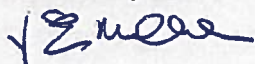
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# Baffinland Iron Mines Corporation

## SPILL CONTINGENCY PLAN

**BAF-PH1-830-P16-0036**

**Rev 0**

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**Department:** Environment  
**Title:** Environmental Manager  
**Date:** March 26, 2014  
**Signature:** 

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### TRACK CHANGES TABLE

A review and update of the Spill Contingency Plan has been undertaken, with the following salient revisions to the March 2013 version of the Emergency Response and Spill Contingency Plan (H349000-1000-07-126-0014, Rev 0)


### Index of Major Changes/Modifications in Revision 2

Item No.	Description of Change	Relevant Section
1	The Emergency Response and Spill Contingency Plan (H349000-1000-07-126-0014, Rev 0) was separated into two (2) documents. Emergency Response Plan (BAF-PH1-830-P16-0007) and Spill Contingency Plan (BAF-PH1-830-P16-0036).	All
2	Updated distribution list	Table A
3	Update of purpose and scope to reflect current strategy to address emergency response and spill contingency.	Section 1
4	Changes to spill response threshold levels	Section 2
5	Roles and Responsibilities are now solely described in the Emergency Response Plan (BAF-PH1-830-P16-0007).	formerly Section 3.0
6	Changed to discuss response on fresh water only,	Section 3.2 (formerly Section 6.2)
7	Updated fuel inventories	Section 5.1 (formerly Section 7.1)
8	Updated to refer to reporting requirements in the Emergency Response Plan (BAF-PH1-830-P16-0007)	Section 6 (formerly Section 8)
9	Appendix A updated to reflect current site layouts and spill kits locations	Appendix A
10	Updated to reflect current site inventories and MSDS's	Appendix C & D
11	Updated to include only NU-NT Spill Report Form	Appendix E

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***Appendix A - Current Site Layouts (2014) for Milne Port, Mary River Mines Site, Mid-Rail Camp, and Steensby Camp***

***Appendix B - Spill Response Supplies***

***Appendix C - Hazardous Materials List***


***Appendix D - Material Safety Data Sheets***

***Appendix E - NT-NU Spill Report***

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### ***Foreword***

The Spill Contingency Plan supports/complements the Emergency Response Plan. For the distribution list of the plan, see Table A. Additional copies of this Plan may be obtained from:

#### **Baffinland Iron Mines Corporation**

2275 Upper Middle Road East, Suite 300

Oakville Ontario L6H 0C3


Tel: (416) 364-8820 Fax: (416) 364-0193

**Table A: Distribution List for the Spill Contingency Plan**

<b>Department of Environment - Environmental Protection Division</b> PO Box 1000 Station 1870 Iqaluit, NU, Canada X0A 0H0 Tel: (867) 975-4644, 1-867-222-1925 (Enforcement Officer) Fax: (867) 975-4594	<b>Department of Fisheries and Oceans - Central and Arctic Region</b> 301 – 5204 50 <sup>th</sup> Ave Yellowknife, NT X1A 1E2 Tel: (867) 669-4927 (Fisheries Protection Biologist) Fax: (867) 669-4940
<b>Qikiqtani Inuit Association, Department of Major Projects</b> P.O. Box 219 Iqaluit, NU X0A 0H0 Tel: (867) 867-975-8400, (867) 975-4644 (Director, Major Projects) 1-800-6672742 (Administrator) Fax: (867) 979-3238	<b>AANDC - Nunavut Regional Office</b> Land Administration Division PO Box 100 Iqaluit, NU, Canada X0A 0H0 Tel: (867) 975-4283 (Land Administration Manager) Fax: (867) 979-6445
<b>AANDC - Nunavut Regional Office</b> Water Resources Division PO Box 2200 Iqaluit, NU, Canada X0A 0H0 Tel: (867) 975-4295 (Field Operations Manager) Tel: (867) 975-4295 (Water Resources Officer) Fax: (867) 979-6445	<b>AANDC - Nunavut Regional Office</b> Water Resources Division PO Box 2200 Iqaluit, NU, Canada X0A 0H0 Tel: (867) 975-4550 (Water Resources Manager) Fax: (867) 979-6445
<b>Nunavut Impact Review Board</b> PO Box 1360 Cambridge Bay, NU, Canada X0B 0C0 Tel: (867) 983-4600, 1-866-233-3033 Fax: (867) 983-2594	<b>Nunavut Water Board</b> PO Box 119 Gjoa Haven, NU, Canada X0B 1J0 Tel: (867) 360-6338 Fax: (867) 360-6369
<b>Hamlet of Pond Inlet</b> PO Box 180 Pond Inlet, NU, Canada X0A 0S0 Tel: (867) 899-8934 Fax: (867) 899-8940	<b>Mittimatalik Hunters and Trappers Organization</b> PO Box 189 Pond Inlet, NU, Canada X0A 0S0 Tel: (867) 899-8856 Fax: (867) 899-8095

