
# Comprehensive Spill Contingency Plan

# GEORGE CAMP

Updated AUGUST, 2016

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# 1. INTRODUCTION AND BACKGROUND

## 1.1. Background

Sabina Gold & Silver Corp. (Sabina) is actively exploring the Back River property mineral rights (encompassing the primary exploration camp at Goose Lake, as well as a satellite camp at George Lake and unoccupied claim groups at Boot Lake, Boulder Pond, Wishbone and Del Lake.

The Back River exploration project is located in western Nunavut, south of Bathurst Inlet within the Slave Structural Province. It lies approximately 525 kilometres northeast of Yellowknife, NWT and 400 kilometres south of Cambridge Bay, NU. The project area is within the zone of continuous permafrost, and is represented on National Topographic System 1:250,000 scale map sheets 76F, 76G, 76J, and 76K.

## 1.2. Purpose

This spill emergency plan has been implemented to ensure that Sabina respects all applicable laws, regulations and requirements from federal and territorial authorities. Sabina has obtained and complies with all required permits, approvals and authorizations required for the operations. The following regulations and documents constitute an integral part of the Plan:

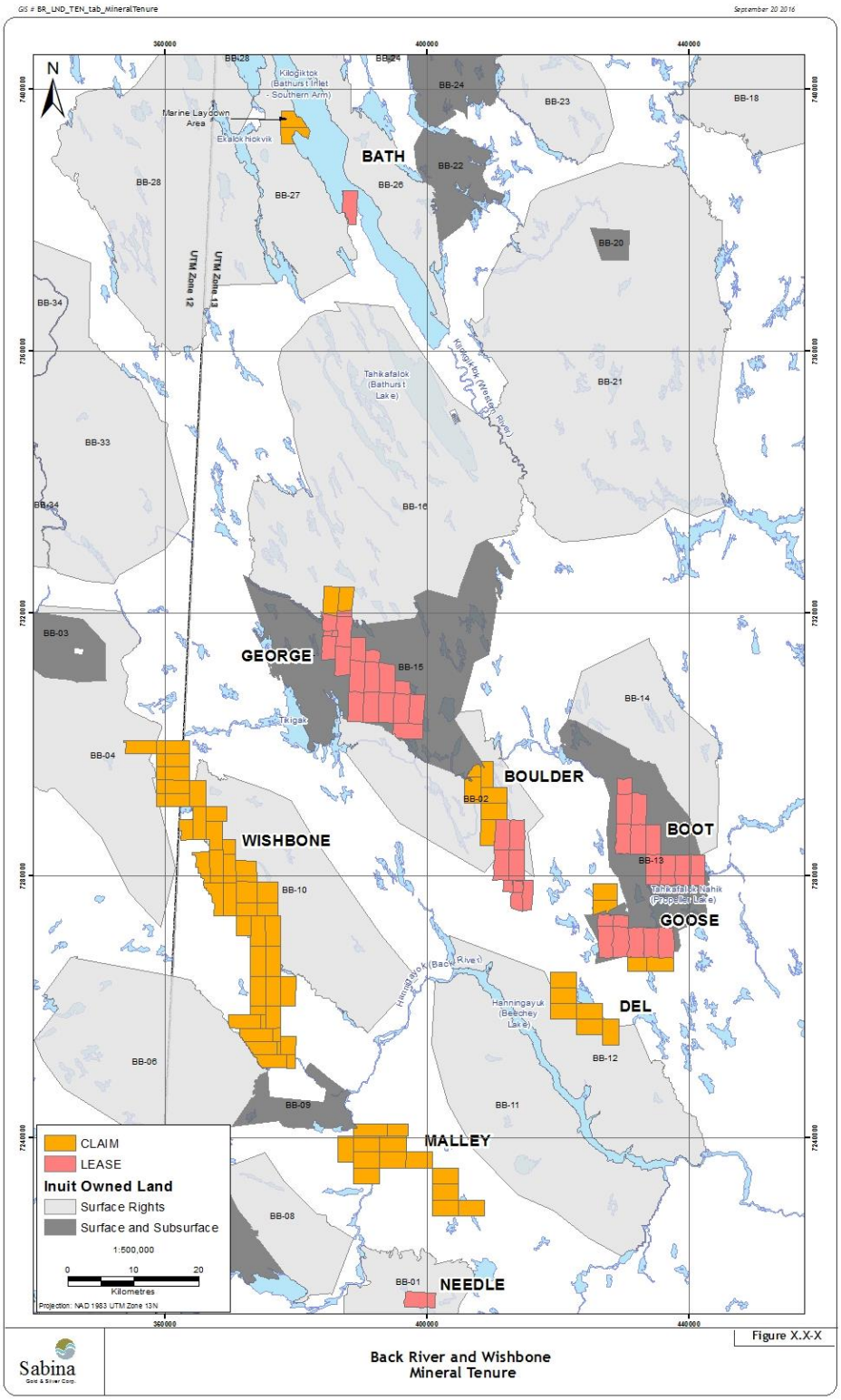
- The Canadian Environmental Protection Act controls hazardous substances from their production and/or import, their consumption, storage and/or disposal.
- The federal Fisheries Act protects fish and their habitat from pollution and disturbances. Fisheries and Oceans Canada reviews permit applications and restoration plans submitted by other agencies.
- The federal Transportation of Dangerous Goods Act and Regulations ensure the protection of public health and safety, and the environment during the handling and transport of dangerous goods. The Regulations apply to all modes of transportation, by road, by sea, and by air.
- The federal Territorial Land Use Regulations define regulatory measures to maintain appropriate environmental practices for any land use activities on territorial lands that are under the control, management and administration of the Crown. These regulations require that land use permits be issued for operations such as mineral exploration and mining.
- The Guidelines for Preparation of Hazardous Material Spill Contingency Plans describe parameters that should be considered in the development of hazardous material spill emergency plans. It also defines the information that should be incorporated into a comprehensive contingency plan.
- The CCME Code of Practice for Used Oil Management defines appropriate environmental options for handling, storage, collection, recycling, transport, reuse and/or disposal of used oils in Canada. It helps regulatory authorities formulate provincial and/or regional strategies for used oil management.

