

RIO ALGOM EXPLORATION INC. (BHP)
WOLVERINE PROJECT
FUEL SPILL CONTINGENCY PLAN (*draft*)

Prepared by: Megan Fast

January 2019

BHP (Rio Algom)
180 W Magee Road
Tucson AZ 85704

Table of Contents

	Page
Preamble	3
1.0 Introduction	4
2.0 Site Information	4
2.1 Campsite	4
2.2 Campsite and Fuel Caches	5
2.3 Effective Date of the Plan	5
2.4 Background Information on Site	5
3.0 Petroleum & Chemical Storage	6
3.1 Petroleum Transfer Method	6
4.0 Risk Assessment and Mitigation of Risk	6
4.1 Responsibilities	6
5.0 Responding to Failures and Spills	6
5.1 Basic Steps	6
5.2 Reporting Procedure	7
5.3 Emergency Contact List	7
6.0 Action Plans	8
6.1 Spills on Land	8
6.2 Spills on Snow	8
6.3 Spills on Ice	9
6.4 Spills on Water	9
6.5 Spills Due to Accidental Load Release	10
7.0 Resource Inventory	10
8.0 Training/Exercise	10
9.0 Appendices	

PREAMBLE

This Fuel Spill Contingency Plan is effective from the date of issuance of all water licences and land use permits currently being applied for by for its Wolverine Project on Victoria Island until the expiry of said licences and permits.

The Fuel Spill Contingency Plan has been prepared for internal company use and distributed to regulators for approval as part of Rio Algom's Land Use and Water Licence permits.

1.0 INTRODUCTION

The purpose of the Rio Algom Fuel Spill Contingency Plan is to provide a plan of action for any spill event during the Company’s exploration program on Victoria Island in the Kitikmeot Region of Nunavut. This Plan provides the protocol for responding to spills (or potential spills) that will minimize health and safety hazards, environmental damage and clean-up costs as well as defining responsibilities of response personnel. This Fuel Spill Contingency Plan details the sites that operations will be conducted upon, describes the response organizations, action plans, reporting procedures and training exercises in place.

The Fuel Spill Contingency Plan will;

- *Promote the safe and careful use of potentially hazardous materials;*
- *Promote the safe and effective recovery of spilled potentially hazardous materials;*
- *Minimize the environmental impacts of spills to water or land;*
- *Identify roles, responsibilities and reporting procedures for spill events;*
- *Provide readily accessible emergency information to clean-up crews, management and government agencies, and;*
- *Comply with federal and territorial regulations and guidelines pertaining to the preparation of contingency plans and notification requirements in the event of an emergency or spill.*

2.0 SITE INFORMATION

2.1. Campsite

The Wolverine Project camp at South Block’s is temporary 10-person camp located on Crown Land at Zone 12 W 493506 E 7609918 N.

Capacity: **10** people

- Facilities:
- One 14’ x 32’ Weatherhaven sleep tent heated with propane
 - One 14’ x 32’ Weatherhaven kitchen tent heated with propane
 - One 14’ x 32’ Weatherhaven office tent heated with propane
 - Eight pup-tent style tents
 - Two plywood outhouses
 - One heli-pad
 - One strip (existing at Ross airport)
 - Two fuel cache stored in “Insta berms” equipped with water drains
 - Spill response equipment located beside fuel berms and heli-pad

Equipment

- One 7.5 kW diesel generator
- One 50 cc Honda water pump
- One A Star BK2 helicopter
- One Twin-Otter
- Three tent diesel heaters
- One propane kitchen stove/oven
- One propane kitchen refrigerator
- One Incinerator

2.2. Campsite and Fuel Caches

Jet A, diesel fuel, and gasoline to be stored in 45 gal (205 litre) drums stored in portable “Insta Berms” that are outfitted with filtered water drains. These will be located a minimum of 31 metres from the normal high-water mark and in such a manner that no fuel can enter any such water body.

The North Block fuel cache is located at 72° 14' 48.41"N 109° 29' 40.64"W and the South Block campsite and fuel cache are located at 68° 45' 16.06"N 109° 4' 37.67"W. (see Map Attachment A)

2.3. Effective Date of Plan

The Plan is effective concurrent with all licences and permits for the Project.