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## SUSTAINABLE DEVELOPMENT POLICY

At Baffinland Iron Mines Corporation, we are committed to conducting all aspects of our business in accordance with the principles of sustainable corporate responsibility and always with the needs of future generations in mind. Everything we do is underpinned by our responsibility to protect the environment, to operate safely and fiscally responsibly and to create authentic relationships. We expect each and every employee, contractor, and visitor to demonstrate a personal commitment to this policy through their actions. We will communicate the Sustainable Corporate Policy to the public, all employees and contractors and it will be reviewed and revised as necessary on an annual basis.

These four pillars form the foundation of our corporate responsibility strategy:

Health and Safety

Environment

Investing in our Communities and People

Transparent Governance

### 1.0 HEALTH AND SAFETY

We strive to achieve the safest workplace for our employees and contractors; free from occupational injury and illness from the very earliest of planning stages. Why? Because our people are our greatest asset. Nothing is as important as their health and safety.

We report, manage and learn from injuries, illnesses and high potential incidents to foster a workplace culture focused on safety and the prevention of incidents.

We foster and maintain a positive culture of shared responsibility based on participation, behaviour and awareness. We allow our workers and contractors the right to stop any work if and when they see something that is not safe.

### 2.0 ENVIRONMENT

We employ a balance of the best scientific and traditional Inuit knowledge to safeguard the environment.

We apply the principles of pollution prevention and continuous improvement to minimize ecosystem impacts, and facilitate biodiversity conservation.


We continuously seek to use energy, raw materials and natural resources more efficiently and effectively. We strive to develop pioneering new processes and more sustainable practices.

We understand the importance of closure planning. We ensure that an effective closure strategy is in place at all stages of project development and that progressive reclamation is undertaken as early as possible to reduce potential long-term environmental and community impacts.

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### 3.0 INVESTING IN OUR COMMUNITIES AND PEOPLE

We respect human rights and the dignity of others. We honour and respect the unique culture, values and traditions of the Inuit people.

We contribute to the social, cultural and economic development of sustainable communities adjacent to our operations.

We honour our commitments by being sensitive to local needs and priorities through engagement with local communities, governments, employees and the public. We work in active partnership to create a shared understanding of relevant social, economic and environmental issues, and take their views into consideration when making decisions.

### 4.0 TRANSPARENT GOVERNANCE

We will take steps to understand, evaluate and manage risks on a continuing basis, including those that impact the environment, employees, contractors, local communities, customers and shareholders.

We ensure that adequate resources are available and that systems are in place to implement risk-based management systems, including defined standards and objectives for continuous improvement.


We measure and review performance with respect to our environmental, safety, health, socio-economic commitments and set annual targets and objectives.

We conduct all activities in compliance with the highest applicable legal requirements and internal standards

We strive to employ our shareholder's capital effectively and efficiently. We demonstrate honesty and integrity by applying the highest standards of ethical conduct.



Tom Paddon  
President and Chief Executive Officer  
September 2011

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## Mary River Project Health, Safety and Environment Policy

The Baffinland Iron Mines Corporation (BIMC) Mary River Project Health, Safety and Environment Policy is a statement of our commitment to achieving a safe, healthy and environmentally responsible workplace. We will not compromise this policy for the achievement of any other organizational goal.

