Appendix C – Updated Plans Associated with the Application

February 16, 2012

SOUTHAMPTON ISLAND PROJECT

Spill Contingency Plan

Submitted to:
Vale Exploration Canada Inc.
Hwy 17 West
Copper Cliff, ON P0M 1N0

REPORT

Report Number: 1113720019

Distribution:

Nunavut Water Board

Kivalliq Inuit Association

Aboriginal Affairs and Northern Development Canada

Golder Associates

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TABLES

APPENDICES

1.0 INTRODUCTION AND PROJECT DETAILS

Vale Exploration Canada Inc. (Vale) has developed this Spill Contingency Plan for exploration activities at the Southampton Island Project (the Project), including geophysical surveys and drilling.

Spills can cause adverse environmental effects, harm to people, and can be costly to clean up especially in remote areas such as Southampton Island, Nunavut. Therefore, to the extent practical, spills must first of all be prevented. In the event of a spill, impacts to the environment and human health can be reduced if the spill is contained and cleaned up as promptly as possible. Vale is committed to reducing all environmental impacts, including those caused from spills. Vale's corporate values can be found in Appendix A.

Version 3.0 of the Spill Contingency Plan was prepared for the amendment application to the Nunavut Water Board (water licence 2BE-SIP1114) to include the location of the camp and on-ice drilling as part of the project activities. Version 3.0 also addresses the terms and conditions outlined in section 2, Part H: Conditions Applying to Spill Contingency Planning of the Project's water licence. The one item from Part H that has not been addressed is an onsite contact number; this will be provided to the regulatory agencies once a number is available.

This Spill Contingency Plan follows the Government of Nunavut, *Consolidation of Spill Contingency Planning and Reporting Regulations* R-068-93 (Government of Nunavut, 1999) and the Aboriginal Affairs and Northern Development Canada (AANDC), formerly Indian and Northern Affairs Canada, Guidelines for Spill Contingency Planning (AANDC, 2007).

1.1 Project Description

Vale is planning on conducting mineral exploration for nickel on the northeast side of Southampton Island, approximately 65 km northeast of the Hamlet of Coral Harbour, Nunavut.

The project activities are located between 64°52'26" - 64°30'28" N and 82°59'30" - 82°29'28" W (see Figures 1 and 2 in Appendix B). The Project occurs on both Crown and Inuit Owned land, therefore Vale has applied for and received land use permits with AANDC and the Kivalliq Inuit Association (KIA), as well as a water licence with the Nunavut Water Board.

Vale has all the necessary prospecting permits issued by the AANDC Mine Recorder's Office.

In the summer of 2011, Vale carried out a prospecting program. The team of geologists was based in Coral Harbour and flew back and forth each day to the Project.

In 2012, Vale plans to do further mineral exploration work including drilling and a camp to support the drilling program. The proposed camp location is at 64° 45' 43.56"N and 82° 29' 27.24"W and is shown on Figures 1 and 2 in Appendix B. Vale plans on having a drilling program every summer from 2012 – 2017. Depending on the results of the drilling programs, Vale may also do a winter drilling program which would include on-ice drilling.

1.2 Vale Contact Information

Table 1: Southampton Project Contacts

Team Member	Position	Contact Information	Address
Jason Rickard	Senior Geologist	T: 905-403-2548 T: (field) TBA E: jason.rickard@vale.com	Highway 17 West Copper Cliff, ON P0M 1N0
Clare Goddard	Health Safety and Environment Coordinator	T: 705-682-8462 E: clare.goddard@vale.com	Highway 17 West Copper Cliff, ON P0M 1N0

1.3 Spill Contingency Plan Revision List

Table 2 Spill Contingency Plan Revision List

Company	Company Contact	Version	Date Issued	Version Format
Vale Exploration Canada	Everett Makela	1.0	June 27, 2011	Electronic PDF
Vale Exploration Canada	Jason Rickard	2.0	February 3, 2012	Electronic PDF
Vale Exploration Canada	Jason Rickard	3.0	February 16, 2012	Electronic PDF

1.4 Distribution List

Table 3 Spill Contingency Plan Distribution List

Company/Institute of Public Government	Version	Date Issued	Version Format
Nunavut Water Board (water licence application)	1.0	June 27, 2011	Electronic PDF
Indian and Northern Affairs Canada (INAC) (land use permit application)	1.0	June 27, 2011	Electronic PDF
Kivalliq Inuit Association (land use permit application)	1.0	June 27, 2011	Electronic PDF
Nunavut Water Board (amendment application)	3.0	February 16, 2012	Electronic PDF
Aboriginal Affairs and Northern Development Canada (AANDC) (amendment application)	3.0	February 16, 2012	Electronic PDF
Kivalliq Inuit Association (amendment application)	3.0	February 16, 2012	Electronic PDF
Drilling company /expediting company (TBA)	3.0	TBA	Electronic PDF

1.5 List of Hazardous Materials On-Site

The following table provides a list of the hazardous materials, type of storage container, the anticipated operational and maximum volumes on-site and the storage locations and uses.

Table 4: On-site Hazardous Materials Description

Material	Storage Container	Normally On-site		Maximum On-site		Storage Location and Uses
		Fuel Cache	At Drill	Fuel Cache	At Drill	
Diesel Fuel	205 L drums	50 drums (10,250 L)	1-10 drums (205 - 2,050 L)	100 drums (20,500 L)	10 drums (2,050 L)	Fuel cache and adjacent to drill. Diesel will be stored in the fuel cache and daily amounts will be transported as needed with the drill.
Jet B	205 L drums	50 drums (10,250 L)	0	100 drums (20,500 L)	5 drums (5,125 L)	Jet B will be stored at the fuel cache and used by the helicopter when needed
Propane	100 pound bottles	5 bottles	0	10 bottles	0	Propane will be stored at the fuel cache and used for the camp.

The Material Safety Data Sheet (MSDS) for diesel, Jet B and propane are included in Appendix C.

Diesel, Jet B and propane will be provided by the expediting company contracted for the project.

Other hazardous materials found on-site will be in very small quantities and associated with the drill and camp. These would include lubricants, oil, and grease for maintenance of the drill and camp generators/equipment. All servicing of the drill will be conducted over tarps or other impervious materials to catch any leaks, drips, or spills.

1.6 Spill Prevention Measures

1.6.1 Fuel

All fuel used for the project will be stored in 205 L drums. Drums will be slung by helicopter from the Coral Harbour Airport to a fuel cache on the property located next to the camp. Diesel for the drill will be slung by helicopter to the drill sites. Additional fuel may also be stored at a temporary fuel cache at the Coral Harbour Airport. If fuel is to be stored at the Coral Harbour Airport, all necessary access and storage requirements will be discussed with the Government of Nunavut and the airport manager in Coral Harbour prior to setting up the temporary fuel cache.

The fuel cache at the camp will be located on level ground, at least 100 m from any water body.

The camp expeditor will be responsible for ensuring all fuel associated with the camp, diesel and propane, is contained in secondary containment and all transfer hoses and pumps are in good working order. All fuel systems will be maintained and inspected regularly.

Portable drip trays and appropriately sized fuel transfer hoses with pumps will be used when refuelling the drill to avoid any leaks/drips onto the land.

The project supervisor or designated fuel monitor will conduct daily visual inspections to check for leaks or damage to the fuel drums, as well as stained or discoloured soils around fuel cache areas and adjacent motorized equipment. Regular maintenance and oil checks will be conducted on the drill, as determined by the drilling contractor.

There will be spill kits located at the camp/fuel cache and the drill site.

1.6.2 Grey Water

Grey water associated with the camp will be pumped to a sump located at a minimum 100 m from the camp and 30 m from any water body. A 1 m freeboard will be maintained at all times. The sump and pipe will be checked regularly for any leaks or spills.

1.7 Potential Spill Scenarios and Environmental Impacts

The following table identifies the potential spills that may occur during the project and corresponding potential impact to the environment.

