De Lauzon, Boucherville, Québec, J4B 1E7.
GRAYMONT (WESTERN CANADA) INC.	#260 – 4311, 12th Street N.E., Calgary, Alberta, T2E 4P9
GRAYMONT (WESTERN US) INC.	3950 South, 700 East, Suite 301, Salt Lake City, Utah, 84107
GRAYMONT (WI) INC.	Foot of Hill Avenue, Superior, Wisconsin, 54880

EMERGENCY TEL. No.: (613) 996 – 6666 CANUTEC (Canada) (800) 424 – 9300 CHEMTREC (US)

Chemical Name	Chemical Family	Chemical Formula
Calcium hydroxide	**Alkaline earth hydroxide**	**Complex mixture - mostly $Ca(OH)_2$**
Molecular Weight	Trade Name and Synonyms	Material Use
$Ca(OH)_2$ = 74.096	**Hydrated Lime, Lime, Slaked lime, Lime Putty, Lime Slurry, Milk of Lime, Calcium Hydroxide**	**Neutralization, Flocculation, Stabilization, absorption**

SECTION II - COMPOSITION AND INFORMATION ON INGREDIENTS

Hazardous Ingredients	Approximate Concentration (% by weight)	C.A.S. Number	Exposure limits (mg/m^3)					
			OSHA PEL	ACGIH TLV	RSST VEMP	MSHA PEL	NIOSH REL	NIOSH IDLH
(Complex Mixture)	**(% by weight)**		**(TWA) 8/40h**	**(TWA) 8/40h**	**(TWA) 8/40h**	**(TWA) 8/40h**	**(TWA) 10/40h**	
Calcium hydroxide	**92 to 100**	**1305-62-0**	**15 (T) 5 (R)**	**5**	**5**	**5**	**5**	**N/A**
Crystalline Silica, Quartz	**0 à 0.1 Or 0.1 à 1 (Note 1)**	**14808-60-7**	**$30/(\%SiO_2)+2$ (T) $10/(\%SiO_2)+2$ (R)**	**0.025 (R)**	**0.1 (R)**	**$30/(\%SiO_2)+2$ (T) $10/(\%SiO_2)+2$ (R)**	**0.05 (R)**	**50**

(**Note 1**): Concentration of crystalline silica in a series of lime products will vary from source to source. It was not detected on some samples (< 0.1% w/w). Therefore two ranges are being disclosed. (**Note 2**): **ACGIH TLV** Version 1973 has been adopted by the Mine Safety Health Administration (**MSHA**) as the regulatory Exposure Standard. (**Note 3**): (**T**) Total Dust; (**R**): Respirable Dust.

SECTION III - PHYSICAL AND CHEMICAL DATA

Physical State Gas ☐ Liquid ☐ Solid ☑	Odor and Appearance **Slight earthy odor – Fine white powder**		Odor Threshold (p.p.m.) **Not applicable**	Specific Gravity **2.3 – 2.4**
Vapor Pressure (mm) **Not applicable**	Vapor Density (Air = 1) **Not applicable**	Evaporation Rate **Not applicable**	Boiling Point (°C) **Not applicable**	Melting Point (°C) **Not applicable**
Solubility in Water (20°C) **0.165g/100g solution**	Volatiles (% by volume) **Not applicable**	pH (25 °C) **Sat. soln $Ca(OH)_2$ 12.45**	Bulk Density (kg/m^3) **320 - 690**	Coefficient of water/oil distribution **Not applicable**

SECTION IV - FIRE OR EXPLOSION HAZARD DATA

Flammability

Yes ☐ No ☑ If yes, under which conditions?

Extinguishing Media

Calcium Hydroxide does not burn. Use extinguishing media appropriate to surrounding fire conditions.

Special Fire Fighting Procedures

Not applicable

Flash point (° C) and Method	Upper flammable limit (% by volume)	Lower flammable limit (% by volume)
Not applicable	**Not applicable**	**Not applicable**
Auto Ignition Temperature (°C)	TDG Flammability Classification	Hazardous Combustion Products
Not applicable	**Non-flammable**	**None**

Dangerous Combustion Products **None**

EXPLOSION DATA

Sensitivity to Chemical Impact	Rate of Burning	Explosive Power	Sensitivity to Static Discharge
Not applicable	**Not applicable**	**Not applicable**	**Not applicable**