- The Nunavut Environmental Protection Act governs the protection of the environment from contaminants. The act defines offences and penalties as well as the powers of government inspectors.
- The Nunavut Spill Contingency Planning and Reporting Regulations describe requirements for spill reporting and emergency planning.
- The Field Guide for Oil Spill Response in Arctic Waters developed for the Emergency Prevention, Preparedness and Response Working Group, describes precise response methods and strategies for emergency response operations and provides technical support documentation.
- The Land Transportation Emergency Response Guideline for Petroleum Spills developed by the Canadian Petroleum Products Institute outlines scope, emergency response code of practice, response time guidelines, response equipment and personnel capability requirements.
- The Canada Shipping Act (CSA), as amended by Chapter 36, stipulates that operators of designated Oil Handling Facilities must have an on-site Oil Pollution Emergency Plan.
- The Canada Shipping Act Response Organizations and Oil Handling Facilities Regulations (sor/95-405) apply.

This document is a review and analysis of the preparedness for events which may occur due to unforeseen circumstances. The plan details response actions to be taken in the event of unintentional materials release during the ongoing exploration program and associated support such as camps and overland transport. The plan is dynamic and will be updated at least annually to address any significant changes in operating plans, should they occur.

A copy of the plan will be posted at all exploration camps.

**Figure 1. Location map of the Sabina's exploration properties within Western Nunavut.**



## 1.3. Sustainable Development Policy

Sabina Gold & Silver Corp. regards itself as a responsible explorer and mineral developer. We are committed to fostering sustainable development throughout all stages of our activities. We constantly strive to conduct our operations in a manner that balances the social, economic, cultural and environmental needs of the communities in which we operate.

To build on this commitment, Sabina will:

- Meet or strive to exceed all relevant legislated sustainable development requirements in the regions where we work.
- Ensure appropriate personnel, resources and training is made available to implement our sustainable development objectives.
- Establish clear lines of responsibility and accountability throughout the company to meet these objectives.
- Implement proven management systems and procedures to facilitate our sustainable development objectives. A Priority will be placed on developing and implementing management structures related to the environment, health and safety, emergency response and stakeholder engagement.
- Act as responsible stewards of the environment for both current and future generations. We will make use of appropriate assessment methodologies, technologies and controls to minimize environmental risks throughout all stages of mineral development.
- Work closely with local communities and project stakeholders to understand their needs, address their concerns and provide project-related benefits to create win-win relationships. Our goal is to earn and maintain a social license to operate at all our operations while building partnerships.
- Pursue economically feasible projects in order to generate shareholder profitability and support long-term positive socio-economic development in the regions where we work.
- Utilize a precautionary approach as it applies to potential effects from our activities. Work with employees, contractors and stakeholders to promote a culture of open and meaningful dialogue to ensure that any known or suspected departures from established protocols are reported to management in a timely manner.
- Regularly review this policy to ensure it is consistent with Sabina's current activities and the most recent legislation.
- Continually improve our performance and contributions to sustainable development including pollution prevention, waste minimization and resource consumption.
- Implement programs at each of our operations to monitor and report compliance and proactively address potential deficiencies in our policies and procedures.

The objectives of our sustainable development policy cannot be accomplished without the active involvement and commitment of many dedicated individuals. As such, we will regularly communicate this policy and its outcomes to our employees, contractors and relevant stakeholders. Together, we can foster a culture of sustainable development at Sabina.

## 1.4. Sabina Policy on Initiation for Cleanup Activities

Sabina initiates clean up activity when, in the opinion of management, Sabina is clearly associated, or likely associated with the spilled product. The guiding principles of Sabina's Comprehensive Spill Contingency Plan is to comply or exceed existing regulations to ensure protection of the environment, and to keep employees, government officials and the public aware of our plans.

## 1.5. Risk Management

The likelihood of a significant spill event occurring at Back River at the George tank farm is very low, due to the double-walled tanks contained in the lined, bermed area, and the prescribed procedures for fuel transfer and anti-siphon devices in the tanks.

The greatest likelihood of incident is associated with drummed fuel including the rupture of drums during movement or leaks during storage. The first risk can be mitigated through proper operator training of equipment operation, clear marking and segregation of fuel supplies and heightened operator awareness when working near fuel supplies. The second risk is mitigated with secondary containment and frequent inspection of the drums (carried out during regular yard duties). Additional hazards are present during refueling operations (mitigated with drip trays and absorbent mat), and during local drum movement (e.g. from storage to helipads), which is mitigated by using experienced operators, carefully securing the drums to the loader during movement, and safe driving practices.

Salt, used in the drilling process, is delivered in pelletized form, making any spill easier to clean up. Regular inspection of the storage area will allow for rapid detection of any spill.

Frequent inspections of the greywater line will turn up any leaks in the system which can be quickly repaired. Any issues would likely be noticed by most people in camp as either moisture and/or an odor would be present.

The likelihood of drill additives entering a water body is extremely small. With the exception of on-ice drilling, drills are located at least 31 m above the high water mark of lakes, ponds and streams, with vegetation and overburden material providing an effective mechanical barrier to the transport of materials to the water body. As an added mitigation measure, geo-textile cloth fences are constructed on the downhill side of all new drill setups. For on-ice drilling, excess return water is pumped to a point on shore more than 31 m from the estimated high water mark (difficult to determine conclusively due to snow cover). Snow and lake ice also create an effective barrier and containment mechanism to spills of material at the drill site, allowing for easy cleanup. Drill sites are inspected for cleanliness upon completion of the hole.

Despite the mitigation measures taken, should any incident arise as a result of human error or unforeseen circumstances, the operating procedures outlined in this document will be implemented.

## 1.6. Existing Facilities

The Sabina mineral exploration camps are located in the Kitikmeot Region approximately 525 kilometres northeast of Yellowknife, NWT and 400 kilometres south of Cambridge Bay, NU.

### 1.6.2. George Camp

The George camp is located on the western shore of George Lake (Figure 2) and consists of an approximate 50 person camp. These facilities are located on the eastern side of an esker which has been partially leveled for use as an airstrip. The lakeshore is approximately 60 m to the east of the camp buildings. A lined, bermed bulk fuel storage area is located approximately 100 m off the northwest end of the airstrip.

- Latitude: 65º 55'N, Longitude: 107º 27'W
- UTM coordinates: 388106 E, 7313281N on NTS Map Sheet 76 G/14

**Figure 2. Aerial image of George camp. Photograph taken June, 2016.**

### 1.6.3. Temporary Camps for Resupply and Exploration

Temporary camps for up to 20 people may be established for a season in exploration target areas located 20 km or more from the main camps and would be established for safety, environmental and economic reasons. The intent is not to establish a network of camps across the exploration area, but to have the opportunity and flexibility to establish these temporary camps as needed. Possible locations will be identified based on need and safety. No sewage system will be installed in these camps as no water is needed for Pacto toilets. All solid waste will be carried to the existing camps (Goose and/or George) and disposed as outlined in the approved waste management plan.