2.4. Background Information on the Camp Site

The South Block campsite is located at 68° 45' 16.06"N 109° 4' 37.67"W. The terrain is generally rocky without an abundance of vegetation. The fuel cache at the North block is located at 72° 14' 48.41"N 109° 29' 40.64"W.

3.0 PETROLEUM AND CHEMICAL STORAGE

All fuels required for use in the exploration program and at the campsite will be move at request from Cambridge Bay in a Twin Otter. Arrangements have been made for fuel to be stored in Cambridge Bay at a secure location.

<i>Fuel type</i>	<i>Purpose</i>	<i>Size</i>	<i>Total</i>
<i>Jet A</i>	<i>Helicopter use</i>	<i>205 litre drums</i>	<i>3,895 litre</i>
<i>Diesel</i>	<i>Generator</i>	<i>205 litre drums</i>	<i>1</i>
<i>propane</i>	<i>Heater</i>	<i>100 lb tank</i>	<i>200</i>
<i>oil</i>	<i>Generator and Heli</i>	<i>5 litre containers</i>	<i>25</i>

All fuels for exploration purposes ie Jet A, gasoline and diesel are stored in 205 litre (45 gal) metal drums. Propane is stored in standard 100lb propane tanks. Material Safety Data Sheets (MSDS) for these and other petroleum-based products used in the program are in Appendix B.

Temporary remote fuel caches will be located at the Southern and in the Northern Block it will be in accordance with CSA approved methods of storage of drummed product. Spill kits will be located at each temporary remote fuel cache and fuel will be stored in Insta-berms.

Fuel cache inspections will occur on a regular basis for leaks, damaged or punctured drums.

Empty fuel drums will be backhauled to Cambridge Bay or Yellowknife for disposal. A Waste Manifest will accompany all shipments.

3.1 Petroleum Transfer Method

Manual, electric engine powered pumps, along with the appropriate filtration devices, may be used for the transfer of petroleum products from their storage drums to their end use fuel tanks. Spill kits will be at all petroleum transfer stations.

4.0 RISK ASSESSMENT AND MITIGATION OF RISKS

The following is a list of sources:

- Drummed Products: Leaks or ruptures may occur or bung caps may be loose. This includes Jet fuel, diesel, waste fuel and waste oil.

- Fuel cylinders: Propane leaks may occur at the valves.
- Vehicles and Equipment: Helicopter and fixed wing aircraft, generator, pumps.

Incidents involving leaking or dripping fuels and oils may occur due to malfunctions, impact damage, and lack of regular maintenance, improper storage or faulty operation. Regular inspection and maintenance in accordance with recognized and accepted standard practices at all fuel caches, reduces the risks associated with the categories listed above. .

4.1 RESPONSIBILITIES

Camp Manager – responsible for checking fuel drum conditions and evidence of leakage daily, assuring drip trays are in place and not overflowing; keeping spill kits and absorbent mats in good repair and accessible. If spill or likelihood of a spill occurs the Technician will immediately report to the **Project Supervisor**.

Pilots to report spills or potential spills to the **Project Supervisor**.

Project Supervisor will report any spill to the NWT/Nunavut 24-Hour Spill Report Line and initiate clean-up. Project Supervisor will request additional aid from external sources if deemed necessary.

If one or more of these key personnel are absent from the site an alternative person will be named as either Camp Manager or Project Supervisor for the interim.

Project Supervisor - Santiago Gonzalez – (520) 448-5864

Camp manager – Tim Stockhausen -(520) 448-5888

5.0 RESPONDING TO FAILURES AND SPILLS

In the case of any spill or environmental emergency, it is necessary to react in the most immediate, safe and environmentally responsible manner. No spill or incident is so minor that it can be ignored and every spill must be reported.

5.1 BASIC STEPS

The basic steps of the response plan are as follows:

1. Ensure the safety of all persons at all times.
2. Identify and find the spill substance and its source, and, if possible, stop the process or shut off the source.
3. Inform the immediate supervisor or his or her designate at once, so that he/she may take appropriate action. Appropriate action includes the notification of a government official, if required; Spill Report forms are included at the back of this plan.
4. Contain the spill or environmental hazard, as per its nature, and as per the advice of CIRNAC Water Resources Inspector as required.
5. Implement any necessary cleanup or remedial action.