SECTION V - REACTIVITY DATA

Chemical Stability		
Yes ☑ No ☐	If no, under which conditions?	**Absorbs carbon dioxide in the air to form calcium carbonate.**
Incompatibility to other substances		
Yes ☑ No ☐	If so, which ones?	**Boron tri-fluoride, chlorine tri-fluoride, ethanol, fluorine, hydrogen fluoride, phosphorus pentoxide; and acids (violent reaction with generating heat and possible explosion in confined area).**
Reactivity		
Yes ☑ No ☐	If so, under which conditions?	**Reacts violently with strong acids. Reacts chemically with acids and many other compounds and chemical elements to form calcium based compounds. Explosive when mixed with nitro organic compounds.**
Hazardous Decomposition Products		**Thermal decomposition at 540°C will produce calcium oxide and water.**
Hazardous Polymerization Products		**Will not occur.**

SECTION VI - TOXICOLOGICAL PROPERTIES

Route of Entry

☑ Skin Contact	☐ Skin Absorption	☑ Eye Contact	☑ Acute Inhalation	☐ Chronic Inhalation	☑ Ingestion

Effects of Acute Exposure to Product

Skin	**Severe irritation of mucous and skin, removes natural skin oils.**
Eyes	**Severe eye irritation, intense watering of the eyes, possible lesions, possible blindness when exposed for prolonged period. Eye irritation data: Eye-Rabbit-10mg/ 24 h – Severe.**
Inhalation	**If inhaled in form of dust, irritation of breathing passages, cough, sneezing.**
Ingestion	**If ingested: pain, vomiting blood, diarrhea, collapse, drop in blood pressure (indicates perforation of esophagus or stomach).**

Effects of Chronic Exposure to Product:

Contact dermatitis. Following repeated or prolonged contact, this product can cause redness, desquamation and fissures. This product may contain trace amounts of crystalline silica. Excessive inhalation of respirable crystalline silica dust may result in respiratory disease, including silicosis, pneumoconiosis and pulmonary fibrosis.

LD_{50} of Product (Specify Species and Route)	Irritancy of Product	Exposure limits of Product
7340 mg/kg (Rat, Oral) **7300 mg/kg (Mouse, Oral)**	**Severe to moist tissues**	**Unavailable**
LC_{50} of Product (Specify Species)	Sensitization to Product	Synergistic materials
Unavailable	**None**	**None reported**

SECTION VI - TOXICOLOGICAL PROPERTIES (Cont'd)

☑ Carcinogenicity ☐ Reproductive effects ☐ Tératogenicity ☐ Mutagenicity

Calcium Hydroxide is not listed as a carcinogen by ACGIH, MSHA, OSHA, NTP, DFG, RSST or IARC. It may, however, contain trace amounts of Crystalline Silica listed carcinogens by these organizations.

Crystalline Silica, which inhaled in the form of quartz or crystobalite from occupational sources, is classified by IARC as carcinogenic to humans. (Group 1)

Silica, crystalline (Airborne particles of respirable size) is regulated under California's Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Crystalline Silica is listed as a chemical known to the State to cause cancer.

NIOSH considers crystalline silica to be potential occupational carcinogen as defined by the OSHA carcinogen policy [29 CFR 1990]. (Ca).

NTP lists respirable Crystalline Silica as known to be human carcinogens based on sufficient evidence of carcinogenicity in humans. (K).

ACGIH lists respirable Crystalline Silica (quartz) as suspected human carcinogen. (A2).

DFG lists respirable Crystalline Silica as a substance that causes cancer in man (1)

RSST lists respirable Crystalline Silica (quartz) as suspected human carcinogen.

SECTION VII - PREVENTIVE MEASURES

Personal Protective Equipment (PPE)	**Wear clean, dry gloves, full length pants over boots, long sleeved shirt buttoned at the neck, head protection and approved eye protection selected for the working conditions.**
Gloves (Specify)	**Gauntlets Cuff style.**
Respiratory (Specify)	**Respirator Recommendations for Calcium Hydroxide: Not available.** **Respirator Recommendations for Calcium Oxide: NIOSH approved respirator.** **Up to 10 mg/m^3: (APF = 5) Any quarter-mask respirator.** **Up to 20 mg/m^3: (APF = 10) Any particulate respirator equipped with an N95, R95 or P95 filter except quarter-mask respirator. Any supplied-air respirator.** **Up to 25 mg/m^3: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode. Any powered, air purifying respirator with a high-efficiency particulate filter.**
Eyes (Specify)	**ANSI, CSA or ASTM approved safety glasses with side shields. Tight fitting dust goggles should be worn when excessive (visible) dust conditions are present. Do not wear contact lenses without tight fitting goggles when handling this chemical.**
Footwear (Specify)	**Resistant to caustics.**
Clothing (Specify)	**Fully covering skin. Remove when wet or contaminated. Change daily.**
Other (Specify)	**Evaluate degree of exposure and use PPE if necessary. After handling lime, employees must shower. If exposed daily, use oil, Vaseline, silicone base crème etc. to protect exposed skin, particularly neck, face and wrists.**

Engineering Controls (e.g. ventilation, enclosed process, specify)

Enclose dust sources; use exhaust ventilation (dust collector) at handling points, keep levels below Max. Concentration Permitted.