**The Mary River Project implements this Policy through the following commitments:**

- Continual improvement of safety, occupational health and environmental performance.
- Meeting or exceeding the requirements of regulations and company policies.
- Integrating sustainable development principles into our decision-making processes.
- Maintaining an effective Health, Safety and Environment Management System.
- Sharing and adopting improved technologies and best practices to prevent injuries, occupational illnesses and environmental impacts.
- Engaging stakeholders through open and transparent communication.
- Efficiently using resources, and practicing responsible minimization, reuse, recycling and disposal of waste.
- Rehabilitation of disturbed lands to a safe, acceptable, and localized state.

**Our commitment to provide the leadership and action necessary to accomplish this policy is exemplified by the following principles:**

- All injuries, occupational illnesses and environmental impacts can be prevented.
- Employee involvement and active contribution is essential and required.
- Management is responsible for preventing injuries, occupational illnesses and environmental impacts.
- Working in a manner that is healthy, safe and environmentally sound is a condition of employment.
- All operating exposures can be safeguarded.
- Training employees to work in a manner that is healthy, safe and environmentally sound is essential.
- Prevention of personal injuries, occupational illnesses and environmental impacts is good business.
- Respect for the communities in which we operate is the basis for productive relationships.


We have a responsibility to provide a safe workplace and utilize systems of work to meet this goal. All employees must be clear in understanding the personal responsibilities and accountabilities in relation to the tasks we undertake.

The Mary River Project has no higher priority than the health and safety of all people working on our behalf and the responsible management of the environment. In ensuring our overall profitability and business success every Baffinland and business partner employee working at one of our work sites is required to adhere to this policy.



Tom Paddon  
President and Chief Executive Officer  
March 2013



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# 1 INTRODUCTION

## 1.1 PURPOSE AND SCOPE

The **Emergency Response Plan (ERP)** identifies potential environmental, health and safety emergencies that could arise during the construction and operation phases of the Mary River Project. The ERP establishes the framework for responding to these situations and applies to all aspects of the Mary River Project. All Baffinland employees and contractors are required to comply with the requirements of the Emergency Response Plan.

This **Spill Contingency Plan (SCP)** identifies potential spills of hazardous materials on land, ice, or fresh water that could arise during the construction and operation phases of the Mary River Project. Credible spill scenarios are identified and protocols for preventing, responding to, and recovering from releases to the environment involving regulated hazardous substances. The Spill Contingency Plan complements Baffinland's Emergency Response Plan.

The updated SCP reflects the level of activity that occurs or will occur at the Mary River sites during 2014. The SCP is a requirement of Baffinland's various regulatory permits and documents including:

- NIRB Project Certificate No. 005
- Type 'A' Water Licence 2AM-MRY1325
- Type 'B' Water Licences 2BB-MRY1114 and 8BC-MRY1314
- QIA Commercial Lease No. Q13C301.

## 1.2 APPROACH TO SPILL RESPONSE

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 nature of the material, quantity spilled, location and season. Diesel and Jet Fuels are the main products that may be spilled and therefore spill response procedures focus primarily on these hazardous materials. Other chemicals that may be spilled include sewage water, calcium chloride flakes, concrete additives, anti-freeze, methanol, and small quantities of lubricants and oils.


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

1. Immediately warn other personnel working near the spill area.
2. Evacuate the area if the health and safety of personnel is threatened.

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3. 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.
4. Notify the Environmental Supervisor, who will initiate the spill response operations.

All spill response interventions carried out by the spill response team follow these general procedures:

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


**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).

**Protection** – Evaluate the potential dangers of the spill 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.

**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 as possible oily water for containerization and/or treatment.

**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. Reporting requirement forms are presented in Appendix A.

The emergency response levels to spills and the procedures specific to spills on land, water, snow and ice are presented in the following sections. Spill response operations, techniques, equipment and materials are further detailed in the spill response training course documentation.

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## 2 LEVELS OF SPILL RESPONSE EMERGENCY

The levels of emergency response for spills are detailed in the ERP document under Section 2.0. Baffinland has adopted a generic classification system that includes three levels of emergencies. Each level of emergency, based on the significance of the event, requires varying degrees of response, effort and support. With emphasis on spills and releases the three response levels are as follows:

**Level 1 (Low)** – Minor accidental release of a deleterious substance with:

- ♦ No threat to public safety; and/or
- ♦ Negligible environmental impact to receiving environment.