Table 5: Potential Materials Spills and Impacts to the Environment

Material (source)	Potential Spill	Potential Spill Volume (worst case)	Potential Environmental Impact
Diesel Fuel/Jet B	1) Over pumping of fuel from drum to drill rig/camp/helicopter 2) Leaking from drill rig/camp equipment 3) Minor leaking from drum inside/outside secondary containment 4) Large puncture, fast leaking drum inside/ outside secondary containment 5) All drums punctured and leaking at once (very unlikely)	Under 205 L (max 100 drums (20,500L))	Diesel and Jet B may be harmful to wildlife and aquatic life. It is not readily biodegradable and has the potential for bioaccumulation in the environment. Runoff into water bodies must be avoided. In the very unlikely worst case scenario if all the drums were opened simultaneously and contents seeped into surrounding soil and water bodies at the Project site fuel cache, this could cause illness or death to aquatic life and indirectly affect wildlife feeding from the land and water.
Drill Cuttings	1) Drill cuttings emanating from the drill hole may spill/flow away from the designated sump/ natural depression into a water body 2) While drilling on-ice drill cuttings may spill onto the ice or spill under the ice	Variable, depending on the drill hole depth and distance to the water body	1) Drill cuttings have high sediment content. If the drill cuttings enter a water body they will increase the turbidity, potentially causing illness or death to aquatic life. 2) Drill cuttings spilled on-ice can be scraped up and moved to the sump, the environmental impact would be minimal. Drill cuttings spilt under ice increase the turbidity, potentially causing illness or death to aquatic life.

2.0 FUEL SPILL RESPONSE

2.1 Response Organization

The field supervisor will be responsible for prevention, containment, reporting, and clean-up of any spill on-site. The field supervisor will also be responsible for all follow-up correspondence with regulatory agencies, if required. The field supervisor will be supported by the Vale Safety, Health and Environment Consultant.

2.2 Identifying, Containing, and Reporting a Fuel Spill

The following sections describe spill response procedures for potential fuel spills, including diesel and Jet B. The procedures are limited to scenarios that will likely occur during the project.

The appropriate MSDS sheets are included in Appendix C and will be included in the spill response kits and should be consulted to identify health and safety hazards.

2.2.1 Initial Action

In the event of any spill, the following tasks will be followed to properly contain the spilled material:

- assess the severity of the spill;
- assess whether the spill, leak, or system failure can be readily stopped or brought under control;
- stop product flow or leak, if possible and if it is safe to do so;
- wear appropriate personal protective equipment from the spill kit, such as impervious clothing, goggles, and gloves when containing the spill; and
- approach from upwind if it is safe to do so.

2.2.2 Spill Reporting

Under the *Consolidation of Spill Contingency Planning and Reporting Regulations* for Nunavut (Government of Nunavut 1999), an immediately reportable spill is defined as either one of the following for diesel or Jet B:

- volume greater than 100 litres (L); and/or
- the spill is likely to be an imminent environmental or human health hazard.

If during the initial action, a spill is assessed to meet either of the two above criteria the spill will be reported as soon as it is safe to do so. **To report the spill, the field supervisor will call the Northwest Territories/Nunavut (NWT/NU) 24-hour spill line at 867-920-8130.**

When able, the field supervisor will complete the NWT/NU Spill Report form (Appendix D) and fax or e-mail the form to the NWT/NU 24-hour spill line at 867-873-6924 (fax) or spills@gov.nt.ca (e-mail).

The AANDC Manager of Field Operations in Iqaluit will also be contacted either by phone at 867-975-4295 or by fax at 867-975-6445.

For non-reportable spills, the field supervisor will fill out the spill report form and it will be kept with the Project file.

2.2.3 Spill on Land

If it is safe to do so, consider the following general spill response procedures for small spills on land, less than 100 L:

- use appropriate absorbent materials, earthen dikes, or trenches to prevent it from flowing out of the spill area or toward water bodies; and
- recover the spill as soon as possible.

For larger spills greater than 100 L, quick containment of spills is necessary to prevent spreading over a large area. This is of greatest concern when spills occur in granular soils (e.g., sand or gravel) and with light products, such as diesel and Jet B. All will flow down-slope, to low points, and away from the spill source.

In some cases, a trench can be dug ahead of the spill on the down slope side to collect the liquid for removal by absorbent booms, pads, buckets, or pumps. To facilitate this, the following steps can be taken.

- construct a soil berm downslope of the spill;
- block entry into waterways, if required, and contain the spill with earth or other barrier(s);
- if appropriate, use synthetic, impervious sheeting to act as a barrier;
- where possible, recover spills using shovels and/or pumps;
- absorb petroleum residue with synthetic absorbent pad materials;
- recover spilled and contaminated material, including soil and vegetation; and
- if the spill is due to a punctured drum, place the drum and any recovered soil in drum overpacks.

Once removed, recovered product and contaminated soil will be contained for handling and disposal. For a large spill, on-site field crews will contain the spill and may need to contact a third party contractor in Coral Harbour to assist with the clean-up.

2.2.4 Spill on Snow

Snow and ice, similar to soil, can be used to create berms to contain spills. Many of the techniques and objectives are similar to those on land. These include the following:

- blocking entry into waterbodies and containment with snow or other barrier(s);
- trenching or ditching to intercept or contain flow of liquids on snow, where feasible;
- compacting the snow around the outside perimeter of the spill area;
- constructing a snow berm with shovels; and
- if feasible, using synthetic liners to provide an impervious barrier at the spill site.

The low point of the spill area should be located and clear channels can be created in the snow to allow free product to flow into that low point. All channels should be directed away from water bodies. The liquid can then be collected by shovelling spilled material into containers.

2.2.5 Spill on Water

Spills on, or near water, should be contained as close as possible to the release point. Spill containment booms can be used to concentrate floating product for recovery. On small spills, absorbent pads can be used to pick up contained diesel. On larger spills a skimmer may be required.

When a spill occurs near a stream, it should be prevented from entering the water, by berming or trenching. If diesel enters a stream, it should be intercepted in calm areas, using absorbent booms. Absorbent booms or pads should not be used in fast currents and turbulent water. The following strategies can be used to contain spills on slow moving or calm water:

- Contain spills on open water immediately to restrict the size and extent of the spill. Diesel that floats on water may be contained through the use of booms, absorbent materials, or skimming.
- Deploy containment booms to minimize spill area; the effectiveness of booms may be limited by wind, waves and other factors.
- Use absorbent booms to slowly encircle and absorb spilled material. These absorbents are hydrophobic (they absorb hydrocarbons and repel water).
- Once booms are secured, use pumps, absorbents, or skimmers to draw in diesel and minimal amounts of water. Skimmed liquids can be pumped through hoses to empty drums.
- Use absorbent pads and similar materials to capture small spills and/or oily residue on water.

In fast current or turbulent waters the use of containment booms may be impractical as petroleum can become entrained in the water flowing under the boom. Other containment or protection methods such as the use of diversion or exclusion booms may be mobilized in the event of larger spill volumes.

2.3 Spill Disposal

Once the spill has been contained and the spilled product has been recovered, either through absorbent materials or removing contaminated soil, snow, or water, all contaminated materials will be packaged in containers for off-site disposal. Contaminated soil, snow, and water will not be treated or disposed at the site.

3.0 SEDIMENT/DRILL CUTTINGS RESPONSE

For drill cuttings that do not flow to the designated sump/natural depression, all efforts will be made to prevent sedimentation of nearby water bodies. Attempts will be made to recover the drill cuttings and direct them to the sump/natural depression. Silt curtains may also be installed downstream of the release to prevent sediment from drill cuttings from entering the water body.

4.0 RESOURCE INVENTORY

There will be two spill kits located at the project site each with a sorbent capacity of 205 L. One will be located with the drill and one at the camp/fuel cache. A third spill kit may be required if diesel is temporarily stored at the Coral Harbour Airport.

The spill kit contents are described below:

- 100 absorbent pads (oil, gas & diesel);

- five 18” x 18” oil absorbent pillows;
- 10 3” x 4’ absorbent socks (oil, gas & diesel);
- one 1 Lb. Jar of Plug n Dike (leak stop);
- eight high density hazmat disposal bags;
- six pairs of nitrile gloves;
- two large tarps;
- three aluminum scoop shovels;
- one Spill Contingency Plan;
- one laminated list of contents; and
- two drum overpacks.