SECTION VII - PREVENTIVE MEASURES (Cont'd)

Leak and Spill Procedure

Limit access to trained personnel. Use industrial vacuums for large spills. Ventilate area.

Waste Disposal

Transport to disposal area or bury. Review Federal, Provincial and local Environmental regulations.

Handling Procedures and Equipment

Avoid skin and eye contact. Minimize dust generation. Wear protective goggles and in cases of insufficient ventilation, use NIOSH approved dust respirator. An eye wash station and safety shower should be readily available where this material or its water dispersions are used. Contact lenses should not be worn when working with this chemical.

Storage Requirements

Keep tightly closed containers in a cool, dry and well-ventilated area, away from acids. Keep out of reach of children.

Special Shipment Information

Calcium Hydroxide is neither regulated by the Transportation of Dangerous Goods (TDG) Regulations (Canada) nor by the Hazardous Materials Regulations (USA).

SECTION VIII - FIRST AID MEASURES

Skin

Carefully and gently brush the contaminated body surfaces in order to remove all traces of lime. Use a brush, cloth or gloves. Remove all lime-contaminated clothing. Rinse contaminated area with lukewarm water for 15 to 20 minutes. Consult a physician if exposed area is large or if irritation persists.

Eyes

Immediately rinse contaminated eye(s) with gently running lukewarm water (saline solution is preferred) for 15 to 20 minutes. In the case of an embedded particle in the eye, or chemical burn, as assessed by first aid trained personnel, contact a physician.

Inhalation

Move source of dust or move victim to fresh air. Obtain medical attention immediately. If victim does not breathe, give artificial respiration.

Ingestion

If victim is conscious, give 300 ml (10 oz) of water, followed by diluted vinegar (1 part vinegar, 2 parts water) or fruit juice to neutralize the alkali. Do not induce vomiting. Contact a physician immediately.

General Advise

Consult a physician for all exposures except minor instances of inhalation.

SECTION IX - REGULATORY INFORMATION

Superfund Amendments and Reauthorization Act of 1986 (SARA Title III). / The Emergency Planning and "Community Right-to-Know" Act (EPCRA). / Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). / Resource Conservation and Recovery Act (**RCRA**).

Component Calcium Hydroxide has been reviewed against the following regulatory listings:

- **SARA Section 302 – Emergency Planning Notification. Extremely Hazardous Substances (EHS) List and Threshold Planning Quantity (TPQ). (40 CFR, Part 355, Section 30) : Not listed.**
- **SARA Section 304 – Emergency Release Notification. Extremely Hazardous Substances (EHS) and Reportable Quantity (RQ) List. (40 CFR, Part 355, Section 40) : Not listed.**
- **SARA Section 311/312 – Hazard Categories (40 CFR, Part 370) : This product is regulated under CFR 1910.1200 (OSHA Hazard Communication) as Immediate (Acute) Health Hazards – Irritant.**
- **SARA Section 313 – Toxics Release Inventory (TRI). Toxic Chemical List (40 CFR, Part 372). Not listed.**
- **CERCLA – Hazardous Substance (40 CFR, Part 302): Not listed in Table 302.4.**
- **RCRA – Hazardous Waste Number (40 CFR, Part 261, Subpart D): Not listed.**
- **RCRA – Hazardous Waste Classification (40 CFR, Part 261, Subpart C): Not classified.**

CWA 311. - Clean Water Act List of Hazardous Substances.

Calcium Hydroxide has been withdrawn from the Clean Water Act (CWA) list of hazardous substances. (11/13/79) (44FR65400)

California Proposition 65.

Component Calcium Hydroxide does not appear on the above regulatory listing. This product may contain small amounts of crystalline silica. Silica, crystalline (Airborne particles of respirable size) is regulated under California's Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Crystalline silica is listed as a chemical known to the State to cause cancer.