Greywater generated in the kitchen, showers and laundry facilities is collected in 500 litre, plastic holding tanks. All cleaning agents are biodegradable and phosphate free. On an as-needed basis the grey-water would be pumped to a suitable disposal sump located well back from the local waterways and would be allowed to naturally percolate into the underlying ground.

### 1.6.4. Overland Corridors

A winter road links the two camps (Goose and George) and extends to Bathurst Inlet. Temporary camp facilities and fuel and chemical storage areas may also be accessed as needed to support exploration activities.

Overland transportation may occur between mid-February to mid-May depending on environmental conditions and operational requirements. Environmental conditions that will determine the route include:

- Ice thickness of a sufficient thickness to support heavy equipment so that pumping and using water to build up will be unnecessary.
- Snow thickness will be a minimum of 15 cm on land to prevent damage to soil and vegetation.
- Weather conditions permit safe transport of equipment and materials.

Diesel fuels and lubricants will be used during the construction and operation of the winter road. Other fuel and materials to be transported along the corridor include diesel fuel, aviation gas, drilling additives such as calcium chloride and construction materials.

Storage of these products and wastes will be in compliance with legislation and the National Fire Code that ensures the hazardous materials are stored safely, in a dry manner with clear labeling and secondary containment. All storage areas will be clearly identified with proper labeling and signage. All storage areas will be regularly inspected and stored at least 100m from the high water mark of any water body within secondary containment.

MSDS information for the potential contaminants and products to be transported along the winter road are available on-site.

# 2. MATERIALS TRANSPORT AND STORAGE

## 2.1. Fuel Storage

Diesel fuel is required to generate power on-site, heat buildings and to fuel mobile equipment. The diesel fuel storage at the camps consists of 205L drums as well as double walled tanks (up to 70,000L ULC-approved) situated within a lined secondary berm. Secondary containment (Instaberms) are used for all of the drummed fuel on site. Anticipated fuel supplies for 2016 for George camp are as follows:

**Table 1. Estimate of 2016 Bulk Supplies currently onsite for future Exploration Program**

| Fuel | George | Temporary camp* |
|---|---|---|
| Diesel – Envirotanks | 72,000L shared between two 70,000L enviro tanks | n/a |
| Diesel – 205 L drums | 42 drums | n/a |
| Jet fuel – 205 L drums | 4 drums | n/a |
| Gasoline | 4 drums | n/a |
| AvGas – 205 L drums | 1 drum | n/a |
| Propane – 100 lb cylinders | 15 | n/a |
| Propane – 250 lb cylinders | n/a | n/a |

Supplies will be replenished with quantities dependent on the scope of the program which will be determined. Inventories of fuel at each site are dynamic and are dependent on exploration activities underway and number of personnel in camp.

Drummed fuel is required to support drilling and helicopter activities outside of camp and is strategically relocated as required. All drums are located at least 31 metres above the high water mark of any water body to a maximum volume of 4,000 L (approximately 19 drums) in each cache. Specialized oils and greases used by the drilling contractors are stored in sheds or sea-cans designated for that purpose.

## 2.2. Domestic Greywater and Sewage

Greywater from the kitchen and shower facilities is screened for coarse particles (e.g. food), and released to a sump for settling, after which it is released to a natural depression in the environment. Sewage is managed through using a Pacto toilet system with incineration of the ensuing waste.

## 2.3. Solid Waste

Combustible solid wastes generated from the camp activities are incinerated. Products such as putrescible domestic and office waste are burned. Noncombustible wastes such as scrap metal, non-reusable barrels, incinerator ash, etc., are removed from site using back-haul flights to Yellowknife.

Although the potential for waste rock (including drill core) currently stored to be acid producing is unlikely, any such waste would be disposed of in an approved location and under acceptable practices. Preliminary ARD studies indicate a low likelihood of acid generation.

## 2.4. Chemicals

Sabina is committed to the safe and proper handling of waste materials to ensure minimal environmental impact and land disturbance. Waste chemicals that require special attention and handling include waste oil, hydraulic oil, lubricating oil, calcium chloride, grease, and ethylene glycol.

Waste oil is used to both heat the maintenance and core logging facilities, or to fuel the incinerator at George camp. If not used to fuel heaters or incinerator, waste oil and oil from filters are backhauled for appropriate disposal. Drained spent oil filters will be stored in drums for removal from the site for disposal at an authorized disposal facility.

For drilling, calcium chloride is added to the fresh water to form a brine solution that acts as antifreeze when drilling in permafrost conditions. The drilling return water is reheated and reused using a mega-bag system which catches the drill cuttings as well.

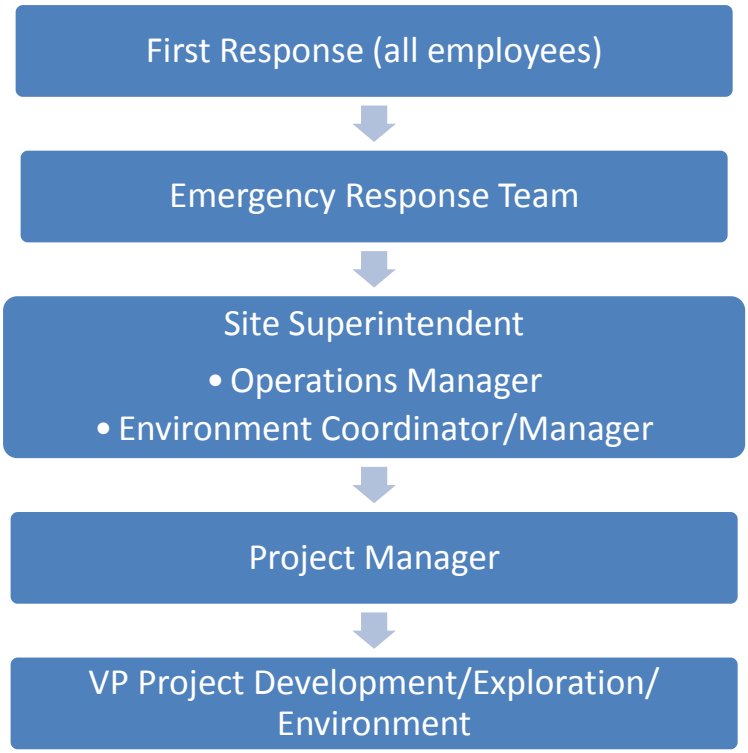
Explosive products, when/if on-site, will be stored in appropriate facilities at designated explosives storage site(s).