Depending on the severity of the spill, additional resources may be required. The following is a list of contractors and government agencies that could be contacted, depending on the severity of the spill:

- Manager, Field Operations, AANDC – Iqaluit, NU
  - Tel: 867-975-4295.
- Manager, Water Resources, AANDC – Nunavut Regional Office, Iqaluit, NU
  - Tel: 867-975-4550
- Manager, Land Administration, AANDC – Nunavut Regional Office, Iqaluit, NU
  - Tel: 867-975-4280
- Manager, Environment, AANDC – Nunavut Regional Office, Iqaluit, NU
  - Tel: 867-975-4549
- Environment Officer, Environmental Protection Branch, Environment Canada, Iqaluit, NU
  - Tel: 867-975-4644
- Lands Administration, Kivalliq Inuit Association, Rankin Inlet, NU
  - Tel: 867-645-2800
- Environmental consultant, Golder Associates, Edmonton, AB
  - Tel: 780-483-3499
- General contractor, Sudliq Developments Ltd, Coral Harbour, NU
  - Tel: 867-925-8119

5.0 TRAINING

As part of the project orientation, all members of the field crew will be required to read and follow the Spill Contingency Plan. During the Health and Safety orientation on-site all of the field crew will be briefed on the locations of the spill kits and proper use in the event of a spill. All field crew members will be provided revisions of the plan as they are implemented.

6.0 REFERENCES

AANDC, 2007, Guidelines for Spill Contingency Planning, Water Resources Division, Indian and Northern Affairs Canada, Yellowknife, NT, April 2007. Available online: http://www.aadnc-aandc.gc.ca/eng/1100100024236

Government of Nunavut, 1999. *Environmental Protection Act*, Consolidation of Spill Contingency Planning and Reporting Regulations. Department of Resource, Wildlife and Economic Development, Government of the Northwest Territories , Yellowknife, NWT 1999. Available online: http://env.gov.nu.ca/sites/default/files/Spill%20Planning%20and%20Reporting%20Regs.pdf

Report Signature Page

GOLDER ASSOCIATES LTD.

Sarah Gagné, P.Eng.
Project Manager

Art Cole, P.Eng
Principal

SG/AC/bh

APPENDIX A

Vale Values

VALE VALUES

Ethics and Transparency

Our behaviour as an organization, by acting with integrity, abiding by the law, moral principles and behavioural covenants established and accepted by society, and by clearly communicating our policies and results.

Excellence in Performance

The quest for continuous improvement and process control, using performance indicators acknowledged as best practice, promoting a high-performance culture and ensuring that long-lasting competitive advantages are obtained and sustained.

Entrepreneurship

Our determined mindset as an organization that rapidly and unrelentingly seeks new opportunities and innovative solutions in the face of shifting challenges and needs, ensuring the execution of strategies that contribute to Vale's growth.

Economic, Social and Environmental Responsibility

We acknowledge the need for these dimensions to be constantly in balance, promoting development and ensuring sustainability.

Prioritizing Life and Safety

We will never forgo safety. People are more important than results and material goods. There is never a choice to be made regarding someone's life — our only choice is the life, health, and safety of our customers, employees, and communities.

Respect for Diversity

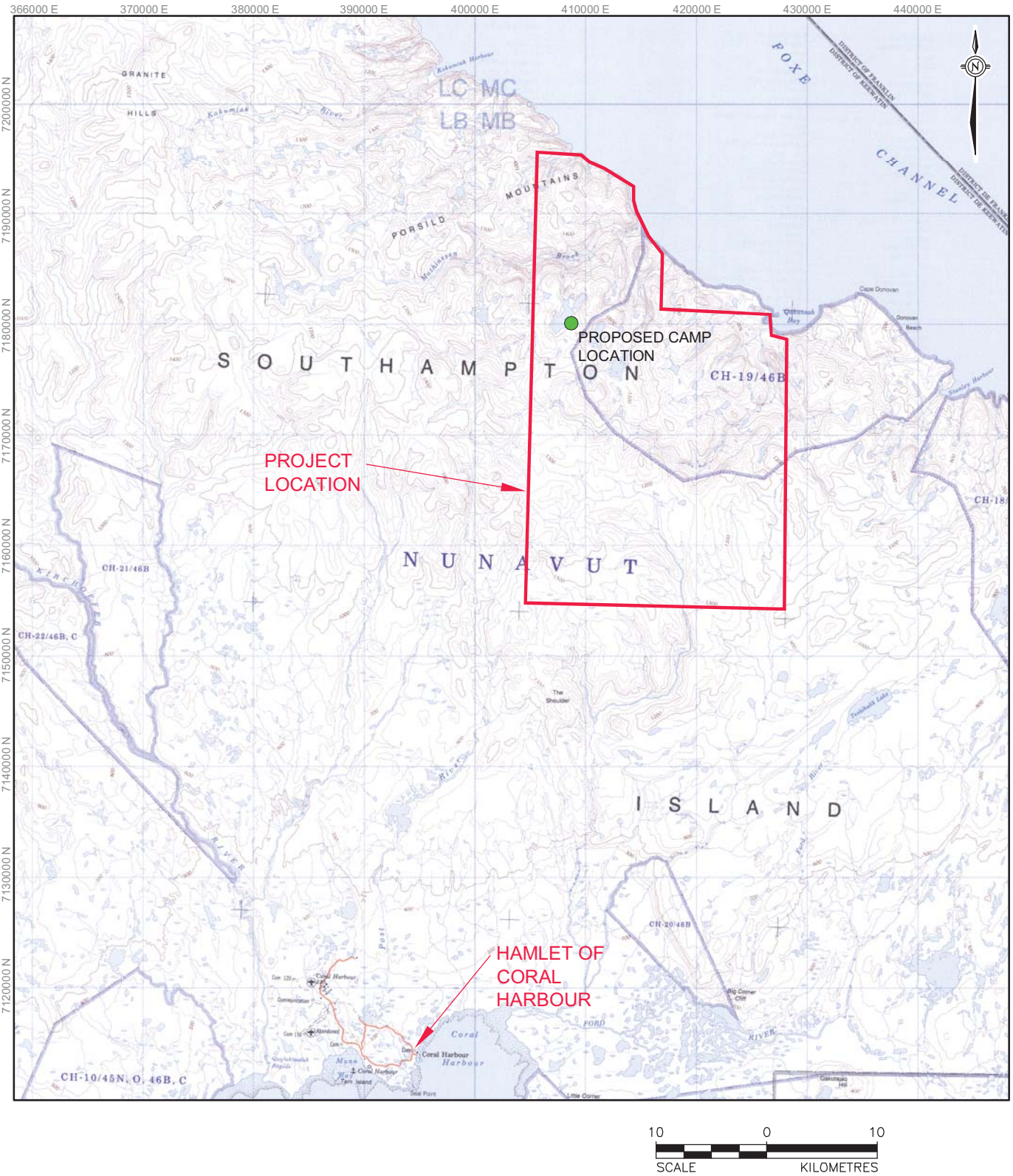
Acknowledging one another as equals, respecting differences and promoting competitive inclusion — and recognizing differences as opportunities for integration and growth.

Proud to "Be Vale"

The result of all these values. We behave as owners of the business, in the relentless quest to achieve our defined goals, sharing and celebrating results and strengthening relationships. We are proud to build something that will make a difference. This is why we are proud to be Vale — all of us, management and other employees of the Company.

APPENDIX B

Site Diagrams



PROJECT

CORAL HARBOUR AREA
SOUTHAMPTON ISLAND, NUNAVUT

TITLE

PROJECT LOCATION MAP

REFERENCE

TOPOGRAPHIC MAPs 46B AND 46G OBTAINED FROM CANMATRIX. © 1986 AND 1995 (RESPECTIVELY) HER MAJESTY THE QUEEN IN RIGHT OF CANADA. DEPARTMENT OF NATURAL RESOURCES. ALL RIGHTS RESERVED. DATUM: NAD83 PROJECTION: UTM ZONE 17.