Transportation - Hazardous Materials Regulations (USA) & Transportation of Dangerous Goods (TDG) Regulations (Can).

Calcium Hydroxide does not appear on the above regulatory listings

Toxic Substances Control Act (TSCA).

All naturally occurring components of this product are automatically included in the USEPA TSCA Inventory List per 40 CFR 710.4 (b). All other components are listed on the USEPA TSCA Chemical Substances Inventory. Calcium Hydroxide is subject to inventory update reporting (IUR).

Canadian Environmental Protection Act (CEPA) – Substances Lists (DSL/NDSL).

Calcium Hydroxide is specified on the public Portion of the Domestic Substances List (DSL).

ANSI/NSF 60 - Drinking Water Treatment Additives.

Hydrated Lime has been investigated with respect to elements identified by EPA as toxic and it has been classified for use in direct contact with drinking water (in accordance with Standard ANSI/NSF 60). For a list of classified products, refer to Underwriters Laboratories Inc.'s Online Certifications Directory.

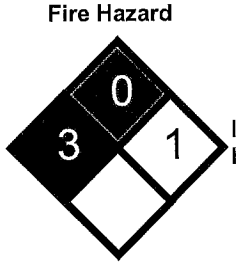
FDA - U.S. Food and Drug Administration, Department of Health and Human Services.

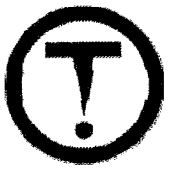
Calcium Hydroxide has been determined as "Generally Recognized As Safe" (GRAS) by FDA. See 21CFR184.1205. (CFR Title 21 Part 184 - - Direct food substances affirmed as generally recognized as safe).

SECTION X - OTHER INFORMATION

Hazardous Materials Identification System (U.S.)

National Fire Protection Association (U.S.) NFPA 704



WHMIS – Classification:	WHMIS – Classification:
"E" Corrosive Materials.	**"D2A" Materials causing other toxic effects.**
Symbol: 	Symbol: 

Additional Information/Comments:

The technical data contained herein is given as information only and is believed to be reliable. GRAYMONT makes no guarantee of results and assumes no obligation or liability in connection therewith.

Sources Used:

NFPA, NLA, TDG, CSST, RSST, (LSRO-FASEB), Hazardous Products Act, Environment Canada, Enviroguide, OSHA, ACGIH, IARC, NIOSH, CFR, NTP, HSDB, EPA SRS, RTECS, DFG, Chemistry and Technology of Lime and Limestone (John Wiley and Sons, Inc.), Lime and Limestone (WILEY-VCH).

SECTION XI - PREPARATION INFORMATION

Prepared by:	Telephone number:	Date :
GRAYMONT (QC) INC. **Quality Assurance & Technical Services**	**(450) 449-2262**	**June 2011**

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Material Safety Data Sheet

PROPANE

1 . Product and company identification

Product name : PROPANE

Synonym : Propane HD-5, Propane commercial, Liquified Petroleum Gas (LPG), C3H8, CGSB Propane Grade 1, CGSB Propane Grade 2, odourized propane, stenched propane, automotive propane.

Code : W222

Material uses : Propane is used as a fuel gas, refrigerant and as a raw material for organic synthesis. It is also used as a laboratory gas. The grade determines the propane content. It is supplied as pressurized liquid in tanks.

Manufacturer : PETRO-CANADA
P.O. Box 2844
150 – 6th Avenue South-West
Calgary, Alberta
T2P 3E3

In case of emergency : Petro-Canada: 403-296-3000
Canutec Transportation:
613-996-6666
Poison Control Centre: Consult local telephone directory for emergency number(s).

2 . Hazards identification

Physical state : Gas at room temperature; liquid when stored under pressure.

Odour : Propane is an odourless gas. Odourized propane will contain up to 28 g Ethyl Mercaptan per 1000 L of propane.

WHMIS (Canada) : Class A: Compressed gas.
Class B-1: Flammable gas.

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

Emergency overview : CAUTION!

EXTREMELY FLAMMABLE GAS. MAY CAUSE FLASH FIRE. HIGH PRESSURE GAS.

Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst or explode. Keep away from heat, sparks and flame. Do not puncture or incinerate container. Avoid breathing gas. Avoid contact with skin and clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. At high concentrations, can displace oxygen and cause asphyxiation. A minimum requirement of 19.5% of oxygen at sea level (148 torr O2, dry air) is recommended.

Routes of entry : Dermal contact. Eye contact. Inhalation.