Small quantities of various household chemicals are on site for domestic use.

Material Safety Data Sheets (MSDS) will be collected and kept at the site for all chemicals and fuel products. Appropriate storage and handling of these products will be undertaken.

# 3. ROLES AND RESPONSIBILITIES

The general response and notification chart is presented in the following:




## 3.1. All Employees (First Responders)

- Immediately warn other personnel working near the spill area.
- Evacuate the area if the health and safety of personnel is threatened.
- Notify direct supervisor or site superintendent, who will initiate the spill response operations.
- In the absence of danger, take any safe and reasonable measure to stop, contain and identify the nature of the spill.
- Participate in spill response as directed by the Site Superintendent.

## 3.2. Emergency Response Team (Spill Cleanup Crew)

- Conduct cleanup of significant spills under direction of Site Superintendent.

## 3.3. Site Superintendent

- Assemble and manage the Emergency Response Team, as required.
- Ensures cleanup is completed to Sabina standards in line with direction from the Operations. Manager, Environmental Coordinator/Manager, and Project Manager.
- Notify Operations Manager, Project Manager, and Environmental Coordinator/Manager of incident.

- Provides update to the Operations Manager, Project Manager, and Environmental Coordinator/Manager.
- Record date, location (GPS), material spilled, volume, reason for release, any negative impact, status of cleanup, and corrective actions taken.
- Keep and maintain database of all reportable and non-reportable spills as identified in the Plan.
- Conducts ongoing monitoring of cleanup operations leading to close-out.

## 3.4. Operations Manager

- Provides advice and ensures cleanup is completed to Sabina standards in line with direction from the Project Manager and Director, Environment and Community Relation.
- Ensures Emergency Response Team is adequately trained in spill response.
- Ensures Emergency response and/or monitoring equipment and supplies are regularly inspected and maintained
- Organize spill response training and exercises.
- Lead investigation and identify measure and/or training to prevent similar spills.

## 3.5. Environmental Coordinator/Manager

- Provides advice and ensures spill is documented appropriately as per this plan and regulatory requirements.
- Record date, location (GPS), material spilled, volume, reason for release, any negative impact, status of cleanup, and corrective actions taken; confirm these details with Site Superintendent.
- Obtain photographs of spill site before clean up starts if possible and after the cleanup has been completed. Take pictures of undisturbed area beside the spill area for a comparison. If spill occurs on snow, stake or otherwise identify the affected area so that it can be evaluated once the snow melts.
- As directed by the Director, Environment and Community Relations and Project Manager liaise with NWT/NU applicable agencies regarding on-going cleanup activities, inspections and incident closure
- Assist in initial and ongoing response efforts.
- Provide advice to assist with cleanup.
- Co-ordinate inspections and spill closure by applicable agencies.
- Assist with investigation and identify measure and/or training to prevent similar spills.

## 3.6. Project Manager

- Notify HQ staff including VP Exploration and Director, Environment and Community Relations for any reportable spills as identified in this Plan

- With Site Superintendent and Operations Manager classify spill level as minor, moderate or major and ensure appropriate response initiated
- Ensure tracking and recording of non-reportable spills as identified in the Plan
- Provides advice, when required, to the Environmental Coordinator and the Site Superintendent on handling the spill situation, storage and disposal options.
- Assists in developing effective spill management and prevention practices.
- Classify the spill as minor, moderate or major as per Appendix B.
- As directed by the Director, Environment and Community Relations reports spill to 24-hour Spill Reporting Line.
- As directed by the Director, Environment and Community Relations liaise with NWT/NU applicable agencies regarding on-going cleanup activities.
- Co-ordinate inspections and spill closure by applicable agencies.
- Assist in spill response training and exercises.

### 3.7. VP Project Development/Exploration/Environment

- Engage Legal Counsel and Sabina Senior Management and Board of Directors as required.
- Notify and update Senior Management and Board members as required.

# 4. TRAINING AND TESTING

## 4.1. Training

### 4.1.1 Site Orientation

On site orientation will be provided to all onsite personnel to ensure employees are aware of:

- What First Responders are to do in case of a Spill.
- The location of MSDS sheets and Spill Report Forms.
- The location of the Spill Response Kits.
- The general locations of fire extinguishers and firefighting equipment.
- The location of the Spill Action Plan and the Fire Action Plan.

### 4.1.2. Role Specific

Specific on-site training will be provided to all employees, whose job function may have a higher probability of experiencing a spill, to ensure they are aware of:

- How to identify and avoid the conditions which may lead to a spill.
- Develop an understanding of the potential environmental impacts of a spill.
- Develop and understanding of the financial costs of a spill.

- Recognize the hazards associated with sources of ignition (smoking, electrical sparks) near a fuel source.
- Spill kit contents and use of them.
- Turn off valves to stop the flow of fuel.

For employees involved in fuel handling, additional training would be provided regarding appropriate refueling techniques and drum handling procedures.

#### 4.1.3. Emergency Response Team

Members of the Emergency Response Team will be provided a higher level of training to allow for a safe and adequate response. This includes:

- All information given as part of the Role Specific Training.
- Fire extinguishers and water pump locations and use.
- Details of the Spill Action Plan and the Fire Action Plan.
- Identify, evaluate and mitigate the hazards posed by any spilled product by using appropriate PPE (personal protective equipment).

### 4.2. Testing

A spill 'drill' is to be held twice annually, approximately 6 months apart, at each field operation. This drill must include a familiarization of all onsite personnel in their responsibilities including what to do in case of a spill. The drill must also include a hands-on scenario where the Emergency Response Team utilizes equipment to deal with the spill scenario. The drill may be broken down into two or more sessions to ensure adequate coverage. Records of this testing are to be kept on file and posted to provide access for those who were unable to attend.

## 5. SPILL RESPONSE EQUIPMENT

### 5.1. General Equipment

Heavy equipment and aircraft may be used in the area for emergency use to respond to spill incidents. Spill kits and spill response equipment are to be located in key locations and are to be accessible to responders.