**Level 2 (Medium)** – Major accidental release of a deleterious substance with:

- ♦ Some threat to public safety; and/or
- ♦ Moderate environmental impact to receiving environment

**Level 3 (High)** – Uncontrolled hazard which:

- ♦ Jeopardizes project personnel safety; and/or
- ♦ Significant environmental impacts to receiving environment

For spills, the level of emergency response to a given spill incident is based in part on the specific substance released, quantity spilled, the receiving environment that is potentially impacted, and human health risk. The level of response is also based on whether the location of the spill release is within engineered containment. The following matrix provides a working guideline for project personnel with regard to the level of response that is warranted for a specific spill release based on the above mentioned factors.

Various aspects of the emergency spill response such as organization, roles and responsibilities, generic emergency response procedures, internal and external contacts lists, training, resources, and reporting are detailed in the Emergency Response Plan document. The reader is referred to the ERP for guidance and instruction regarding those aspects of emergency response.


SPILL RESPONSE LEVELS				
	Level 1	Level 2	Level 3	
Explosives	<100 kg <500 kg	100-1,000 kg 500-5,000 kg	>1,000 kg >5,000 kg	in water body on land
Sewage	<1,000 L <10,000 L	1,000-10,000 L 10,000-100,000 L	>10,000 L >100,000 L	in water body on land
Hydrocarbons				
Lubricants	<10 L	10-1,000 L	>1,000 L	in water body
Antifreeze	<500 L	500 -5,000 L	>5,000 L	on land
Hazardous Materials	<1,000 L	1,000-100,000 L	>100,000 L	contained area

**FIGURE 2-1: SPILL RESPONSE LEVELS**

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## 3 RESPONSE PROCEDURES

### 3.1 SPILLS ON LAND

Response to spills on land will include the general procedures detailed in the Emergency Response Plan.

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 spill and also serve as containment to allow recovery of the spill.

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 spill. 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 of floating oil (if applicable).

The use of large quantities of absorbent materials to recover large volumes of spilled fluids should be avoided. Large volumes of free-product should be recovered and containerized, as much as possible, by using vacuums and pumps appropriate to the material. 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. Peat moss may also be sprinkled on vegetation to absorb films of petroleum products.

### 3.2 SPILLS ON FRESH WATER

Responses to spills on fresh water include the general procedures previously detailed. Various containment, diversion and recovery techniques are discussed in the following sections. The following elements must be considered when conducting response operations:

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

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Containment of a fuel slick on a requires the deployment of mobile floating booms to intercept, control, contain and concentrate (i.e., increase thickness) the floating oil. For a large lake, typically, one end of the boom is anchored to shore while the other is towed by a boat and use to circle the diesel fuel 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 fuel is spilled in a smaller water body such as a small lake or pond, it may not be possible to deploy booms using a boat. In this case, measures are taken to protect sensitive and accessible shoreline (spills resulting from traffic incidents). The fuel 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 are 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 diesel fuel for collection while allowing water to continue to flow unimpeded. In the case of floating fuel, in a stream, heading for a culvert (i.e., at a road crossing) a culvert block is used to stop and concentrate moving fuel for collection while allowing water to continue to flow unimpeded. In both cases fuel 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.

### 3.3 SPILLS ON SNOW AND ICE

In general, snow and ice will slow the movement of hydrocarbons. The presence of snow may also hide the fuel 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 absorbent material is to be limited as reasonably practical. 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 underlying water body.

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.

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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 lined berms on land. The contaminated water and product will be treated on site utilizing available oily water treatment systems. Additional contaminated snow storage sites will be identified at Milne Port and the Mine Site in preparation for the 2014 Work Plan. Free phase product that is recovered will be utilized as a source of fuel on site if possible or shipped offsite for processing.

### 3.4 WILDLIFE PROTECTION PROCEDURES

In response to a spill event, techniques used to prevent wildlife from becoming oiled or contaminated, by preventing animals from entering the contaminated area, will consist of hazing and other deterrents. This will be accomplished using a combination of both audible and visual devices, including but not limited to:

- Pyrotechnics, i.e. shell crackers, screamers, propane cannons for shore based spills.
- Visual scare tactics, i.e.: helicopters, emergency response vessels or other water vessels.
- Broadcast sounds, i.e. Breco Bird Scarer designed to float with an oil spill.
- Exclusion, i.e. netting applied in smaller contaminated areas such as settling or evaporation ponds.