Potential acute health effects

Inhalation : Inhalation of this product may cause respiratory tract irritation and Central Nervous System (CNS) Depression, symptoms of which may include; weakness, dizziness, slurred speech, drowsiness, unconsciousness and in cases of severe overexposure; coma and death.

Ingestion : As this product is a gas, refer to the inhalation section.

Skin : Contact with rapidly expanding gas may cause burns or frostbite.

Eyes : Contact with rapidly expanding gas may cause burns or frostbite.

Potential chronic health effects

Chronic effects : No known significant effects or critical hazards.

Carcinogenicity : Not listed as carcinogenic by OSHA, NTP or IARC.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

2 . Hazards identification

Medical conditions aggravated by over-exposure : Overexposure may lead to cardiac sensitization.

See toxicological information (section 11)

3 . Composition/information on ingredients

Name	CAS number	%
HD-5 Propane		
Propane	74-98-6	90 - 100
Propene	115-07-1	1 - 5
Commercial Propane		
Propane	74-98-6	75 - 100
Propene	115-07-1	10 - 20
Both grades may contain:		
Ethane	74-84-0	3 - 6*
**Montreal: may vary from 0.1-2%*		
Butane+	106-97-8	1 - 5

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

4 . First-aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : As this product is a gas, refer to the inhalation section.

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

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

5 . Fire-fighting measures

Flammability of the product : Class I - flammable gas (NFPA).

Extinguishing media

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

Not suitable : None known.

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

Products of combustion : Carbon oxides (CO, CO2), smoke and irritating vapours as products of incomplete combustion.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

5 . Fire-fighting measures

Special remarks on fire hazards : Extremely flammable in presence of open flames, sparks, and heat. Vapours are heavier than air and may travel considerable distance to sources of ignition and flash back. Rapid escape of vapour may generate static charge causing ignition. May accumulate in confined spaces.

Special remarks on explosion hazards : Do not pressurise, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Containers may explode in heat of fire. Vapour explosion hazard indoors, outdoors or in sewers. Propane may form explosive mixtures with air.

6 . Accidental release measures

Personal precautions : Accidental releases pose a serious fire or explosion hazard. Immediately contact emergency personnel. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).

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

Methods for cleaning up

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

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

7 . Handling and storage

Handling : Put on appropriate personal protective equipment (see section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use non-sparking tools. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container.

SPECIAL PRECAUTIONS: Sludges and tank scale from petroleum storage tanks, trucks, rail cars, and filters/screens may contain naturally occurring radioactive material ("NORM") in the dominant form of radon 226. Similarily, equipment used for the transfer of petroleum product such as pipelines, pumps and compressors, may have detectable levels of radioactive radon on inner surfaces. Workers involved in cleaning, descaling, repair or other maintenance on inner surfaces of such equipment should avoid breathing and ingesting of dust generated from such activities. Suitable codes of practice should be developed for these activities, detailing appropriate occupational hygiene, personal protective equipment and disposal practices.

Storage : Store in accordance with local regulations. Store in a segregated and approved area. Store in a dry, cool and well-ventilated area, away from incompatible materials (see section 10). Eliminate all ignition sources. Keep container tightly closed and sealed until ready for use.

8 . Exposure controls/personal protection

Ingredient	Exposure limits
Propane	**ACGIH TLV (United States).** TWA: 1000 ppm 8 hour(s).
Propylene	**ACGIH TLV (United States).** TWA: 500 ppm 8 hour(s).
Ethane	**ACGIH TLV (United States).** TWA: 1000 ppm 8 hour(s).
Butane	**ACGIH TLV (United States).** TWA: 1000 ppm 8 hour(s).

Consult local authorities for acceptable exposure limits.

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

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

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

Personal protection

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Recommended: NIOSH-approved self-contained breathing apparatus.

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Recommended: Wear insulated gloves to prevent frostbite.

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

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

9 . Physical and chemical properties

Physical state : Gas at room temperature; liquid when stored under pressure.

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

Auto-ignition temperature : 450°C (842°F) (NFPA)

Flammable limits : Lower: 2.1% (NFPA)
Upper: 9.5% (NFPA)

Colour : Colourless.

Odour : Propane is an odourless gas. Odourized propane will contain up to 28 g Ethyl Mercaptan per 1000 L of propane.

Odour threshold : Not available.

pH : Not available.