### 5.2. Spill Kits

**Table 2. Location of Spill Kits.**

| George Camp | Temporary Camp |
|---|---|
| Tank Farm | Fuel storage |
| Drummed Fuel Storage | Generator shed |
| Generator Quonset | Each Diamond Drill |
| Coreshack | |

| | |
|---|---|
| Drum Crusher | |
| Incinerator | |
| Helipad Area | |
| Dock | |
| Each Diamond Drill | |

**Table 3. Spill Kit Contents.**

| Quantity | Item(s) |
|---|---|
| 1 | 45 gal, 16 Gauge Open Top Drum, c/w Bolting Ring & Gasket |
| 20 | Short Putty Epoxy Sticks |
| 1 | 48” x 48” x 1/16” Neoprene Pad (Drain Stop) |
| 1 | Splash Protective Goggles |
| 1 | Pkg. - Polyethylene Disposable Bags (5 ml) 10 per Package |
| 1 | Shovel (Spark Proof) |
| 1 | Case T-123” x 10’ Absorbent Boom, 4-Booms/Case; |
| 1 | Pkg. – Universal absorbent Mats, 16 ½” x 20”, 100 Mats per Package |
| 1 | Roll – Oil only absorbent mats 150’ x 33” |

** Drill rigs are equipped with a roll of absorbent mat for minor spills. Other appropriate equipment for spill response (PPE, shovel, bags) is typically already located at the drill for general use.*

## 5.3. Mobile Response Unit

A mobile Environmental Response Unit is available to Sabina from a major fuel supplier (Shell) in Yellowknife or Cambridge Bay. This unit can be transported to the site from Cambridge Bay in less than three hours weather permitting.

# 6. SPILL RESPONSE PROCEDURE

A spill is defined as the discharge of a hazardous product out of its containment and into the environment. Potential hazards to humans, vegetation, water resources, fish and wildlife vary in severity, depending on several factors including the nature of the material, quantity spilled, location and season. Fuel is the main product that may be spilled and therefore spill response procedures focus on this hazardous material. Other chemicals that may be spilled include sewage water, and small quantities of lubricants and oils.

All site personnel are briefed on the procedures to be followed to report a spill and initiate spill response. The first person to notice a spill must take the following steps:

- Immediately warn other personnel working near the spill area.
- Evacuate the area if the health and safety of personnel is threatened.
- Notify their supervisor or onsite management, who will initiate the spill response operations.
- In the absence of danger, and before the spill response team arrives at the scene, take any safe and reasonable measure to stop, contain and identify the nature of the spill.

The following identifies steps to be taken in the event of a spill. Steps are listed in order of importance, however, circumstances and conditions may alter the order of these steps to meet a specific situation.

## 6.1. Source Control

Reduce or stop the flow of product without endangering anyone. This may involve very simple actions such as turning off a pump, closing a valve, sealing a puncture hole with almost anything handy (e.g., a rag, a piece of wood, tape, etc.), raising a leaky or discharging hose at a level higher than the product level inside the tank, or transferring fuel from leaking containers.

## 6.2. Control of Free Product

Prevent or limit the spread of the spilled material. Accumulate/concentrate spilled product in an area to facilitate recovery. Barriers positioned down-gradient of the spill will slow or stop the progression of the spill. Barriers can consist of absorbent booms, dykes, berms, or trenches (dug in the ground or in ice).

## 6.3. Protection

Evaluate the potential dangers of the spill in order to protect sensitive ecosystems and natural resources. Block or divert the spilled material away from sensitive receptors. This can also be achieved by using various types of barriers.

## 6.4. Clean up the Spill

Recover and containerize as much free product as possible. Recover and containerize/treat contaminated soil, water, and snow. Pressure-wash contaminated bedrock surfaces, shorelines, ice and recover as much oily water as possible for containerization and/or treatment.

## 6.5. Report the Spill

Provide basic information such as date and time of the spill, type and amount of product discharged, photographic records, location and approximate size of the spill, actions already taken to stop and contain the spill, meteorological conditions and any perceived threat to human health or the environment.

## 6.6. Response by Spill Location

### 6.6.1. Spills on Land

Response to spills on land will include the general procedures previously detailed. The main spill control techniques involve the use of two types of barriers: dykes and trenches. Barriers should be placed down-gradient (down-slope) from the source of the spill, and as close as possible to the source of the spill. Barriers slow the progression of the fuel and also serve as containment to allow for recovery.

Depending on the volume spilled, the site of the spill as well as available material, a dyke may be built with soil, booms, lumber, snow, etc. A plastic liner should be placed at the foot of and over the dykes to protect the underlying soil or other material and to facilitate recovery of the fuel. Construct dykes in such a way as to accumulate a thick layer of free product in a single area (V shaped or U shaped).

Trenches are useful in the presence of permeable soil and when the spilled fuel is migrating below the ground surface. A plastic liner should be placed on the down-gradient edge of the trench to protect the underlying soil. Liners should not be placed at the bottom of the trench to allow water to continue flowing underneath the layer floating oil.

The use of large quantities of absorbent materials to recover important volumes of fuel should be avoided. Large volumes of free-product should be recovered, as much as possible, by using vacuums and pumps, and containerized. Mixtures of water and fuel may be processed through an oil-water separator. Absorbent sheets should be used to soak up residual fuel on water, on the ground (soil and rock), and on vegetation

### 6.6.2. Spills on Water

Response to spills on water includes the general procedures previously detailed. Various containment, diversion and recovery techniques are discussed in the following sections. The following elements must be taken into consideration when conducting response operations:

- Type of water body or water course (lake, ocean, stream, river).
- Water depth and surface area.
- Wind speed and direction.
- Resonance and range of tides.
- Type of shoreline.
- Seasonal considerations (open-water, freeze-up, break-up, frozen).

Containment of an oil slick on the water requires the deployment of mobile floating booms to intercept, control, contain and concentrate (i.e., increase thickness) the floating oil. One end of the boom is anchored to shore while the other is towed by a boat or other means and used to circle the oil slick and return it close to shore for recovery using a skimmer. Reducing the surface area of the slick increases its thickness and thereby improves recovery. Mechanical recovery equipment (i.e., skimmers and oil/water separators) will be mobilized to site if required.

If oil is spilled in a lake it may not be possible to deploy booms using a boat. In this case, measures are taken to protect sensitive and accessible shoreline. The oil slick is monitored to determine the direction of migration. In the absence of strong winds the oil will likely flow towards the discharge of the lake. Measures is taken to block and concentrate the oil slick at the lake discharge using booms where it will subsequently be recovered using a portable skimmer, a vacuum, or sorbent materials.