These techniques need to be set in place immediately after a spill occurrence so as to minimize environmental impact.

The size of the spill and location in relation to sensitive wildlife areas must be assessed at the time of the event as to correctly apply the appropriate level of deterrence. Only workers trained in the safe and proper use of certain hazing equipment will be permitted to haze wildlife. Personal Protective Equipment will be worn by all personnel using equipment, as per manufactures instructions, and that the minimum will include the use of eye and ear protection. Other workers in the vicinity of such devices should also use ear protection or remain a safe distance away. Hazing through the use of pyrotechnics should not be used too close to dry vegetation or flammable spill materials due to fire hazard.


Hazing should be administered in such a way as to prevent wildlife from being hazed into an area where they may be in danger. It is also important to ensure that hazing efforts do not cause already contaminated animals to scatter and techniques are applied as soon as possible to prevent wildlife from contacting spills off the surface of waters (if applicable).

All emergency response vessels shall be equipped with deterrent devices to ensure timely response in case of a spill occurrence off-shore. To prevent habituation, variation of hazing techniques will be used such as changing the location, appearance and types of hazing or using a combination of hazing techniques.

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Efforts shall be made to collect alive or dead oiled wildlife. In the event of a spill occurring in or around a water body, shorelines and beaches shall be inspected for contaminated wildlife to be collected. Emergency Response vessels shall be equipped with dip-nets, large plastic collecting bags for dead wildlife, and cardboard boxes or cloth bags for live oiled wildlife. To ensure that live oiled wildlife are dealt with humanely, capture and handling of wildlife shall only be done by trained individuals. Gloves shall be worn when handling contaminated wildlife (leather gloves for raptors and mammals, latex/rubber gloves for ducks and small shorebirds). Wildlife will be kept individually within cloth bags or ventilated cardboard boxes and label the date and time animal was found, name of finder, location and name of species, if known. Wildlife treatment facilities will then be contacted for advisement on treatment. All contaminated wildlife will be held in a warm quiet place until treatment. The Canadian Wildlife Services (CWS) will be consulted to determine the most humane treatment strategy to be implemented for live oiled wildlife, whether rehabilitation or euthanization.

For wildlife mortalities each carcass shall be bagged and labelled individually. The date and time animal was found, name of finder, location and name of species, if known shall be documented. CWS shall be consulted and approval obtained prior to disposing of any dead wildlife. Contact information for experts in bird hazing and bird exclusion, oiled bird rehabilitation, and, permits needed to haze, salvage, hold and clean, or euthanize birds, are shown in TABLE 3-1.


**TABLE 3-1: EMERGENCY CONTACTS IN CASE OF SPILLS AFFECTING WILDLIFE**

<b>Name</b>	<b>Location</b>	<b>Phone Number</b>	<b>Purpose</b>
Canadian Wildlife Services (CWS)	Qimugjuk	1-867-979-7279	Knowing and providing information on the migratory bird resource and species at risk (under CWS jurisdiction) in the area of a spill (this includes damage assessment and restoration planning after the event)  Minimizing the damage to birds by deterring unoiled birds from becoming oiled  Ensuring the humane treatment of captured migratory birds and species at risk by determining the appropriate response and treatment strategies which may include euthanization or cleaning and rehabilitation.
Cobequid Wildlife Rehabilitation Centre	Brookfield, NS	1-902-893-0253	Provide veterinary care and rehabilitation for wildlife
Nunavut Emergency Management	P.O. Box 1000, Station 700 Iqaluit, NU X0A 0H0	1-800-693-1666	Nunavut Emergency Management is responsible for developing the territorial emergency response plans, coordinating general emergency operations at the territorial and regional levels, and supporting community emergency response operations.
International Bird Rescue	International	1-888-447-7143	Wildlife rehabilitation specialists, can manage all aspects of wildlife response

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## 4 DISPOSAL OF SPILLED MATERIAL

Plastic ore sacks, steel drums, or other appropriate containers as approved by the Environmental Supervisor are used to contain and transport contaminated soil for treatment. Depending on the nature of the spilled contaminant, the soil may be treated for remediation at Baffinland's landfarm at Milne Port (hydrocarbon based spills, sewage spills). Contaminated soil resulting from the spill of other hazardous chemicals will be treated as a hazardous waste and shipped to a licensed facility for treatment and disposal (refer to: Waste Management Plan). Temporary storage of contaminated materials is within lined berms. Used sorbent material is burned in the site incinerators as per incinerator standard operating procedures.