Golder Associates
Calgary, Alberta

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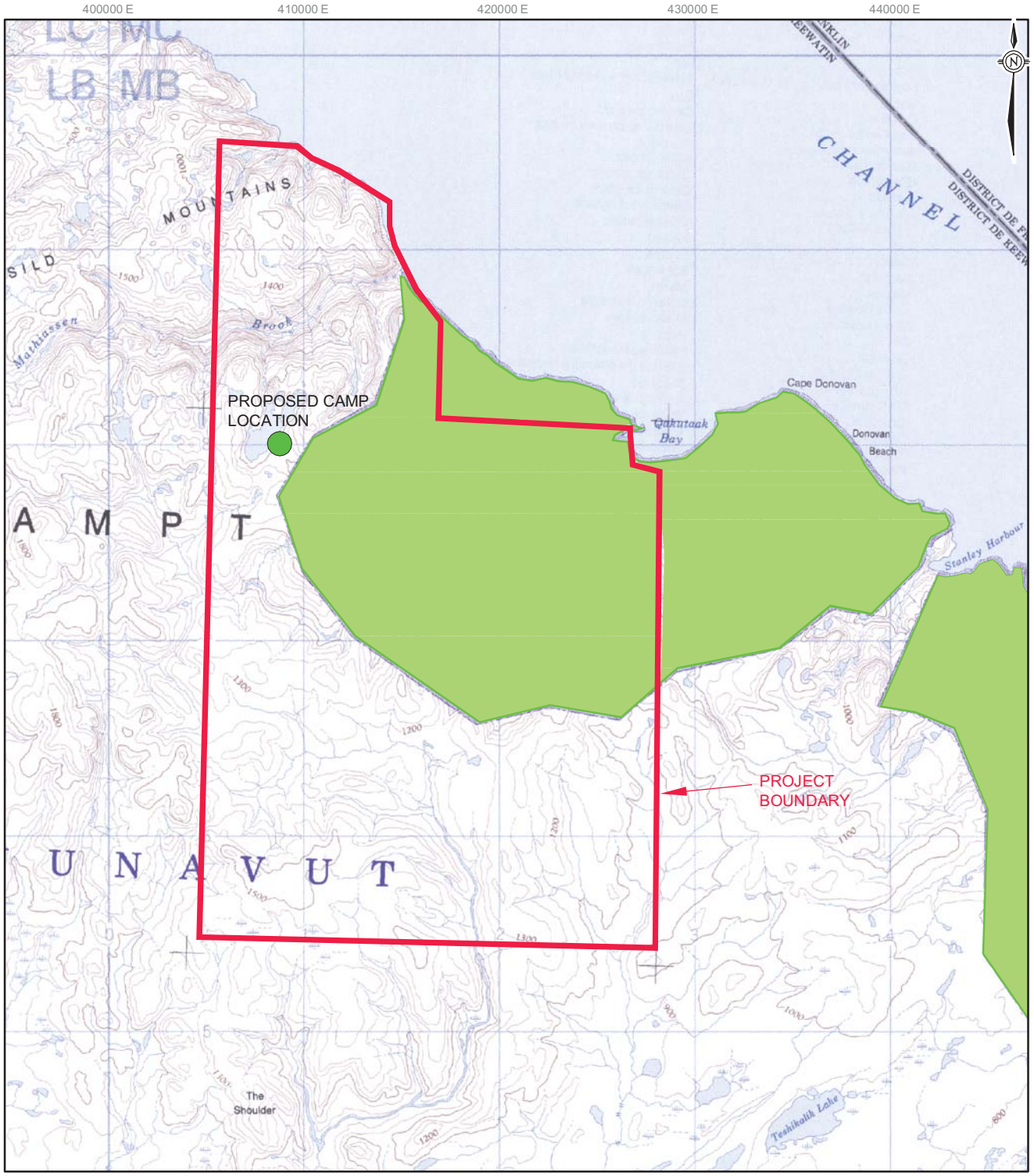

LEGEND

- PROJECT BOUNDARY
- CROWN LAND
- INUIT OWNED LAND

5 0 5 10
SCALE KILOMETRES

REFERENCE

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PROJECT

CORAL HARBOUR AREA
SOUTHAMPTON ISLAND, NUNAVUT

TITLE

SITE MAP

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Calgary, Alberta

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FIGURE: 2

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APPENDIX C

Material Safety Data Sheets

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.
™ Trademark of Suncor Energy Inc. Used under licence.

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 B AVIATION TURBINE FUEL

1 . Product and company identification

Product name : JET B AVIATION TURBINE FUEL

Synonym : Jet B; Jet B DI; JP-4; Jet F-40; NATO F-40; Turbine Fuel, Aviation, Wide Cut Type (Can/CGSB-3.22).

Code : W219, SAP: 150, 151, 152

Material uses : Used as aviation turbine fuel. May contain a fuel system icing inhibitor.

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 like.

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 : DANGER!

EXTREMELY FLAMMABLE LIQUID AND VAPOUR. FLAMMABLE. VAPOUR MAY CAUSE FLASH FIRE. CAUSES SKIN IRRITATION. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. POSSIBLE BIRTH DEFECT HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE BIRTH DEFECTS, BASED ON ANIMAL DATA.

Extremely flammable liquid. Irritating to 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 may cause birth defects, based on animal data. Avoid exposure during pregnancy. 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 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 : Irritating to skin.

Eyes : May cause eye irritation.

Potential chronic health effects

Chronic effects : No known significant effects or critical hazards.

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

2 . Hazards identification

Mutagenicity : No known significant effects or critical hazards.

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 (C6-C14)	64741-41-9	60 - 100
Benzene	71-43-2	0.1 - 0.5
Fuel System Icing Inhibitor (FSII) (if added**): (Diethylene Glycol Monomethyl Ether)	111-77-3	0.1 - 0.15
Anti-static, antioxidant, corrosion inhibitor and metal deactivator additives.	Not applicable	< 0.1

** Please note that Jet B DI, JP-4, Jet F-40 and NATO F-40 all contain Fuel System Icing Inhibitor (FSII). corrosion 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 : 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), sulphur oxides (SOx), aldehydes, ketones, 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.

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
Benzene	**ACGIH TLV (United States). Absorbed through skin.** TWA: 0.5 ppm 8 hour(s). STEL: 2.5 ppm 15 minute(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.

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: -31°C (-23.8°F) [NFPA]

Auto-ignition temperature : 240°C (464°F) [NFPA]

Flammable limits : Lower: 1.3% [NFPA]
Upper: 8% [NFPA]

Colour : Clear and colourless.

Odour : Gasoline like.

Odour threshold : Not available.

pH : Not available.

Boiling/condensation point : 50 to 270°C (122 to 518°F)

Melting/freezing point : Not available.

Relative density : 0.75 to 0.8 kg/L @ 15°C (59°F)

Vapour pressure : 21.1 kPa (158 mm Hg) @ 37.8°C (100°F)

Vapour density : 3.5 [Air = 1]

Volatility : Not available.

Evaporation rate : Not available.

Viscosity : Not available.

Pour point : Freezing point: <-51ºC (<-60ºF) for all types of Jet B including F40

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, diborane and halogen compounds.

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

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Complex mixture of petroleum hydrocarbons (C6-C14)	LD50 Dermal	Rabbit	>2000 mg/kg	-
	LD50 Oral	Rat	>5000 mg/kg	-
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
Benzene	LD50 Dermal	Rabbit	>9400 mg/kg	-
	LD50 Oral	Rat	930 mg/kg	-
	LC50 Inhalation Vapour	Rat	13200 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

11 . Toxicological information

Conclusion/Summary : Not available.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
Complex mixture of petroleum hydrocarbons (C6-C14)	-	2A	-	-	-	-
Benzene	A1	1	A	+	Proven.	+

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	UN1863	FUEL, AVIATION, TURBINE ENGINE	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).

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 : EXTREMELY FLAMMABLE LIQUID AND VAPOUR. FLAMMABLE. VAPOUR MAY CAUSE FLASH FIRE. CAUSES SKIN IRRITATION. CANCER HAZARD - CONTAINS MATERIAL WHICH CAN CAUSE CANCER. 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		3
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 : **12/7/2009.**

Date of issue : 7 December 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

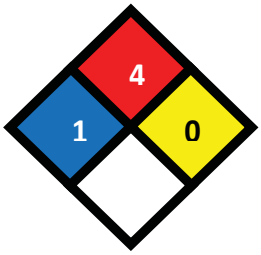
To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material 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

Propane **MSDS NO: 6182**

EMERGENCY OVERVIEW
DANGER!
EXTREMELY FLAMMABLE GAS –
MAY CAUSE FLASH FIRE OR EXPLOSION!
COMPRESSED GAS

High concentrations may exclude oxygen and cause dizziness and suffocation. Contact with liquid or cold vapor may cause frostbite or freeze burn.



NFPA 704 (Section 16)

1. CHEMICAL PRODUCT and COMPANY INFORMATION

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

EMERGENCY TELEPHONE NUMBER (24 hrs): **CHEMTREC (800) 424-9300**
COMPANY CONTACT (business hours): Corporate EHS (732)750-6000
MSDS Internet Website www.hess.com (See Environment, Health, Safety & Social Responsibility)

SYNONYMS: Dimethylmethane, Liquefied Petroleum Gas (LPG), Sales Propane, Commercial Propane, Refinery Propane, Product Propane (non-odorized)

See Section 16 for abbreviations and acronyms.