9 . Physical and chemical properties

Boiling/condensation point : -42°C (-43.6°F)
Melting/freezing point : Not available.
Relative density : Not available.
Vapour pressure : 1434.9 kPa (10763 mm Hg) @ 38°C (100°F)
Vapour density : 1.56 [Air = 1]
Volatility : Volatile.
Evaporation rate : Not available.
Viscosity : Not available.
Pour Point : Not available.
Solubility : Not available.

10 . Stability and reactivity

Chemical stability : The product is stable.
Hazardous polymerisation : Under normal conditions of storage and use, hazardous polymerisation will not occur.
Materials to avoid : Reactive with oxidising agents and halogenated compounds.
Hazardous decomposition products : May release COx, smoke and irritating vapours when heated to decomposition.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Butane	LC50 Inhalation Gas.	Rat	658000 mg/m³	4 hours

Conclusion/Summary : Not available.

Chronic toxicity

Conclusion/Summary : Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitiser

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Propylene	A4	3	-	-	-	-

Mutagenicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Conclusion/Summary : Not available.

Biodegradability

Conclusion/Summary : Not available.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimised wherever possible. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Do not puncture or incinerate container. Empty pressure vessels should be returned to the supplier.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information	UN number	Proper shipping name	Classes	PG*	Label	Additional information
TDG Classification	UN1978	PROPANE	2.1	-		-
DOT Classification	Not available.	Not available.	Not available.	-		-

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Compressed gas

Canada

WHMIS (Canada) : Class A: Compressed gas.
Class B-1: Flammable gas.

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.

International regulations

Canada inventory : All components are listed or exempted.

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

Europe inventory : All components are listed or exempted.

16 . Other information

Label requirements : EXTREMELY FLAMMABLE GAS. MAY CAUSE FLASH FIRE. HIGH PRESSURE GAS.

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

Health	2
Flammability	4
Physical hazards	2
Personal protection	K

16 . Other information

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

References : Available upon request.
TM/MC Marque de commerce de Petro-Canada - Trademark

Date of printing : **7/13/2009.**

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Date of previous issue : No previous validation.

Responsible name : **Product Safety - DSR**

Indicates information that has changed from previously issued version.