In small slowly-flowing rivers, streams, channels, inlets or ditches, inverted weirs (i.e., siphon dams) are used to stop and concentrate moving oil for collection while allowing water to continue to flow unimpeded. In the case of floating oil, in a stream, heading for a culvert (i.e., at a road crossing) a culvert block is used to stop and concentrate moving oil for collection while allowing water to continue to flow unimpeded. In both cases oil will then be recovered using a portable skimmer or sorbent materials.

In the case of spills in larger rivers, with fast moving currents, diversion booming is used to direct the oil slick ashore for recovery. Single or multiple booms (i.e., cascading) may be used for diversion. Typically, the booms are anchored across the river at an angle. The angle will depend on the current velocity. Choosing a section of a river that is both wider and shallower makes boom deployment easier. Diversion booming may also be used to direct an oil slick away from a sensitive area to be protected.

### 6.6.3. Spills on Snow and Ice

In general, snow and ice will slow the movement of hydrocarbons. The presence of snow may also hide the oil slick and make it more difficult to follow its progression. Snow is generally a good natural sorbent, as hydrocarbons have a tendency to be soaked up by snow through capillary action. However, the use of snow as a sorbent material is to be limited as much as possible. Snow and frozen ground also prevent hydrocarbons from migrating down into soil or at least slow the migration process. Ice prevents seepage of fuel into the water.

Response to spills on snow and ice includes the general procedures previously detailed. Most response procedures for spills on land may be used for spills on snow and ice. The use of dykes (i.e., compacted snow berms lined with plastic sheeting) or trenches (dug in ice) slow the progression of the fuel and also serve as containment to allow recovery of the fuel. Free-product is recovered by using a vacuum, a pump, or sorbent materials. Contaminated snow and ice is scraped up manually or using heavy equipment depending on volumes. The contaminated snow and ice is placed in containers or within plastic lined berms on land. If required, a contaminated snow storage site is to be located in close proximity to one of the four (4) main work sites to facilitate inspection and monitoring, in an area which is still easily accessible once it is time to remove the snow (i.e., spring or summer), and at least 31 m

away from any body of water or ditch. Once enough snow has melted, the oily water is removed from the storage and processed through a high volume oil-water separator that would be mobilized to site. Hydrocarbons recovered will be burned in the camp incinerator or shipped off-site for processing.

## 6.7. Response by Material Spilled

### 6.7.1. Fuel

Detection of leaks will be using two methods - a fuel inventory reconciliation and inspection. A reconciliation of fuel storage volumes will be completed when George is operating and a spill response will be initiated in the event of any unexplained loss.

Inspections will be conducted to ensure either there has not been a leak or that the conditions of the area could result in a leak. These inspections will include the fuel drums and storage containers, secondary containment sumps and associated spill containment devices, any pumps and product-handling equipment, and overfill protection devices. These inspections will be recorded to include who completed the inspections, areas included in the visual inspection and any deficiencies noted.

Fuel spills, leaks at storage facilities or vehicle accidents will be handled by following these steps:

- Identify the source of the leak or spill.
- Contact the Environmental Coordinator/Site Superintendent.
- Stop leaks from tank or barrel by;
  - Turning off valves.
  - Utilizing patching kits to seal leaks.
  - Placing plastic sheeting at the foot of the tank or barrel to prevent seepage into the ground.
  - Contain the spill and the source if possible.
  - Take photographs of the spill site before and after the clean-up.

Small spills will be cleaned up by removing the contaminated soil and storing it in empty 205 L drums for backhaul and disposal at an approved hazardous waste disposal site. Should a large spill occur, cleanup and disposal efforts will be coordinated as necessary with the appropriate authorities and agencies.

Further information on the handling of fuel spills is detailed in Appendix 2.

### 6.7.2. Domestic Sewage and Solid Waste

Any problems with the sewage disposal system, incinerator or other waste disposal mechanism will be immediately reported to the Site Superintendent.

In the event of a power failure, the stand by generator will be put into operation as soon as possible. Similarly, in the case of a pump failure, the backup pump will be put on-line. Any greywater drainage problems will be addressed as quickly as possible to minimize the chance of a spill. As necessary, appropriate safety equipment and personal protective clothing will be available to site personnel.

### 6.7.3. Chemical

Assess the hazard of the spilled material by referring to the relevant MSDS sheet. Each response will vary based on the material. If the chemical is hazardous, ensure personal protective equipment is utilized (latex gloves, eye protection, etc.) before approaching the spill. As chemicals are only used in extremely small quantities on site, use absorbent mats to soak up spilled liquids and place in an appropriate container.

## 6.8. Response to a Fire

Various products, including fuel, may be flammable under certain circumstances. It is important to ensure that spills do not present a risk of fire prior to commencing the cleanup. If a fire does break out, refer to relevant site firefighting procedures.

## 6.9. Disposal

Appropriate disposal, as directed by the Environmental Manager, for any recovered product and contaminated soil, water or absorbent clean up materials is regulated and must be authorized by the agency investigating the incident. Obtain approval from all appropriate government agencies before disposal. A hazardous waste generator number has been acquired and used by the expeditor when disposing of camp waste.

Fuel contaminated soil can be remediated at camp through incineration or alternatively, the contaminated soil can be flown out to Yellowknife for disposal in an approved dump site.

Any non-reusable recovered product, contaminated soil and clean up materials, which cannot be incinerated, will be stored in containers and returned to camp prior to disposal.

# 1. Spill Potential Analysis

## 7.1. Camps

### 7.1.1. Fuel

Fuel spills could potentially occur from:

- Fuel storage containment (tanks, barrels) leaks.
- Spills during drum transport from aircraft to fuel storage area.
- Spills from vehicles or equipment as a result of accidents.
- Spills during fuel transfer from barrels to equipment or heaters.

Spills occurring during fuel handling, transfer or storage operations will be minimized by:

- Secondary containment.
- Proper storage of barrels.
- Inspections of the storage facilities and barrels.
- Inventory tracking.
- Staff training in proper fuel handling procedures.
- Spill response training for personnel associated with fuel handling.
- Immediate cleanup of minor spills.
- Enclosing spigots on fuel containers with absorbent mat to collect any slow drips.

The potential for spills affecting surface water is low, as fuel storage and transfer points are located away from watercourses and lakes. Close inspection of fuel transfer activities will be undertaken during all times while fuel is being pumped/transferred to equipment. Secondary containment will be used at all refueling points and storage areas.