2. COMPOSITION and INFORMATION ON INGREDIENTS

INGREDIENT NAME (CAS No.)	CONCENTRATION PERCENT BY WEIGHT
Propane (74-98-6)	> 85
Propylene (115-07-1)	< 10
Ethane (74-84-0)	<10
Mixed hydrocarbons [butane (C4) and higher]	<10

Aliphatic hydrocarbons separated from natural gas having carbon numbers in the range of C2 through C4, predominantly C3 (propane and propylene). Propane offer for commercial distribution will be odorized with trace amounts of odorant (typically well below 0.1% ethyl mercaptan).

3. HAZARDS IDENTIFICATION

EYES

Vapors are not irritating. However, contact with liquid or cold vapor may cause frostbite, freeze burns, and permanent eye damage.

SKIN

Vapors are not irritating. Direct contact to skin or mucous membranes with liquefied product or cold vapor may cause freeze burns and frostbite. Ingestion is unlikely. Contact to mucous membranes with liquefied product may cause frostbite and freeze burns. Signs of frostbite include a change in the color of the skin to gray or white, possibly followed by blistering. Skin may become inflamed and painful.

INGESTION
Ingestion is unlikely. Contact with mucous membranes with liquefied product may cause frostbite and freeze burns.

INHALATION
This product is considered to be non-toxic by inhalation. Inhalation of high concentrations may cause central nervous system depression such as dizziness, drowsiness, headache, and similar narcotic symptoms, but no long-term effects. Numbness, a "chilly" feeling, and vomiting have been reported from accidental exposures to high concentrations.

This product is a simple asphyxiant. In high concentrations it will displace oxygen from the breathing atmosphere, particularly in confined spaces. Signs of asphyxiation will be noticed when oxygen is reduced to below 16%, and may occur in several stages. Symptoms may include rapid breathing and pulse rate, headache, dizziness, visual disturbances, mental confusion, incoordination, mood changes, muscular weakness, tremors, cyanosis, narcosis and numbness of the extremities. Unconsciousness leading to central nervous system injury and possibly death will occur when the atmospheric oxygen concentration is reduced to about 6% to 8% or less.

WARNING: The burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

CHRONIC and CARCINOGENICITY
None expected - see Section 11.

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE
Individuals with pre-existing conditions of the heart, lungs, and blood may have increased susceptibility to symptoms of asphyxia (lack of oxygen).

4. FIRST AID MEASURES

EYES
In case of liquid contact with the eyes, open eyelids wide to allow liquid to evaporate. Cover eyes to protect from light. Seek immediate medical attention.

SKIN
In case of blistering, frostbite or freeze burns seek immediate medical attention.

INGESTION
Risk of ingestion is extremely low. However, in cases of ingestion or oral exposure, seek immediate medical attention.

INHALATION
Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

5. FIRE FIGHTING MEASURES

FLAMMABLE PROPERTIES (for Propane)

FLASH POINT:	-156 ^{o}F (-104 ^{o}C)
AUTOIGNITION POINT:	842 ^{o}F (450 ^{o}C)
OSHA/NFPA FLAMMABILITY CLASS:	FLAMMABLE GAS
LOWER EXPLOSIVE LIMIT (%):	2.1
UPPER EXPLOSIVE LIMIT (%):	9.5

FIRE AND EXPLOSION HAZARDS
Liquid releases flammable vapors at well below ambient temperatures and readily forms a flammable mixture with air. Dangerous fire and explosion hazard when exposed to heat, sparks or flame. Vapors are heavier than air and may travel long distances to a point of ignition and flash back. Container may explode in heat or fire. Runoff to sewer may cause fire or explosion hazard.

EXTINGUISHING MEDIA
Use extinguishing media suitable for the surrounding material, preferably or, any extinguisher suitable for Class B fires, dry chemical, fire fighting foam, CO_2, and other gaseous agents. However, fire should not be extinguished unless flow of gas can be immediately stopped.

FIRE FIGHTING INSTRUCTIONS
Gas fires should not be extinguished unless flow of gas can be immediately stopped. Shut off gas source and allow gas to burn out. If spill or leak has not ignited, determine if water spray may assist in dispersing gas or vapor to protect personnel attempting to stop leak.

Use water to cool equipment, surfaces and containers exposed to fire and excessive heat. For large fire the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure.

Isolate area, particularly around ends of storage vessels. Let vessel, tank car or container burn unless leak can be stopped. Withdraw immediately in the event of a rising sound from a venting safety device. Large fires typically require specially trained personnel and equipment to isolate and extinguish the fire.

Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH - approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.

See Section 16 for the NFPA Hazard Rating.

6. ACCIDENTAL RELEASE MEASURES

ACTIVATE FACILITY SPILL CONTINGENCY or EMERGENCY PLAN.

Evacuate nonessential personnel and secure all ignition sources. No road flares, smoking or flames in hazard area. Consider wind direction, stay upwind and uphill, if possible. Evaluate the direction of product travel. Vapor cloud may be white, but color will dissipate as cloud disperses - fire and explosion hazard is still present!

Stop the source of the release, if safe to do so. Do not flush down sewer or drainage systems. Do not touch spilled liquid (frostbite/freeze burn hazard!). Consider the use of water spray to disperse vapors. Isolate the area until gas has dispersed. Ventilate and gas test area before entering.

7. HANDLING and STORAGE

HANDLING PRECAUTIONS
Keep away from flame, sparks and excessive temperatures. Use only in well ventilated areas. See also applicable OSHA regulations for the handling and storage of this product, including, but not limited to, 29 CFR 1910.110 Storage and Handling of Liquefied Petroleum Gases.

STORAGE PRECAUTIONS
Store only in approved containers. Bond and ground containers. Keep away from flame, sparks, excessive temperatures and open flame. Keep containers closed and clearly labeled. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area and in accordance with NFPA 58 “Liquefied Petroleum Gas Code.”

8. EXPOSURE CONTROLS and PERSONAL PROTECTION

EXPOSURE LIMITS

Component (CAS No.)	Source	TWA (ppm)	Note
Propane (74-98-6)	OSHA	1000	
	ACGIH	1000 (as Aliphatic hydrocarbon gases)	
Propylene (115-07-1)	OSHA	None established by OSHA or ACGIH	
	ACGIH	500 ppm; A4	
Ethane (74-84-0)	OSHA	None established by OSHA or ACGIH	
	ACGIH	1000 (as Aliphatic hydrocarbon gases)	
Mixed hydrocarbons [butane (C4) and higher]	OSHA	N/A - Limits above will predominate	
	ACGIH	1000 (as Aliphatic hydrocarbon gases)	

ENGINEERING CONTROLS

Use adequate ventilation to keep gas and vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces. Use explosion-proof equipment and lighting in classified/controlled areas.

EYE/FACE PROTECTION

Where there is a possibility of liquid contact, wear splash-proof safety goggles and faceshield.

SKIN PROTECTION

Where contact with liquid may occur, wear apron, faceshield, and cold-impervious, insulating gloves.

RESPIRATORY PROTECTION

Use a NIOSH approved positive-pressure, supplied air respirator with escape bottle or self-contained breathing apparatus (SCBA) for gas concentrations above occupational exposure limits, for potential for uncontrolled release, if exposure levels are not known, or in an oxygen-deficient atmosphere.

CAUTION: Flammability limits (i.e., explosion hazard) should be considered when assessing the need to expose personnel to concentrations requiring respiratory protection.

Refer to OSHA 29 CFR 1910.134, ANSI Z88.2, NIOSH Respirator Decision Logic, and the manufacturer for additional guidance on respiratory protection selection.

9. PHYSICAL and CHEMICAL PROPERTIES

APPEARANCE

Colorless gas. Cold vapor cloud may be white but the lack of visible gas cloud does not indicate absence of gas. A colorless liquid under pressure.

ODOR

Odorless when pure, but may have a “natural gas” type odor when treated with odorizing agent (usually ethyl mercaptan).