For Copy of (M)SDS : Internet: www.petro-canada.ca/msds

Canada-wide: telephone: 1-800-668-0220; fax: 1-800-837-1228

For Product Safety Information: (905) 804-4752

Notice to reader

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

Appendix 4 Fuel System Inventory

Appendix 4
Tank Information

Location	Map Reference	ID	Registration #	In Secondary Containment?	Capacity (L)	Fuel type	Status On Site	Status on FIRSTS	Type	Notes
Main Tank Farm System (MTS)	M-01	M-01	EC-00004535	Yes	836,250	P-50 Diesel	Active	Incomplete identification	Vertical AST	
	M-02	M-02	EC-00004535	Yes	836,250	P-50 Diesel	Active	Incomplete identification	Vertical AST	
	M-03	M-03	EC-00004535	Yes	836,250	P-50 Diesel	Inactive	Incomplete/incorrect identification	Vertical AST	
	M-04	M-04	EC-00004535	Yes	1,597,314	P-40 Diesel	Active	Incomplete identification	Vertical AST Gem Steel 1982 Serial # 82-133-1	
	M-05	M-05	EC-00004535	Yes	1,597,314	P-40 Diesel	Inactive	Incomplete/incorrect identification	Vertical AST	
	M-06	M-06	EC-00004535	Yes	1,597,314	P-40 Diesel	Inactive	Incomplete/incorrect identification	Vertical AST	
	M-07	M-07	EC-00004535	Yes	1,597,314	P-40 Diesel	Inactive	Incomplete/incorrect identification	Vertical AST Gem Steel Serial # 82-133-2	
	M-08	M-08	EC-00004535	Yes	1,597,314	P-40 Diesel	Inactive	Incomplete/incorrect identification	Vertical AST Gem Steel Serial # 82-133-5	
	M-09	M-09	EC-00004535	Yes	1,597,314	P-40 Diesel	Inactive	Incomplete/incorrect identification	Vertical AST Gem Steel Serial # 82-133-3	
	M-10	M-10	EC-00004535	Yes	1,597,314	P-40 Diesel	Inactive	Incomplete/incorrect identification	Vertical AST Gem Steel Serial # 82-133-4	Need to confirm ser#. Covered in snow during Feb visit
	M-11	M-11	EC-00004535	Yes	1,597,314	P-40 Diesel	Inactive	Incomplete/incorrect identification	Vertical AST Gem Steel 1989 Serial # 89-33-001	
	M-12	M-12	EC-00004535	Yes	1,597,314	P-40 Diesel	Inactive	Incomplete/incorrect identification	Vertical AST Gem Steel 1986 Serial # 86023-001	
	M-13	M-13	EC-00004535	Yes	1,597,314	P-40 Diesel	Active	Incomplete identification	Vertical AST GLM 1988 Serial # J-8716	
	M-14	M-14	EC-00004535	Yes	1,597,314	P-40 Diesel	Active	Incomplete identification	Vertical AST Wilkinson steel	
Jet A System in Main Tank Farm	M-15	M-15	EC-00004535	Yes	1,597,314	Jet A	Active	Incomplete identification	Vertical AST Gem Steel 1993 Serial # 93-86	
Individual Tanks in Main Tank Farm	M-16	M-16	EC-00018370	Yes	63,594	P-50 Diesel	Inactive	Incomplete/incorrect identification	Vertical AST Marclan Industries 1985 Serial # 954	
	M-17	M-17	EC-00018371	Yes	63,594	P-50 Diesel	Inactive	Incomplete/incorrect identification	Vertical AST Marclan Industries 1986 Serial # 960	
	M-18	M-18	EC-00018372	Yes	63,594	P-50 Diesel	Inactive	Incomplete/incorrect identification	Vertical AST Marclan Industries 1986 Serial # 958	
	M-19	M-19	EC-00018374	Yes	63,594	P-50 Diesel	Active	Incomplete/incorrect identification	Vertical AST Vertical AST Marclan Industries 1986 Serial # 957	
	M-20	M-20	EC-00018375	Yes	63,594	P-50 Diesel	Inactive	Incomplete/incorrect identification	Vertical AST Marclan Industries 1986 Serial # 1184	
	M-21	M-21	EC-00018376	Yes	63,594	P-50 Diesel	Inactive	Incomplete/incorrect identification	Vertical AST Marclan Industries 1985 Serial # 952	
	M-22	M-22	EC-00018377	Yes	144,043	Diesel	Inactive	Incomplete/incorrect identification	Horizontal AST	Volume is based on external dimensions
	M-23	M-23	EC-00018378	Yes	6,000	Diesel	Inactive	Identified	Horizontal AST	
	MTF-1	Unidentified Tank	-	Yes	2,000	Diesel	Active	Unidentified	Horizontal AST	