### 7.1.2. Domestic Sewage and Solid Waste

Waste from the kitchen and Pacto systems are carried to the incinerator in a small trailer, with virtually no risk of spillage. The greywater lines are routinely inspected for leaks and repaired as necessary. The screens at the greywater sump are cleaned of debris daily.

### 7.1.3. Solid Waste

Failures may occur in the handling of solid waste in the following modes:

- Incinerator at George camp fails.
- Accidental damage to the incinerator and it components, or the heaters and/or their fuel supplies.
- Mechanical breakdown.
- Improper maintenance.

Visual inspection of the incinerator and its combustion products will be carried out frequently, typically in the normal course of operation. The incinerator will be operated according to the manufacturer's instructions.

#### 7.1.4. Chemicals

Any chemicals brought on site are stored in manufacturers' approved packaging. Although unlikely, leaks may occur resulting in minor spills of chemical product in storage. It is more likely a leak will occur during the transfer of chemicals or from accidental failure of containers.

Sabina provides training to its staff in product handling and inspection procedures, which we feel, will result in reduced occurrences of chemical spills.

### 7.2. Overland Transport

The following table identifies possible incidents which may occur along the camp road, including the consequences of that incident and the preventative measures to be implemented.

**Table 4. Summary of Potential Incidents and Preventative Measures**

| Incident | Description | Consequences | Preventative measures |
|---|---|---|---|
| Refueling of vehicles | Refueling hose could break, spring a leak, overfilling of equipment tank, spillage from gas storage tank | Puddles of fuel over limited area.<br>Hose breaks at equipment and sprays a large amount of fuel over a larger area.<br>"Slick" flows steadily from equipment. | All refueling will occur in area 31m from waterways<br>Personnel will be aware of emergency shut-off valves and trained in spills response.<br>Spill Kit available. |
| Vehicle storage and operation | Vehicles could leak fuel while in operation or during stopping along route. | Puddles of fuel over limited area to the entire contents of a tank being discharged. | Vehicles will stop 31m from waterways<br>Personnel will be trained in spills response.<br>Spill Kit available. |
| Fuel containers leaking | Fuel being brought to the vehicles could leak fuel while in operation or during stopping along route. | Puddles of fuel over limited area up to the entire contents of a tank being discharged. | Regular visual inspection will occur to ensure tanks are not leaking.<br>Personnel will be trained in spills response.<br>Spill Kit available. |
| Vehicle accident | Accident on road that involves equipment going off road/overturning | This worst case scenario could result in a tank of fuel and any materials being transported spilling entire contents over a large area. | Safe road corridor will flagged<br>Speed limits will be in affect<br>Transportation of Dangerous Goods manifest if necessary<br>Coordination and communication between the cat-haul and camps will be maintained<br>Camp personnel will be ready to mobilize in case of accident<br>Spill kit available with cat-haul and on-site |

| Incident | Description | Consequences | Preventative Measures |
|---|---|---|---|
| Temporary fuel storage leakage and/or spill | Fuel caches leak fuel or due to accident contents are spilled | Puddles of fuel over limited area<br>Storage container breaks and fuel spreads over a larger area | All storage will occur in area 31m from waterways.<br>Secondary containment berms will be used for fuel caches.<br>Personnel will be aware of emergency shut-off valves and trained in spills response.<br>Spill Kit available. |
| Calcium Chloride spill | Bags of salt could be torn and spilled in temporary storage area or in transport | Tears and bag breakages could lead to salt spread over limited area.<br>Bags could break in a manner that salt is spread over a larger area. | Personnel will be trained in proper material handling and transport methods<br>Salt will be stored and transported in 50lb bags on pallets wrapped in plastic.<br>Secondary containment will be used at temporary storage location at D'Arcy Lake<br>Spill kits and equipment available. |

### 7.3. Fire Prevention

The most serious spill incident would involve fire and a hydrocarbon-based fuel source. In order to minimize the risk of fire, **No Smoking** and **Flammable** signs will be posted as needed at storage areas and with the cat-haul train along with a dry chemical fire extinguisher. Workers will be trained in the use of the fire extinguisher and be instructed of the risk caused by electrical and open flame fire hazards near fuel.

# 8. Reporting Procedures

All spills are to be reported to site management. An internal log of spills, no matter how small, is to be kept and maintained by the Site Superintendent. Each record will include date, location, material spilled, volume, reason for release, any negative impact, status of cleanup, and corrective actions taken. Photo's (before, during and after cleanup) shall also be taken of all significant spills.

Significant spills, as identified in this Plan, are to be externally reported to the NWT/Nunavut Spill Response Line. The Project Manager will ensure spills are reported externally as required. The Spill response form (Appendix C) is to be completed for all externally reported spills and forwarded to the NWT/Nunavut Spill Response Centre within the required 24 hour reporting period. The Project Manager, or their designate, will notify Sabina Headquarter senior management of any reportable spills as listed below.

Any spill, or incident that may likely result in a spill, of an amount equal to or greater than the amount listed in the table below shall be promptly externally reported. Spills adjacent to or into a surface water or ground water shall be externally reported regardless of quantity.

**Table 5. External Reporting Volumes**

| TDGA Class | Description of Contaminant | Amount Spilled |
|---|---|---|
| 1 | Explosives | Any amount |
| 2.1 | Compressed gas (flammable) | Any amount of gas from containers with a capacity greater than 100 litres |
| 2.2 | Compressed gas (non-corrosive, non-flammable) | Any amount of gas from containers with a capacity greater than 100 litres |
| 2.3 | Compressed gas (toxic) | Any amount |
| 2.4 | Compressed gas (corrosive) | Any amount |
| 3.1, 3.2, 3.3 | Flammable liquid | 100 litres |
| 4.1 | Flammable solid | 25 kg |
| 4.2 | Spontaneously combustible solids | 25 kg |
| 4.3 | Water reactant solids | 25 kg |
| 5.1 | Oxidizing substances | 50 litres or 50 kg |
| 5.2 | Organic Peroxides | 1 litre or 1 kg |
| 6.1 | Poisonous substances | 5 litres or 5 kg |
| 6.2 | Infectious substances | Any amount |
| 7 | Radioactive | Any amount |
| 8 | Corrosive substances | 5 litres or 5 kg |
| 9.1 (in part) | Miscellaneous products or substances, | 50 litres or 50 kg |
| 9.2 | Environmentally hazardous | 1 litre or 1 kg |
| 9.3 | Dangerous wastes | 5 litres or 5 kg |
| 9.1 (in part) | PCB mixtures of 5 or more parts per million | 0.5 litres or 0.5 kg |
| None | Other contaminants | 100 litres or 100 kg |
| | | |