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## 5 POTENTIAL SPILL ANALYSIS

To prepare for emergency spill response, potential spill analysis was conducted on various worst-case scenarios. The exercise serves to identify potential risk areas, as well as to determine the fate of spilled products and their environmental effects. This section examines spill scenarios as they relate to the types of site construction and other activities as anticipated during 2014.

Several types of materials have been identified as capable of causing environmental, health, and safety concerns should a spill occur while being transported, used, stored and/or handled. These include: fuel, explosives, untreated sewage and effluent, concrete additives, lubricants, oils and oily water. These materials are planned to be utilized daily during the construction activities, often in sufficiently large quantities, warranting the evaluation of potential spill scenarios. All other hazardous materials, chemicals or wastes are handled/used/stored in smaller quantities and packaged/transported in small containers that limit the magnitude of the spills that can occur.

### 5.1 FUEL SPILLS ON LAND


Fuel represents the greatest volume of hazardous material located on site. For locations of the tank farms, temporary fuel depots and approximate spill kit locations at each of the Project sites, see Appendix A. For the quantities of fuel currently stored on site and the expected maximum quantities stored at each location during the 2014 Work Plan, see TABLE 5-1.

**TABLE 5-1: CURRENT FULE INVENTORY\***

Location	Fuel Currently on Site		Total Fuel Inventory
Milne Port	1.097 ML	Jet- A	26.18 ML
	25.08 ML	Diesel	
Mine Site	130,000 L	Jet- A	837,000 L
	707,000 L	Diesel	
Steensby Inlet	1,664 Barrels @ 205 L	Jet- A	495,280 L
	752 Barrels @ 205 L	Diesel	

\*Note: Currently on-site March 2014.

The fuel tank farms are designed to have bermed spill containment with capacity equal to the volume of the largest tank plus 10% of the volume of the remaining tanks or 110% volume of the largest tank, whichever is greatest. In calculating the volume of the containment, the footprint of the smaller tanks is subtracted.

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The above basis is consistent with the document “Design Rationale for Fuel Storage and Distribution Facilities” 3rd Edition 2006, published by the Department of Public Works of the Northwest Territories. The lining in the bermed area is an impervious high-density polyethylene (HDPE) membrane. Refuelling stations are equipped with a lined and bermed area to contain minor spills or leaks during refuelling. The liner (e.g., 40 mm hypolon liner or equivalent) is protected by sand bedding. Vehicles and mobile equipment drive onto this bedding for refuelling. All fuel transfer is done by pumps with auto shut off valves (similar to gas station pump handles). In the event that mobile equipment refuelling is completed outside of the lined containment, drip trays will be utilized by experienced/trained operators, with spill kits located in close proximity in case of emergency.


**TABLE 5-2: FUEL STORAGE CAPACITY FOR 2014 WORK PLAN\***

Location	Peak Number of Tanks and Capacity of Fuel Storage for 2013	Type of fuel	Total Storage Capacity
Milne Port	4 pre-fabricated steel tanks @ 750,000 L ea	Jet- A	49 ML
	2 steel tank @ 5 ML ea, 3 steel tanks @ 12 ML ea.	Diesel	
Mine Site	4 pre-fabricated steel tanks @ 500,000 L ea	Diesel	2.0 ML
Steensby Inlet	1,664 Barrels @ 205 L	Jet- A	495,280 L
	752 Barrels @ 205 L	Diesel	

\*Note: Actual fuel inventory will be dependent on fuel delivery considerations.

All bulk fuel storage areas are equipped with spill kits for emergency response (see Appendix A for locations) and a current copy of Spill Contingency Plan will be maintained that identifies spill kit locations and response plans. The spill kit contains the appropriate type, size and quantity of equipment for the volume/type of product present in the storage location as well as the environment likely to be affected by a spill (i.e., ground, river, lake, and ocean). For a list of spill response supplies, see Appendix B.