Appendix 4
Tank Information

Location	Map Reference	ID	Registration #	In Secondary Containment?	Capacity (L)	Fuel type	Status On Site	Status on FIRSTS	Type	Notes
Satellite Tank System (STS)	S-1	S-1	EC-00004544	Yes	90,920	P-50 Diesel	Active. Segregated from header.	Identified	Horizontal AST	
	S-2	S-2	EC-00004544	Yes	90,920	P-50 Diesel	Active. Segregated from header.	Identified	Horizontal AST	
	S-3	S-3	EC-00004544	Yes	90,920	P-50 Diesel	Inactive. Empty.	Identified	Horizontal AST	
	S-4	S-4	EC-00004544	Yes	90,920	P-50 Diesel	Inactive. Empty.	Identified	Horizontal AST	
	S-5	S-5	EC-00004544	Yes	90,920	P-40 Diesel	Active. Segregated from header.	Identified	Horizontal AST	
	S-6	S-6	EC-00004544	Yes	90,920	P-40 Diesel	Active. Segregated from header.	Identified	Horizontal AST	
	S-7	S-7	EC-00004544	Yes	90,920	P-40 Diesel	Active. Segregated from header.	Identified	Horizontal AST	
	S-8	S-8	EC-00004544	Yes	90,920	P-40 Diesel	Active. Segregated from header.	Identified	Horizontal AST	
	S-9	S-9	EC-00004544	Yes	90,920	P-40 Diesel	Active. Segregated from header.	Identified	Horizontal AST	
	S-10	S-10	EC-00004544	Yes	90,920	P-40 Diesel	Active. Segregated from header.	Identified	Horizontal AST	
	S-11	S-11	EC-00018392	Yes	22,730	Gas	Inactive. Empty.	Identified	Horizontal AST	
	S-12	S-12	EC-00018392	Yes	22,730	Gas	Inactive. Empty.	Identified	Horizontal AST	
Waste Oil Tank Farm (WOTF)	WO-1	WO-1	EC-00018398	Yes	90,920	Waste Oil	Active	Identified	Horizontal AST	
	WO-2	WO-2	EC-00018398	Yes	90,920	Waste Oil	Active	Identified	Horizontal AST	
Tanks in Bone Yard	BY-1	Unidentified Tank	-	N/A	64019	-	2 of 5 tanks withdrawn from service Mar 2011 (EC-00018404, EC-00018409). Not sure which these 2 tanks are)	Incomplete/incorrect identification	Horizontal AST 1979 Serial # 4187L AG-4027	
	BY-2	Unidentified Tank	-	N/A	102431	-	2 of 5 tanks withdrawn from service Mar 2011 (EC-00018404, EC-00018409). Not sure which these 2 tanks are)	Incomplete/incorrect identification	Horizontal AST	
	BY-3	Unidentified Tank	-	N/A	64019	-	2 of 5 tanks withdrawn from service Mar 2011 (EC-00018404, EC-00018409). Not sure which these 2 tanks are)	Incomplete/incorrect identification	Horizontal AST	
	BY-4	Unidentified Tank	-	N/A	105155	-	2 of 5 tanks withdrawn from service Mar 2011 (EC-00018404, EC-00018409). Not sure which these 2 tanks are)	Incomplete/incorrect identification	Horizontal AST 1981 Serial # 4209	
	BY-5	Unidentified Tank	-	N/A	105155	-	2 of 5 tanks withdrawn from service Mar 2011 (EC-00018404, EC-00018409). Not sure which these 2 tanks are)	Incomplete/incorrect identification	Horizontal AST	
	BY-6	Unidentified Tank	-	N/A	14404	-	2 of 5 tanks withdrawn from service Mar 2011 (EC-00018404, EC-00018409). Not sure which these 2 tanks are)	Incomplete/incorrect identification	Horizontal AST	
Emergency Generator	EG-1	Unidentified Tank	-	Yes	2,000	Diesel	Active	Registration not required	Horizontal AST	
	EG-2	Unidentified Tank	-	Yes	2,000	Diesel	Active	Registration not required	Horizontal AST	
Glycol Tanks	GLY-1	Glycol Tank outside WOTF	-	No	9,603	Glycol	Inactive	Unidentified	Horizontal AST	Volume is based on external dimensions
	GLY-2	Glycol Tank outside WOTF	-	No	9,603	Glycol	Inactive	Unidentified	Horizontal AST	Volume is based on external dimensions
	GLY-3	Glycol Tank outside Mill	-	Unknown due to snow cover	8,803	Glycol	Inactive	Unidentified	Horizontal AST	Volume is based on external dimensions
	GLY-4	Glycol Tank Outside Shop	-	Unknown due to snow cover	23,560	Glycol	Inactive	Unidentified	Rectangular tank	Volume is based on external dimensions
	GLY-5	Tank Near Old Office	-	Unknown due to snow cover	2,134	Glycol	Inactive	Unidentified	Horizontal AST	Volume is based on external dimensions
Individual Tanks	IND-1	RTL Shop tank	-	Unknown due to snow cover	2,290	Diesel	Inactive	Unidentified	Horizontal AST	Volume is based on external dimensions
	IND-2	Portable Tank	-	Yes	1,200	Diesel	Active	Registration not required	Horizontal AST Gem Steel	Volume is based on external dimensions
	IND-3	Tank Near Old Accommodations	-	Yes	2,134	Diesel	Inactive	Unidentified	Horizontal AST	Volume is based on external dimensions
	IND-4	Dirty Water Storage Tank	-	No	63,594	hydrocarbon-contaminated water	Active	Unidentified	Horizontal AST Serial # D87-781	
	IND-5	Spare Tank	-	No	22,730	-	Inactive	Unidentified	Horizontal AST	
	IND-6	Spare Tank	-	N/A	2,290	-	Inactive	Unidentified	Horizontal AST Serial # 671100536	New tank, uninstalled
	IND-7	Generator Station	-	Yes	2,000	Diesel	Active	Unidentified	Horizontal AST	
	IND-8	Incinerator Day Tank	-	Yes	6,669	Diesel	In dead storage	Unidentified	Horizontal AST	Volume is based on external dimensions
	IND-9	Main Cabin Day Tank	-	N/A	455	Diesel	Active	Registration not required	Horizontal AST Model C-643334 2008 Serial # 711	
	IND-10	Mill Tank	-	Yes	2,000	Diesel	Inactive	Unidentified	Horizontal AST	
	IND-11	Fuel Tanker Trailer	-	Yes	-	Diesel	Inactive	Registration not required	Mobile tanker trailer	