BASIC PHYSICAL PROPERTIES (for Propane)

BOILING POINT: -43.8 °F (-42.1 °C)
VAPOR PRESSURE: 109.73 psig @ 70 °F (21.1 °C)
VAPOR DENSITY (air = 1): 1.56 @ 32 °F (0 °C)
SPECIFIC GRAVITY (H_2O = 1): 0.531 @ 32 °F (0 °C)
SOLUBILITY (H_2O): slight (62.4 ppm) @ 77 °F (25 °C)

10. STABILITY and REACTIVITY

STABILITY: Stable. Hazardous polymerization will not occur.

CONDITIONS TO AVOID and INCOMPATIBLE MATERIALS

Keep away from strong oxidizers, ignition sources and heat. Explosion hazard when exposed to chlorine dioxide. Heating barium peroxide with propane causes violent exothermic reaction. Heated chlorine-propane mixtures are explosive under some conditions.

HAZARDOUS DECOMPOSITION PRODUCTS

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

11. TOXICOLOGICAL PROPERTIES

ACUTE TOXICITY

Propane exhibits some degree of anesthetic action and is mildly irritating to the mucous membranes. At high concentrations propane acts as a simple asphyxiant without other significant physiological effects. High concentrations may cause death due to oxygen depletion.

CARCINOGENICITY

Carcinogenicity: **OSHA:** NO **IARC:** NO **NTP:** NO **ACGIH:**NO

12. ECOLOGICAL INFORMATION

Liquid release is only expected to cause localized, non-persistent environmental damage, such as freezing. Biodegradation of this product may occur in soil and water. Volatilization is expected to be the most important removal process in soil and water. This product is expected to exist entirely in the vapor phase in ambient air.

13. DISPOSAL CONSIDERATIONS

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

14. TRANSPORTATION INFORMATION

PROPER SHIPPING NAME:	Petroleum Gas, Liquefied
HAZARD CLASS:	2.1
DOT IDENTIFICATION NUMBER:	UN 1075
DOT SHIPPING LABEL:	FLAMMABLE GAS

Placard:

15. REGULATORY INFORMATION

U.S. FEDERAL, STATE, and LOCAL REGULATORY INFORMATION

This product and its constituents listed herein are on the EPA TSCA Inventory. Any spill or uncontrolled release of this product, including any substantial threat of release, may be subject to federal, state and/or local reporting requirements. This product and/or its constituents may also be subject to other federal, state, or local regulations; consult those regulations applicable to your facility/operation.

CLEAN WATER ACT (OIL SPILLS)

Any spill or release of this product to "navigable waters" (essentially any surface water, including certain wetlands) or adjoining shorelines sufficient to cause a visible sheen or deposit of a sludge or emulsion

must be reported immediately to the National Response Center (1-800-424-8802) as required by U.S. Federal Law. Also contact appropriate state and local regulatory agencies as required.

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIRONMENT)
The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts natural gas and synthetic gas usable for fuel and any indigenous components of such from the CERCLA Section 103 reporting requirements. However, other federal reporting requirements, including SARA Section 304, may still apply.

SARA SECTION 311/312 - HAZARD CLASSES

ACUTE HEALTH	CHRONIC HEALTH	FIRE	SUDDEN RELEASE OF PRESSURE	REACTIVE
--	--	X	X	--

SARA SECTION 313 - SUPPLIER NOTIFICATION
This product contains the following toxic chemicals subject to the reporting requirements of section 313 of the Emergency Planning and Community Right-To-Know Act (EPCRA) of 1986 and of 40 CFR 372:

INGREDIENT NAME		CONCENTRATION PERCENT BY VOLUME
Propylene	CAS NUMBER: 115-07-1	30 max.

CALIFORNIA PROPOSITION 65 LIST OF CHEMICALS
This product does not contain chemicals that are included on the Proposition 65 “List of Chemicals” required by the California Safe Drinking Water and Toxic Enforcement Act of 1986:

CANADIAN REGULATORY INFORMATION (WHMIS)
Class A (Compressed Gas) Class B, Division 1 (Flammable Gas)

16. OTHER INFORMATION

NFPA® HAZARD RATING

HEALTH:	2
FIRE:	4
REACTIVITY:	1

Refer to NFPA 704 “Identification of the Fire Hazards of Materials” for further information

HMIS® HAZARD RATING

HEALTH:	1	Slight
FIRE:	4	Severe
PHYSICAL:	0	Minimal

SUPERSEDES MSDS DATED: 10/16/2007

ABBREVIATIONS:
AP = Approximately < = Less than > = Greater than
N/A = Not Applicable N/D = Not Determined ppm = parts per million

ACRONYMS:

ACGIH	American Conference of Governmental Industrial Hygienists	API	American Petroleum Institute (202)682-8000
AIHA	American Industrial Hygiene Association	CERCLA	Comprehensive Emergency Response, Compensation, and Liability Act
ANSI	American National Standards Institute (212)642-4900		

DOT	U.S. Department of Transportation [General Info: (800)467-4922]
EPA	U.S. Environmental Protection Agency
HMIS	Hazardous Materials Information System
IARC	International Agency For Research On Cancer
NFPA	National Fire Protection Association (617)770-3000
NIOSH	National Institute of Occupational Safety and Health
NOIC	Notice of Intended Change (proposed change to ACGIH TLV)
NTP	National Toxicology Program
OPA	Oil Pollution Act of 1990
OSHA	U.S. Occupational Safety & Health Administration
PEL	Permissible Exposure Limit (OSHA)
RCRA	Resource Conservation and Recovery Act
REL	Recommended Exposure Limit (NIOSH)
SARA	Superfund Amendments and Reauthorization Act of 1986 Title III
SCBA	Self-Contained Breathing Apparatus
SPCC	Spill Prevention, Control, and Countermeasures
STEL	Short-Term Exposure Limit (generally 15 minutes)
TLV	Threshold Limit Value (ACGIH)
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average (8 hr.)
WEEL	Workplace Environmental Exposure Level (AIHA)
WHMIS	Workplace Hazardous Materials Information System (Canada)

DISCLAIMER OF EXPRESSED AND IMPLIED WARRANTIES

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

APPENDIX D

NWT/NU Spill Report Form

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

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

REPORT LINE USE ONLY

A	REPORT DATE: 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			

At Golder Associates we strive to be the most respected global company providing consulting, design, and construction services in earth, environment, and related areas of energy. Employee owned since our formation in 1960, our focus, unique culture and operating environment offer opportunities and the freedom to excel, which attracts the leading specialists in our fields. Golder professionals take the time to build an understanding of client needs and of the specific environments in which they operate. We continue to expand our technical capabilities and have experienced steady growth with employees who operate from offices located throughout Africa, Asia, Australasia, Europe, North America, and South America.

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Golder Associates

February 16, 2012

SOUTHAMPTON ISLAND PROJECT

Closure and Restoration Plan

Submitted to:
Vale Exploration Canada Inc.
Hwy 17 West
Copper Cliff, ON P1M 1N0

REPORT

Report Number: 1113720019

Distribution:

Nunavut Water Board

Kivalliq Inuit Association

Aboriginal Affairs and Northern Development Canada

Golder Associates

Table of Contents

1.0 INTRODUCTION

Vale Exploration Canada Inc. (Vale) has developed this Closure and Restoration Plan (the Plan) for the Southampton Island Project (the Project), located on Southampton Island, Nunavut approximately 65 km northeast of the Hamlet of Coral Harbour, Nunavut. The Project activities are located between 64°52'26" - 64°30'28" N and 82°59'30" - 82°29'28" W.

The Project area occurs on both Crown and Inuit Owned land, therefore Vale has applied for and recieved land use permits with Aboriginal Affairs and Northern Development Canada (AANDC), formerly Indian Northern Affairs Canada (INAC), and the Kivalliq Inuit Association (KIA), as well as a water licence with the Nunavut Water Board.

Vale has all the necessary prospecting permits issued by the AANDC Mine Recorder's Office.

Version 3.0 of the Closure and Restoration Plan was prepared for the amendment application to the Nunavut Water Board (water licence 2BE-SIP1114) to include the location of the camp and on-ice drilling as part of the project activities.

In the summer of 2011, Vale carried out a prospecting program. The team of geologists was based in Coral Harbour and flew back and forth each day to the Project.

In 2012, Vale plans to do further mineral exploration work including drilling and a camp to support the drilling program. The proposed camp location is at 64° 45' 43.56"N and 82° 29' 27.24"W and is shown on Figures 1 and 2 in Appendix B. Vale plans on having a drilling program every summer from 2012 – 2017. Depending on the results of the drilling programs, Vale may also do a winter drilling program which would include on-ice drilling.

