Spill Contingency Plan for: High Arctic permafrost landscape stability and water quality research project, on the Sabine Peninsula (updated March 1, 2013)

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Plan was prepared: March 1, 2013 and is effective until August 31, 2014

Site: Sabine Peninsula, study area is a ~20-10 km area that runs from the southern edge of the Barrow dome south to approximately Drake Point. (see map attached with NWB licence application)

The project will make use of a field camp at Cape Collingwood (76°32'12.20"N, 108°37'45.84"W), where we have an established air strip and a lake nearby that will be used for a source of drinking water (76°32'9.84"N, 108°42'49.98"W). The following types of fuel will be used on site: gasoline (stored in CSA approved 19L jerry cans and standard 205 L sealed fuel drums) and propane (stored in CSA approved 100 lb pressurized cylinders). This document outlines the organization of the response, the plan for initial response, reporting procedures in the event of a spill, and spill kits maintained on site.

Spill Prevention Measures:

- All fuel will be stored > 100 m from a water course in approved containers on an impermeable tarp.
- Fuel transfer will be via hand pump over a similar tarp to collect spills and spill absorbent will deployed to adsorb any spills.
- All refueling with gasoline will occur > 100 m away from water courses and with a tarp to collect spills.
- Propane will not spill but care will be taken to avoid the release of gas.
- All empty fuel containers will be removed by aircraft. Remaining fuel will be documented with coordinates and amounts and reported to PCSP Resolute (the provider).
- Unused fuel will be removed at the end of the project.
- We will carry spare fuel in approved containers and fill with spouts while en route with ATVs. Further, we keep a spare empty container available to retain fuel from any container that might leak or fail.

Response Organization: The first person on the site will (1) assess the spill situation, (2) immediately contact the designated person in charge (PIC) in camp and provide all information about the spill. Upon receiving this information, the PIC will recommend a course of action according to the following procedure:

(a) Evaluates the scale of the spill.
(b) Activates the initial response plan.

(c) Implements the spill response plan including containment, recovery, remediation, and disposal operations.
(d) Calls NT-NU 24-HOUR SPILL REPORT LINE. TEL: (867) 920-8130. FAX: (867) 873-6924 as soon as possible to report the spill and provide initial incident details. A Spill Report Form will be faxed to (867) 873-6924
(e) Gathers relevant information and submits a detailed spill report to the applicable regulatory agencies as soon as possible upon return to Resolute, or no later than thirty (30) days after the initial reporting of the spill.

Initial Response Plan
The first person at the site will ensure safety of himself and those near the site. Next she/he will notify the PIC about the spill.

Gasoline:
If possible and safety permits, stop the flow and eliminate ignition sources. No smoking is permitted when responding to a gasoline spill. Use particulate sorbent material to soak up the spill. All contaminated water, snow/ice, soils, clean up supplies, and absorbent materials will be stored in closed, labeled containers. The containers will be stored in ventilated ares away from incompatible materials. Electrically ground all containers and transporting equipment.

Propane:
If possible and safety permits, eliminate all ignition sources. No smoking is permitted when responding to a propane release. Do not attempt to contain or remove release. No disposal is required, as it cannot be contained once it has been released.

Reporting Procedure:
1. Report IMMEDIATELY using the 24 hour Spill Report Line. 24 HOUR SPILL REPORT LINE (867) 920-8130
2. Fill out "SPILL REPORT" form as soon as possible and as completely as possible after making the initial report.
3. Where FAX is available, follow up by sending a copy of the spill Report to FAX # (867) 873-6924
4. If telephone communication is not immediately available, the spill will be communicated to the Base Manager at PCSP via radio.
5. AANDC's Water Resources Inspector ((867)-975-4298) will also be notified as soon as possible.

Spill Kits:
We will have a spill kit in the main lab tent in the field camp, and we will carry portable spill kits on each ATV. Each kit will be inspected by the PIC before heading to camp. Spill kits will contain :
- disposable 5 mil polyethylene bags.
- 17' x 19' x absorbent sheets

- absorbent socks
- PVC oil resistant gloves
- splash protective goggles.