# Appendix A. Sabina Spill Response Team

(will be reviewed and updated on an as-needed basis)

**Sabina Contacts:**

| | | |
|---|---|---|
| Environmental Manager | | 604 998-4175 |
| Environmental Coordinator | | 604 998-4175 |
| Site Superintendent | | 604 998-4175 |
| Operations Manager | | 604 998-4175 |
| Project Manager | | 604 998-4175 |
| Direction, Environment and Community Relations | | 604 998-4175 |

**Additional assistance may be obtained, as necessary, from the following organizations:**

| | | |
|---|---|---|
| Det'on Cho Logistics, Yellowknife | Stu Impett/Matt Mossman | (867) 873-6970 |
| Shell Canada, Mobile Environmental Response | Steve Bassett | (867) 874-2562 |
| Kitnuna | Wilf Wilcox | (867) 983-2331 |
| Nuna Logistics Ltd. | Court Smith | (867) 682-4667 |
| Dupont (Fuel Dye) | | (905) 821-5660 |
| Frontier Mining (Sorbents) | | (867) 920-7617 |
| Acklands (Sorbents) | | (867) 873-4100<br>(867) 920-5359 |

**Key Government Contacts:**

| | | |
|---|---|---|
| Nunavut Water Board | Exec. Director<br>Manager of Licensing | (867) 360-6338 |
| Environment Canada | Manager of Enforcement<br>NWT/NU 24hr Spill Report Line | (867) 669-4730<br>(867) 920-8130 |
| Indigenous and Northern Affairs Canada | Water Resources Officer<br><br>Resource Management Officer | (867) 669-2438<br><br>(867) 975-4296 |
| Government of Nunavut Environmental Protection | Director Environment | (867) 979-7800 |
| Department of Fisheries and Oceans | fisheriesprotection@dfo_mpo.gc.ca | 1(855) 852-8320 |
| RCMP (Yellowknife) | | (867) 669-1111 |
| RCMP (Cambridge Bay) | | (867) 983-2111 |
| Workers Compensation | Chief Inspector of Mines | (867) 669-4430 |

# Appendix B. Procedure In The Event Of A Spill

**Priority 1 – Identify spill source and assess hazard**

- Ensure safety of all people in the area.
- Find the source, type and extent of spill
- Assess hazards from the spill
- Check for fire and explosion risk:
    - Extinguish all ignition sources in the area
    - Move machinery only if safe to do so or shut down if necessary
    - Isolate all live equipment to prevent sparks and enforce no smoking by site personnel
- Raise alarm and close off affected area

**Priority 2 – Stop flow of spill**

- Ensure that any necessary safety equipment is worn
- Stop flow at source of spill
- Leak containment requires the planned use of absorbent pads, drip buckets, drip pans, or impermeable geomembrane secondary containment berms to catch any slow or unexpected leaks.
- Larger spills require attempts to limit the spread of the spill. Prevent movement using sorbent material, berms to form a barrier
- If the spill occurs on ice, attempts should be made to stop the spill from reaching ice-free ground.

**Priority 3 – Notify Site Superintendent (SS) and Project Manager (PM)**

- Notify the SS and PM as soon as possible after ensuring the safety of all personnel and attempting to stop the flow and limit spread. Provide as much information as possible about the source, material, amount, fire risk, injuries etc.
- SS and PM will report spill to Nu/NWT Spill Reporting Line, notify Sabina headquarters contacts and ensure any further notifications are made depending on the type and extent of spill.

**Priority 4 – Spill Containment**

- For all spills, use absorbents to contain and soak up the fuel
- Prevent spread of fuel by using booms and berms
- It may be possible to contain the fuel using absorbent materials or by building small berms and dams
- Response operations should not be commenced in the affected area until it is safe.

**Priority 5 – Spill Recovery and Cleanup**

If the spill has been successfully been contained then spill clean-up can start

The SS is to monitor spill clean-up and coordinate clean-up operations

The PM is to complete the Spill Report form and submit to authorities and Sabina headquarter contacts (using Spill Report Form)

- Recover as much fuel as possible
- If possible pump directly into 205L drums. Ensure that the drums are in good shape and available near the spill site
- Absorbent pads should be spread on any remaining fuel that cannot be pumped or manually removed
- Fuel soaked absorbents must be picked up and placed in plastic bags or 205L empty drums
- Contaminated snow can be stored in 205L drums with tops removed. Allow snow to melt and decant off fuel.
- Any drums containing a mixture of fuel and snow or water are likely to freeze. To prevent drums from splitting use only drums in good condition and do not fill to top.
- Drums contained recovered fuel or water, used absorbents should be stored in secondary containment areas.
- Disposal should be by approved methods and facilities as per CM instructions.

**Notes:**

- As much fuel as possible should be removed immediately after the spill. The use of dispersants and burning at the site is not allowed, and a large scale cleanup operation may cause more environmental damage that the fuel itself.
- The health and safety of personnel is the first priority in the case of a fuel spill. Emergency spill response actions should not be undertaken in extreme weather conditions or during periods of darkness, unless the situation has been fully assessed by the CM and PM

- Personnel should ensure they are aware of the location and content of the spill kits
- Spill Response Classification:
    - Minor spills – less than 10L – easily contained
    - Moderate spills – less than 600 L – contain and clean-up by on-site personnel
    - Major spills – more than 1000L – cannot be contained on-site and will require external assistance to clean-up.

# Appendix C. NWT/NU Spill Report

## NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND
OTHER HAZARDOUS MATERIALS

Government of Northwest Territories · Nunavut · Canada · Inuvialuit Land Administration

**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: MM DD YY | Report Time: | ☐ Original Spill Report OR ☐ Update # _____ to the Original Spill Report | **Report Number:** |
| B | Occurrence Date: MM DD YY | Occurrence Time: | | |
| C | Land Use Permit Number (if applicable): | | Water Licence Number (if applicable): | |
| D | Geographic Place Name or Distance and Direction from the Named Location: | | Region: ☐ NT ☐ 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: ☐ Potential Spill | 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: | Employer: | Location Called: | Report Line Number: |

Lead Agency: ☐ EC ☐ CCG/TCMSS ☐ GNWT ☐ GN ☐ ILA ☐ AANDC ☐ NEB ☐ Other: _____

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: | | | |