The scope of this Closure and Restoration Plan (the Plan) covers both drilling activities and a camp. The Plan is effective for the term of the water licence.

2.0 PROJECT SCHEDULE

As previously stated, further mineral exploration work is planned for the summer of 2012. Project activities will include drilling and a camp to support the drilling program and will last approximately 2 to 3 months.

In 2013 to 2017, depending on the results of the 2012 and subsequent programs, further exploration work may be undertaken, this may include on-ice drilling.

3.0 CLOSURE AND RESTORATION

3.1 Seasonal Closure and Restoration

The seasonal closure and restoration will take approximately 1 to 2 days to complete and is described in the preceeding sections.

3.1.1 Buildings and Contents

All tent structures will be secured for the winter and all camp equipment such as stoves, beds, shower etc. will remain securely stored on site. No food or food waste will be left on site.

3.1.2 Drill Locations

All drill equipment will be dismantled, packaged, and stored along with its ancillary equipment and rods, as directed by the drilling contractor. The drill will be left on a level surface, away from water bodies.

All drill locations will be inspected immediately after completion of the drill hole. All waste will be collected and taken to camp for incineration or removed to an approved disposal facility. All sumps will be backfilled. All efforts will be made to contour the sump backfill to pre-existing conditions. At each drill site the surrounding soil will be inspected for potential contamination.

3.1.3 Fuel Cache

Any fuel drums or empty drums from the last drill location will be returned to the fuel cache. Empty drums will be returned to the staging area in Coral Harbour and backhauled to an approved facility throughout the project.

Remaining fuel drums at the fuel cache will be inventoried and stored until the next season. All remaining fuel drums and empty drums, as well as secondary containment, will be inspected. Surrounding soil will also be inspected for potential contamination. Any contaminated soil will be treated according to the *Spill Contingency Plan* (Golder 2012).

3.1.4 Waste

For any field program with a camp, Vale will use a modified burn barrel to incinerate paper products, paperboard packaging, untreated wood, food wastes, and food packaging as described in the Government of Nunavut's *Guideline for the Burning and Incineration of Solid Waste* (GN 2010). All other non-hazardous wastes will be packaged and flown to Coral Harbour for disposal in the hamlet landfill, if all necessary tipping fees and access are in place with the hamlet.

For seasonal camp closure, all ash will be removed from the two stage incinerator and disposed in a natural depression or pit at a minimum 31 m away from water bodies or backhauled to Coral Harbour. The soil under and surrounding the modified burn barrel will be inspected for contamination.

Sewage will be incinerated using Pacto toilets this waste will then be burned in a two stage incinerator. Greywater from the camp will be directed to a sump or natural depression at a minimum 31 m from a water body.

3.1.5 Water System

Pumps, tanks, and hoses will be drained, dismantled, packaged, and stored. Hoses will be rolled up and stored.

3.1.6 Contamination Clean Up

Contaminated soil or water at the drill sites or the camp will be treated as described in the *Spill Contingency Plan* (Golder 2012). Photographs before, during, and after the clean-up will be taken and all clean-up activities will be documented.

3.1.7 Documentation and Inspection

Prior to seasonal closure of the site, all remaining equipment and buildings will be inventoried, locations recorded, and photographed. All areas disturbed by the field program, (e.g., drill sites, fuel cache, camp) will be inspected prior to closure for the season. Records of the inspections will be kept in the project file.

3.2 Final Closure and Restoration

3.2.1 Building and Contents

All reusable equipment such as tents, tent frames, stoves, beds, shower etc. will be dismantled and removed from the site. All consumables associated with camp construction, such as nails, screws, anchors etc. will be recovered where possible, packaged, and flown out with other non-hazardous solid waste for disposal.

3.2.2 Drill Locations

All drill and ancillary equipment will be dismantled, packaged and removed from the site. All drill locations will be inspected immediately after completion of the drill hole. All waste will be collected and taken to camp for incineration or removed to an approved disposal facility. All sumps will be backfilled. All efforts will be made to contour the sump backfill to pre-existing conditions. At each drill site the surrounding soil will be inspected for potential contamination.

3.2.3 Fuel Storage

All remaining fuel drums and empty drums will be removed from the site. The soil under and surrounding the fuel cache will be thoroughly inspected for any contamination, and photographs will be taken. Locations where fuel was stored at the drill sites will be inspected during the drill location inspection. Any contaminated soil will be treated according to the *Spill Contingency Plan* (Golder 2012).

3.2.4 Waste

For any field program with a camp, Vale will use a modified burn barrel to incinerate paper products, paperboard packaging, untreated wood, food wastes, and food packaging as described in the Government of Nunavut's *Environmental Guideline for the Burning and Incineration of Solid Waste* (GN 2010). All other non-hazardous wastes will be packaged and flown to Coral Harbour for disposal in the hamlet landfill, if all necessary tipping fees and access are in place with the hamlet.

For final camp closure, all ash will be removed from the modified burn barrel and disposed in a natural depression or pit at a minimum 31 m away from water bodies. The modified burn barrel will be dismantled and removed from the site. The soil under and surrounding the modified burn barrel will be inspected for contamination.

Sewage will be incinerated using two stage incinerator and Pacto toilets will be used. Greywater from the camp will be directed to a sump or natural depression at a minimum 31 m from a water body.

3.2.5 Water System

Pumps, tanks, and hoses will be drained, dismantled, packaged, and removed from the site. Hoses will be rolled up and removed from site.

3.2.6 Contamination Clean Up

Any contaminated soil or water identified during the closure inspections will be treated according to the *Spill Contingency Plan* (Golder 2012). Photographs will be taken, before, during, and after the clean up.

3.2.7 Documentation and Inspection

Prior to final closure of the site, a complete inspection of all disturbed areas will be conducted. The inspection will include recording locations of all disturbed areas (including coordinates), photographing all disturbed areas,

and documenting a description of the area. Information gathered during the final inspection will be used to write a final closure and restoration report. The report will be distributed to the regulatory agencies as required by the project permits and licence. The final closure and restoration report will also include site maps showing the locations of all drill waste sumps, greywater sump, ash disposal area, camp location, and fuel cache location.

3.3 Site Map

Vale has proposed a camp and fuel cache location at 64° 45' 43.56"N and 82° 29' 27.24"W, as shown in Figures 1 and 2 of Appendix A. At this time, the drill locations are unknown for the project. Vale will include site diagrams of the drill locations and camp layout with annual reporting requirements associated with permits and licence for the project.

4.0 REFERENCES

Golder. 2012. Spill Contingency Plan Version 2.0, Southampton Island Project. Submitted to Vale Exploration Canada January 2012.

GN (Government of Nunavut). 2010. Environmental Guideline for the Burning and Incineration of Solid Waste. Department of the Environment. Iqaluit, Nunavut. Available on-line: http://env.gov.nu.ca/sites/default/files/guideline_-_burning_and_incineration_of_solid_waste_1010.pdf

Report Signature Page

GOLDER ASSOCIATES LTD.