Person in Charge in camp :
July 10-24 2013: Melissa Lafreniere (contact information provided above)
July 24- Aug 1st 2013; Ashley Rudy, PhD Candidate Queen's University, 613-533-6033, ashley.rudy@queensu.ca

Attached with this contingency plan :
A) copy of the Spill Report Form from NT-NU web site;
B) copies of MSDS for standard gasoline and propane

Northwest Territories | Nunavut | Canada

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			

GAS INNOVATIONS

MATERIAL SAFETY DATA SHEET (MSDS) PROPANE

PRODUCT IDENTIFICATION	▪D.O.T. SHIPPING NAME	Propane
	▪SYNONYM (S)	Liquefied Petroleum Gas, Dimethylmethane
	▪D.O.T. I.D. NUMBER	UN-1978
	▪D.O.T. HAZZARD CLASS	2.1 Flammable Gas
	▪D.O.T. LABEL (S)	Flammable Gas
	▪C.A.S. NUMBER	74-98-6
	▪CHEMICAL FORMULA	C_3H_8 or $CH_3CH_2CH_3$
PHYSICAL DATA	▪MOLECULAR WEIGHT	44.097
	▪FREEZING POINT	-187.7°C, -305.9°F
	▪BOILING POINT	-42.1°C, 43.7 °F
	▪VAPOR PRESSURE	752 kPa (gauge), 109 psig
	▪SPECIFIC VOLUME	0.531 m_3/kg, 8.5ft_3/lb @ 1 atm, 21.1°C
	▪RELATIVE DENSITY, (air=1)	1.55 @ 1 atm, 20°C
	▪SOLUBILITY IN WATER	6.5 cm^3/0.1 kg water @ 1 atm, 18°C
	▪DESCRIPTION	At room temperature and atmospheric pressure propane is a colorless, flammable, relatively nontoxic gas, with a characteristic natural gas odor. It is shipped as a liquefied gas under its own vapor pressure.
FIRE AND EXPLOSION HAZARD DATA	▪FLAMMABLE LIMITS IN AIR	2.2 – 9.5 % by volume
	▪AUTO-IGNITION TEMPERATURE	468°C, 874°F
	▪FIRE FIGHTING PROCEDURES	The only safe way to extinguish a Propane fire is to stop the flow of gas. IF the flow cannot be stopped, let the fire burn out while cooling the cylinder and the surroundings using a water spray. Personnel may have to wear approach-type protective suits and positive pressure self-contained breathing apparatus. Firefighters' turnout gear may be inadequate.
	▪ UNUSAUL HAZARDS	1. Cylinders exposed to fire may rupture with violent force. Extinguish surrounding fire and keep cylinders cool by applying water from a maximum possible distance with a water spray. 2. Flammable gases may spread from a spill after the fire is extinguished and be subject to re-ignition.

Date prepared: September 7, 2007

18005 E. Hwy 225 La Porte, TX 77571 www.gasinnovations.com Ph: 281-471-2200 Fax: 281-471-2201

HEALTH HAZARD DATA	▪ PERMISSIBLE EXPOSURE LIMITS	OSHA TWA 1,000 ppm (1,800 mg/m^3) ASGIH TWA None established.
	▪ ACCUTE EFFECTS OVEREXPOSURE	Propane is nontoxic but can act as a simple asphyxiant by displacing air. Symptoms of asphyxia include rapid respirations, dizziness and fatigue. Contact with the liquid phase or with the cold gas escaping from cylinder may cause frostbite.
	▪ CHRONIC EFFECTS OF OVEREXPOSURE	None known.
FIRST AID INFORMATION	▪ INHALATION	Move victim to fresh air. If not breathing, give artificial respiration, preferably mouth-to-mouth. If breathing is difficult, give oxygen. Call a physician.
	▪ CONTACT	Treat for frostbite.
REACTIVITY DATE	▪ STABILITY	(X) Stable. ( ) Unstable.
	▪ INCOMPATIBILITY	Oxidizing material.
	▪ HAZARDOUS DECOMPOSITION/ OXIDATION PRODUCTS	Carbon monoxide, carbon dioxide
	▪ POLYMERIZATION	(X) Will not occur ( ) May Occur
SPILL OR LEAKAGE PROCEDURE	Shut off all ignition sources and ventilate the area. For controlling large flows, personnel may have to wear approach-type protective suits and self-contained breathing apparatus.	
PRECAUTIONS	▪ STORAGE RECOMMENDATIONS	Cylinders should be stored and used in dry, well-ventilated areas away from sources of heat or ignition. Do not store with oxidizers
	▪ PERSONAL PROTECTIVE EQUIPMENT	1. Eye protection – Safety glasses should be worn. 2. Respiratory protection – Approved respiratory equipment must bet be worn when airborne concentrations exceed safe levels. 3. Skin protection – No special equipment is required. Gloves are recommended for cylinder handling.
	▪ BEFORE USING THE GAS	1. Secure the cylinder to prevent it from falling or being knocked over. 2. Leak check the lines and equipment. 3. Have an emergency plan covering steps to be taken in the even of an accidental release.