5.2 REPORTING PROCEDURE

Communication in the way of two-way radios will be set-up in the event that if a spill occurs outside of camp or external fuel cache it can be immediately reported to the Project Supervisor.

All spill kits located at all sources of fuel will have contact information for the NWT Spill Report Line prominently displayed.

A listing of the NWT/NU 24 Hour Spill Report Line as well as other government contacts and company officials will be displayed adjacent to the satellite phone in camp. (See Reporting Procedure and Contacts below).

Immediately notify the Rio Algom head office T: (416) 306-0954 and report to the 24 Hour Spill Line at (867) 920-8130 (Fax: 867-873-6924), Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) Land Use Resource Management Officer (867) 982-4306 and KIA Land Use Inspector (867) 982-3310 ext. 223

1. A Spill Report Form (Appendix C) is filled out as completely as possible before or after contacting the 24 Hour Spill Line.

5.3 EMERGENCY CONTACT LIST

CONTACT	CONTACT NUMBER (Tel / Cell)
Santiago Gonzalez, Project Supervisor	(520) 448-5864
Rio Algom Exploration Office, Tucson AZ	(520) 531-6922
Tim Stockhausen, Camp Manager	(520) 448-5888
24 Hour Emergency Spill Line phone / fax	(867) 920-8130, (867) 873-6924
CIRNAC Land Use Resource Management Officer (Kugluktuk)	(867) 982-4306
CIRNAC Water Resources Inspector	(867) 975 4295
Cambridge Bay Health Centre (24 hr phone line)	(867) 983-4500
Cambridge Bay RCMP; Office Hours / Emergency	(867) 645-0123 / (867) 645-1111
Keewatin Air Ambulance	(867) 645-4455
Discovery Mining Services	(867) 920-4600
Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) Land Use Resource Management Officer	(867) 982-4306
Kitikmeot Inuit Association Land Use Inspector	(867) 982-3310 ext. 223

A detailed report on each occurrence must also be filled out with the CIRNAC Water Resources Inspector no later than 30 days after initially reporting the event. The Spill Report Form is attached as Appendix C.

6.0 ACTION PLANS

The following responses are recommended for fuel spills in differing environments. Depending on the location and size of the exploration program, some of the equipment mentioned in the responses listed below will obviously not be located on site but could be transported to the spill if deemed necessary. The most likely scenario for fuel spills in this type of exploration program would include: leaking drums and re-fueling operations. It is not anticipated that a spill of more than 45 gallons will occur as no fuel container on-site will exceed this capacity.

6.1 Spills on Land (gravel, rock, soil and vegetation)

Trench or ditch to intercept or contain flow of fuel or petroleum products on land where feasible (loose sand, gravel and surface layers of organic materials are amenable to trenching/ditching-trenching in rocky substrates is typically impractical and impossible).

Construct a soil berm downslope of the spill. Use of synthetic, impervious sheeting can also be used to act as a barrier.

Where available, recover spills through manual or mechanical means including shovels, heavy equipment and pumps.

Absorb petroleum residue with synthetic sorbent pad materials.

Recover spilled and contaminated material, including soil and vegetation.

Transport contaminated material to approved disposal or recovery site. Equipment used will depend on the magnitude and location of the spill.

Land based disposal is only authorized with the approval of government authorities.

6.2 Spills on Snow

Trench or ditch to intercept or contain flow of fuel or petroleum products on snow, where feasible (ice, snow, loose sand, gravel and surface layers of organic materials as amenable to trench/ditching; trenching in solid, frozen ground or rocky substrates is typically impractical and impossible).

Compact snow around the outside perimeter of the spill area.

Construct a dike or dam out of snow, either manually with shovels or with heavy equipment such as graders or dozers where available.

If feasible, use synthetic lines to provide an impervious barrier at the spill site.

Locate the low point of the spill area and clear channels in the snow, directed away from waterways, to allow non-absorbed material to flow into the low point.

Once collected in the low area, then shoveling spilled material into containers.

Where safe, disposal can be done through in-situ combustion with approval from government and safety consultants.

Transport contaminated material to approved disposal site. Equipment used will depend on the magnitude and location of the spill.

6.3 Spills on Ice

Contain material spill using methods described above for snow, if feasible and/or mechanical recovery with heavy equipment.