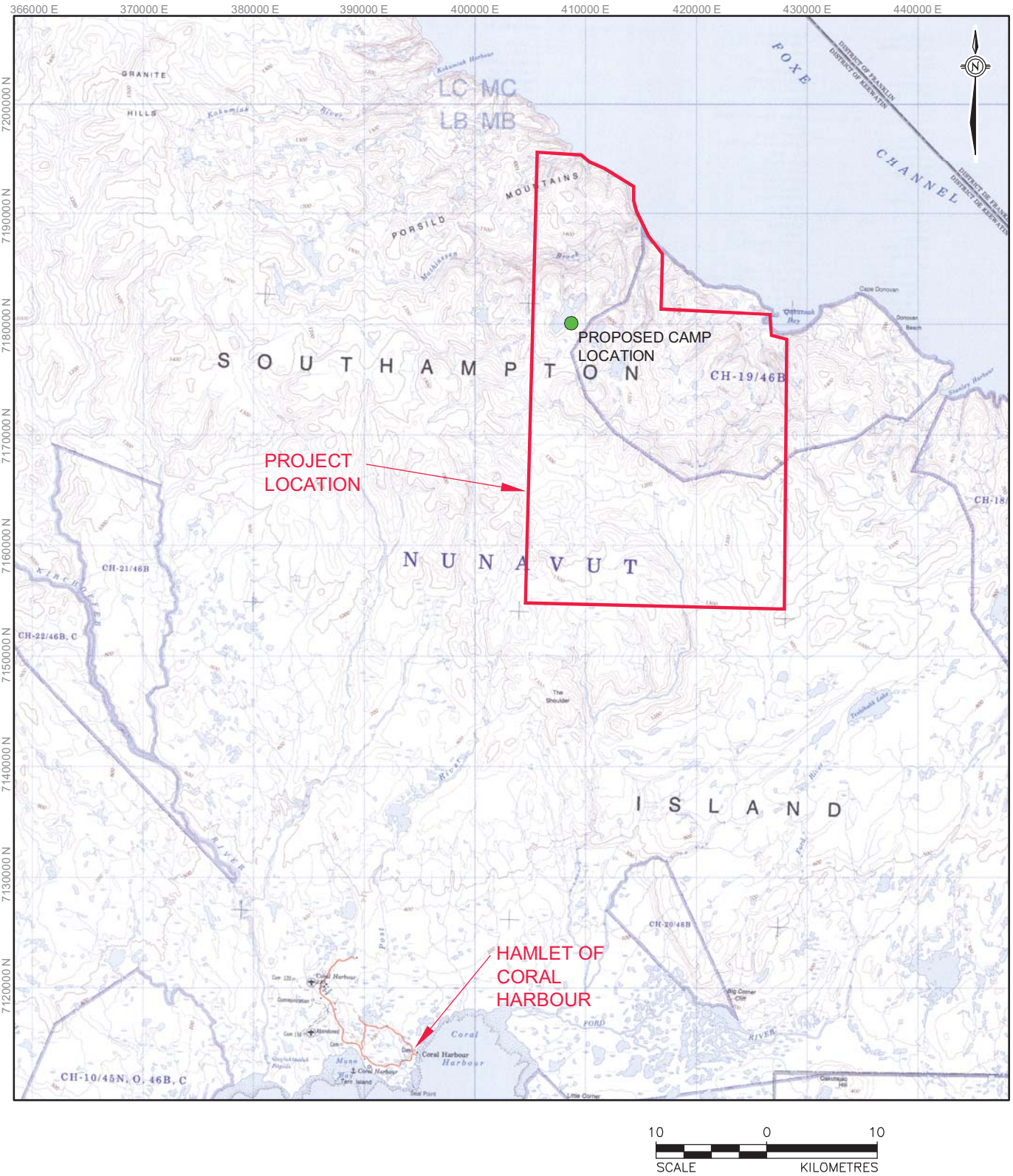
Sarah Gagné, P.Eng.
Project Manager

Arthur Cole, P.Eng
Principal

SG/AC/bh

APPENDIX A

Site Map



PROJECT

CORAL HARBOUR AREA
SOUTHAMPTON ISLAND, NUNAVUT

TITLE

PROJECT LOCATION MAP

REFERENCE

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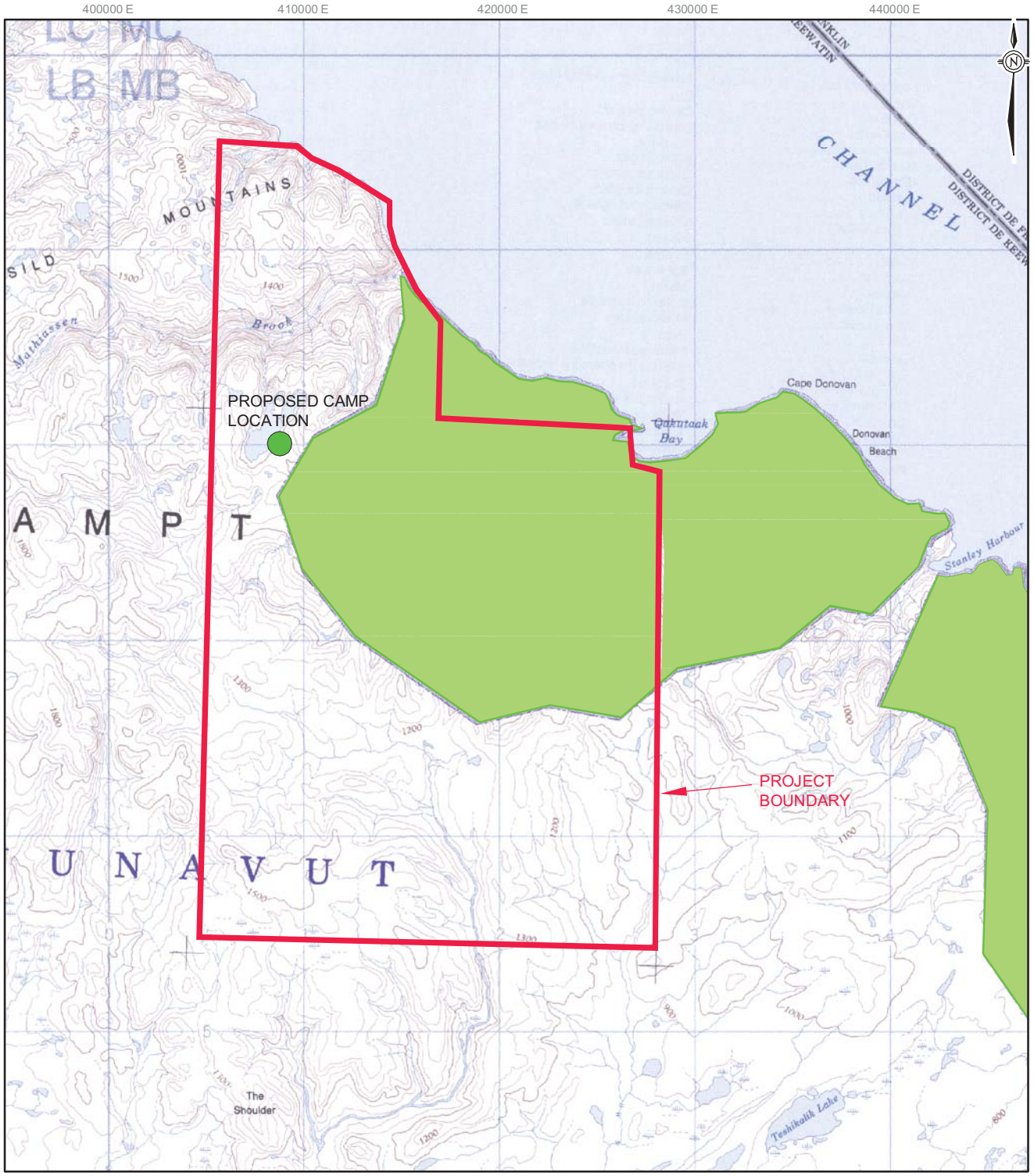
Golder Associates
Calgary, Alberta

PROJECT	11.1372.0019.1000		FILE No.	11137200191000B001
DESIGN	SG	20 Dec. 2011	SCALE	AS SHOWN REV. 0
CADD	BSW	23 Dec. 2011		
CHECK	CD	16 Feb. 2012		FIGURE: 1
REVIEW	JR	16 Feb. 2012		

\\golder.gds\CALIM\CAD\2011\1372\11-1372-0019\1000\Report B\Fig1_11137200191000B001SiteLoc.dwg Feb 16, 2012 - 9:38am



LEGEND

- PROJECT BOUNDARY
- CROWN LAND
- INUIT OWNED LAND

5 0 5 10
SCALE KILOMETRES

REFERENCE

TOPOGRAPHIC MAPs 46B AND 46G OBTAINED FROM CANMATRIX. © 1986 AND 1995 (RESPECTIVELY) HER MAJESTY THE QUEEN IN RIGHT OF CANADA. DEPARTMENT OF NATURAL RESOURCES. ALL RIGHTS RESERVED. DATUM: NAD83 PROJECTION: UTM ZONE 17.

PROJECT

CORAL HARBOUR AREA
SOUTHAMPTON ISLAND, NUNAVUT

TITLE

SITE MAP

Golder Associates
Calgary, Alberta

PROJECT	11.1372.0019.1000	
DESIGN	SG	20 Dec. 2011
CADD	BSW	23 Dec. 2011
CHECK	CD	16 Feb. 2012
REVIEW	JR	16 Feb. 2012

FILE No. 11137200191000B002
SCALE AS SHOWN REV. 0

FIGURE: 2

L:\2011\1372\11-1372-0019\1000\Report B\Fig2_11137200191000B002SitePlan.dwg Feb 16, 2012 - 9:39am

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