Date prepared: September 7, 2007

DISCLAIMER

The information, recommendations, and suggestions herein were compiled form reference material and other sources believed to be reliable. However, the MSDS's accuracy or completeness is not guaranteed by Gas Innovations or its affiliates, nor is any responsibility assumed or implied for any loss or damage resulting from inaccuracies or omissions. Since conditions of use are beyond our control, no warranties of merchantability of fitness for a particular purpose are expressed or implied. This MSDS is not intended as a license to operate under, or recommendation to infringe on, any patents. Appropriate warnings and safe handling procedures should be provided to handlers and users.

Date prepared: September 7, 2007

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MATERIAL SAFETY DATA SHEET

Product Name:
Regular Gasoline
(3392)

SECTION 1 – PRODUCT IDENTIFICATION AND USE

Product name	**Regular Gasoline** *Note: All Irving gasolines are unleaded*	**PIN #/**	UN 1203
Chemical name	Natural gasoline	**TDG, DOT class**	Class 3
Common names and synonyms	Automotive gasoline	**Packing group**	II
		Shipping name	Gasoline; Motor spirit; or Petrol
Product use	Fuel		
WHMIS classification	Flammable liquid Class B Division 2 Very toxic Class D Division 2 Subdivision A		

Hazard codes

NFPA	Health	1	**HMIS**	Health	1
	Flammability	3		Flammability	3
	Reactivity	0		Reactivity	0

NFPA & HMIS Ratings: 0=Insignificant/No Hazard. 1=Slight Hazard. 2=Moderate Hazard. 3=High/Serious Hazard. 4=Extreme/Severe Hazard.

Supplier	Irving Oil Limited, Refining Division Box 1260, Saint John New Brunswick Canada E2L 4H6	**Phone** **Emergency (Chemtrec)** **Refinery**	(506) 202-2000 1-800-424-9300 (506) 202-3000

SECTION 2 – HAZARDOUS INGREDIENTS

Ingredients	CAS#	Concentration (%)	ACGIH TLVs (2008) (ppm) TWA	ACGIH TLVs (2008) (ppm) STEL	OSHA PELs (transitional) (ppm) TWA	OSHA PELs (transitional) (ppm) STEL	OSHA PELs (transitional) (ppm) C	OSHA PELs (transitional) (ppm) P	NIOSH RELs (ppm) TWA	NIOSH RELs (ppm) STEL	LD_{50} (rat, oral) (g/kg)	LC_{50} (rat, 4 hr)
Gasoline	8006-61-9	100	300	500	Not available				Not available		13.6	300 g/m^3
Contains a variety of aromatic and aliphatic hydrocarbons including:												
Benzene	71-43-2	Not available	0.5	2.5	10	None	25	50	0.1	1.0	0.9	113,200 ppm
n-Hexane	110-54-3	Not available	50	None	500	None	None	None	50	None	25	48,000 ppm
Toluene	108-88-3	Not available	20	None	200	None	300	500	100	150	0.6	49 g/m^3

Gasoline is a complex mixture of hydrocarbons. Its exact composition depends on the source of the crude oil from which it was produced and the refining methods used. Gasoline contains hundreds of individual organic chemicals. This section identifies only some of the well-known chemical constituents.
TWA means Time-Weighted Average *C means Ceiling*
STEL means Short Term Exposure Limit *P means Peak*

SECTION 3 – PHYSICAL DATA

Form	Liquid	**Specific gravity**	Typically 0.72 to 0.76 @ 15°C
Colour	Clear to yellow	**Vapour density**	Typically 2.5 to 3.7 (air = 1)
Odour	Characteristic odour	**Vapour pressure**	Variable: 400 to 775 mm Hg @ 20°C
Odour threshold	About 0.1 ppm	**Evaporation rate**	Rapid. ~4. (Butyl acetate = 1)
pH	Not applicable	**Boiling point**	29 to 217°C (85 to 424°F)
Coefficient of water/oil distribution	Not available. Expected to be >1	**Freezing point**	Not available

SECTION 4 – FIRE AND EXPLOSION HAZARDS

Flammability ☒ Yes ☐ No **Conditions** Easily ignited by heat, sparks or flames.
Flash point Typically about -43°C (-45°F) (cc) **Auto ignition temperature** Typically 257°C (494°F)
Lower flammable limit Typically 1.4% **Upper flammable limit** Typically 7.6%
Explosion data: Sensitivity to: **Mechanical impact** Not expected to be sensitive **Static discharge** Vapour: yes
Means of extinction In general, do not extinguish fire unless flow can be stopped. Use carbon dioxide, dry chemical, or foam. Cool containers with flooding quantities of water until well after the fire is out.
Special precautions Vapour is heavier than air. It will spread along the ground & collect in low or confined areas (sewers, basements). Also travels to source of ignition and flashes back. Containers may explode when heated.
Hazardous combustion products Carbon monoxide. Nitrogen oxides. PAHs, phenols, and other aromatic hydrocarbons.