Prevent fuel/petroleum products from penetrating ice and entering watercourses.

Remove contaminated material, including snow/ice as soon as possible.

Containment of fuel/petroleum products under ice surface is difficult given the ice thickness and winter conditions. However, if the materials get under ice, determine area where the fuel/petroleum product is located.

Drill holes through ice using ice auger to locate fuel/petroleum product.

Once detected, cut slits in the ice using chain saws and remove ice blocks.

Fuel /petroleum products collected in ice slots or holes can be picked up via suction hoses connected to portable pump. Care should be taken to prevent the end of the suction hose clogging up by snow, ice or debris.

Fuel/petroleum products that have collected in ice slots may be disposed of by in-situ burning if sufficient holes are drilled in ice. Once all the holes are drilled, the oil which collects in the holes may be ignited. Consult with fire/safety consultants and government authorities to obtain approval.

6.4 Spills on Water

Contain spills on open water immediately to restrict the size and extent of the spill

Fuel/petroleum products which float on water may be contained through the use of booms, absorbent materials, skimming and the erection of culverts.

Deploy containment booms to minimize spill area, although effectiveness of booms may be limited by wind, waves and other factors.

Use sorbent booms to slowly encircle and absorb spilled material. These absorbents are hydrophobic (absorb and repel water).

Once booms are secured, use skimmers to draw in hydrocarbons and minimal amounts of water. Skimmed material can be pumped through hoses to empty fuel tanks/drums.

Culverts permit water flow while capturing and collecting fuel along the surface with absorbent materials.

Chemical methods including dispersants, emulsion – treating agents and shoreline cleaning will be considered.

6.5 Spills Due to Accidental Load Release

The loss of external loads of fuel, oil or chemicals from the helicopter requires an immediate response.

- 1) Obtain GPS co-ordinates of the location and contact base camp. Include quantity and type of load loss.
- 2) Base camp will contact the 24-Hour Spill Line and receive instructions on follow up procedures.
- 3) Administer the appropriate procedure for spills on Land, Water, Snow or Ice

NOTE:

1. **Material Safety Data Sheets** for all hazardous materials involved in this project are listed in Appendix B. These MSDS sheets are for diesel, Jet B, propane and oil.
2. In-situ combustion is a disposal method available for fuels and petroleum products. In-situ burning can be initiated by using a large size portable propane torch (tiger torch) to ignite the fuel/petroleum products. Highly flammable products such as gasoline or alcohol, or combustible material such as wood, may be used to promote ignition of the spilled product. The objective is to raise the temperature for sustained combustion of the spilled product.
Precautions need to be taken to ensure safety of personnel. Also, spilled product should be confined to control burning. These include areas where the spilled material has pooled naturally or been contained via dikes, trenches, depressions or ice slots. Prior to any attempts at in-situ burning, consultation with experts and approval by government authorities are required.

3. Chemical response methods are also available and may include the use of dispersants, emulsions-treating agents, visco-elastic agents, herding agents, solidifiers, and shoreline cleaning agents.
4. Biological response methods include nutrient enrichment and natural microbe seeding.
5. Site remediation will be completed as per the advice of government authorities.

7.0 RESOURCE INVENTORY

Resources available on site:

Trenching/digging equipment in the form of picks and shovels.

Pumps

Impervious sheeting (tarps)

Plastic bags, buckets, empty drums for collection of contaminated material.

2 Spill Kits containing:

4 – oil sorbent booms (5" x 10')

100 – oil sorbent sheets (16.5" x 20" x 3/8")

1 – drain cover (36" x 36" x 1/16")

1 – 1lb plugging compound

2 – pair Nitrile gloves

2 – pair Safety goggles

10 – disposable bags (24" x 48")

8.0 TRAINING/EXERCISE

Rio Algom is aware that without practice no Contingency Plan has value.

At least one practice drill will be held each season to give all employees and contractors a chance to practice emergency response skills. Each practice will be evaluated and a report prepared with the objective of learning where gaps and deficiencies exist, and in what areas more practice is required. Response criteria, communication and reporting requirements will be discussed to ensure everyone fully understands them.

APPENDICES

A = PROJECT MAP

B = MSDS SHEETS

C = SPILL FORM



APPENDIX A