SECTION 5 – REACTIVITY INFORMATION

Stability	Stable
Conditions to avoid	Sources of ignition. Static discharges. High temperatures.
Incompatible substances	Oxidizers such as peroxides, nitric acid, and perchlorates.
Hazardous decomposition products	Carbon monoxide, nitrogen oxides, and numerous aromatic hydrocarbons.

SECTION 6 – HEALTH HAZARD INFORMATION

Route of Entry ☒ Inhalation ☒ Ingestion ☒ Skin absorption

Hazardous Contact ☒ Eye ☒ Skin

Acute exposure Headache, nausea, dizziness and other symptoms of central nervous system (CNS) depression. Aspiration into the lungs can cause severe pneumonitis (serious lung irritation), with coughing, gagging, shortness of breath, chest pain, and/or pulmonary edema (fluid accumulation).

Chronic exposure Peripheral & CNS damage, such as tremors, hallucinations, memory loss, & impaired mental capacity. Damage to kidneys and blood-producing system. Prolonged skin contact may cause dermatitis.

Carcinogenicity Gasoline is classified by IARC as possibly carcinogenic to humans; by ACGIH, as a confirmed animal carcinogen with unknown relevance to humans; and by NIOSH as a potential occupational carcinogen. Gasoline is not included in NTP's 11th Report on Carcinogens. Benzene is a recognized carcinogen.

Teratogenicity Yes (toluene)
Reproductive toxicity Not available
Mutagenicity Yes (benzene)

Irritancy Sensitization Skin, eyes, & respiratory tract. Very serious irritant if trapped against skin. Rare allergic skin reactions

Toxicologically synergistic products Ethanol enhances the action of benzene. Methyl ethyl ketone (MEK) and methyl isobuty ketone (MIBK) enhance the action of n-hexane. Other CNS depressants can be expected to produce additive or synergistic effects.

SECTION 7 – FIRST AID

Inhalation Move victim to fresh air. Give artificial respiration if breathing has stopped and if a qualified AR administrator is available. Apply CPR if both pulse and breathing have stopped. Get medical help immediately.

Ingestion Never give anything by mouth if the person is unconscious, rapidly losing consciousness, or convulsing. If the person is conscious, have them drink 8 to 10 ounces of water or milk to dilute the material in the stomach. **Do not** induce vomiting. If vomiting occurs spontaneously, have the person lean forward to avoid aspiration. Get medical help immediately.

Eye Flush eye with lukewarm, gently flowing fresh water for at least 10 minutes. Get immediate medical help.

Skin Quickly and gently blot away excess product. Remove contaminated clothing and shoes. Wash skin gently and thoroughly with water and non-abrasive soap. Get medical help.

SECTION 8 – PRECAUTIONARY MEASURES

Personal protective equipment

Gloves Tychem™BR/LV, Tychem™ Responder™, Tychem™TK, or Viton™ preferred.

Eye Chemical safety goggles or face shield, as a good general safety practice.

Respiratory NIOSH-approved. SCBA or air line respirator with escape cylinder for confined spaces. A qualified occupational health and safety professional should advise on respirator selection. If an air-purifying respirator is appropriate, use a "P series" filter & organic vapour cartridges.

Clothing & footwear Coveralls to prevent skin contact with product. If clothing or footwear becomes contaminated with product, completely decontaminate it before re-use, or discard it.

Engineering controls Enclose processes. Use local exhaust ventilation to remove vapour at its site of generation. Handle laboratory samples in a fume hood. Use mechanical ventilation in confined spaces.

Handling procedures & equipment Eliminate all sources of ignition. Ensure that ventilation systems are explosion-proof, non-sparking, and grounded. Use intrinsically-safe electrical systems. Ground and bond transfer containers. Keep containers closed. Have safety shower and eyewash in the work area. Never siphon gasoline by mouth.

Leak & spill Procedure Keep unauthorized persons away. Eliminate all sources of ignition. Ventilate area. Stop leak if it can be done safely. Prevent entry into sewers, waterways, or confined spaces. Small spills: Contain with earth, sand, or non-flammable absorbent material. Shovel (non-sparking tools) into clean, dry, labelled containers and cover. Flush area with water. Large spills: Contact emergency services for advice.

Waste disposal Contact appropriate governmental agencies for approved disposal of material.

Storage Cool, dry, well-ventilated area, out of direct sunlight. No ignition sources or incompatible materials. Containers should be grounded, vented and equipped with a flame arrester. Consider leak detection and alarm equipment for storage area.

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

SECTION 9 – PREPARATION DATE OF MSDS

Prepared by D. Smith for Irving Oil Refinery
Revision date November 2, 2008

Phone (506) 202-3000
To re-order MSDS, phone (506) 202-2000