For each method of fuel storage and transfer, Standard Operating Procedures (SOP's) related to fuel storage and transfer have been developed. Proper containment and emergency response equipment will be provided to meet or exceed regulatory requirements. The Emergency Response Plan and the Spill Contingency Plan govern land-based and freshwater operations, The Spill at Sea Response Plan governs marine spills and the Oil Pollution Emergency Plans (OPEP) governs ship to shore fuel transfers for Milne Port.

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### 5.1.1 POTENTIAL FUEL SPILL SCENARIOS

The tank farms located at Milne Port and the Mine Site are constructed in an impermeable secondary containment structure (lined and bermed containment area). The construction is in compliance with building codes and best practices for tank farm facilities. The low point of the containment area is fitted with a sump and pumping system for capture/disposal of runoff in this secondary containment area. The same pumping system is used to recover large spills, should they occur. The secondary containment will be designed to a capacity to contain the complete volume of the largest tank, as well as 10% of the volume of all the remaining tanks.

Due to the capacities of the secondary containments, fuel spills outside these containment areas are unlikely to occur. Adequate procedures (site wide application) and work instructions (task specific) are in place as well as the Construction Environmental Protection Plan (CEPP) to deal with equipment and machinery entering and exiting the tank farms as well as dealing with contamination resulting from traffic in and out of the secondary containment areas.

#### 5.1.1.1 SCENARIO 1: TANK FARMS AREA SPILL

Description of Incident	Rupture or spill from 10ML tank into containment area
Potential Causes	Tank or associated equipment failure. This may include failure as a result of human error, mechanical failure, inadequate maintenance, geotechnical issues, sabotage, etc...
Product Spilled	Diesel or Jet Fuel.
Maximum Volume Spilled	10ML
Estimated Time to Spill Entire Volume	1 hour
Immediate Receiving Medium	Lined containment area
Most Probable Direction of Spill Migration	The fuel will flow into the sump of the containment area.
Distance and Direction to Closest Body of Water	N/A
Resources to Protect	Must ensure fuel does not breach/overtop containment
Emergency Response Level	Level 3 (high) – Refer to ERP
Estimated Emergency Spill Response Time	20 minutes
Spill Response Procedures	If the spill is still occurring the hole/breach will be plugged or stopped if possible. The lined containment will be inspected to ensure that it is safely containing the spill; if not it will be reinforced with temporary berms. The spill will be collected via a vacuum truck and deposited in a suitable site – either an intact fuel tank or, if necessary, the oily water treatment facility.


#### 5.1.1.2 SCENARIO 2: DAY TANK/TEMPORARY STORAGE AREA SPILL

All stand-alone day storage facilities, whether temporary (construction period) or permanent (mine pit), will be double-walled iso-tanks. There are approximately 30 double-walled day tanks at Milne Port and Mine Site camps with a capacity ranging from 5,000L to 20,000L. The iso-tanks will be contained in a restricted area so as to avoid collision from vehicles and placed such that they should not be damaged as a result of works.

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Detailed procedures (site-wide application) and work instructions (task-specific) are in place, along with the Construction Environmental Protection Plan (CEPP) to deal with refuelling operations. The most likely source of spills is during refuelling or refilling of the day tanks with fuel. Only personnel trained in proper refuelling will have access to these tanks. The fuel transfer operation will be halted whenever a leak is detected; all dispensing will be done with auto shut off fuel dispensers, and drip trays will be utilized during all fuel transfers. In light of the robust nature of the Day Tanks and their built in secondary containment, and the use of proper refuelling techniques and drip trays, fuel spills are unlikely to occur. In the event that a spill does occur a spill kit, containing adequate supplies given the volume of the tank it accompanies, will be available in close proximity. Given the volume of these tanks, access to readily available spill cleanup materials and trained personnel, it is anticipated that staff will be able to identify, contain and mitigate any potential spills in an effective and time sensitive manner, The table below details the most severe incident that could occur.

<b>Description of Incident</b>	<b>Puncture or rupture of Iso-tank</b>
Potential Causes	Equipment failure due to faulty manufacturing or collision with mobile equipment.
Product Spilled	Diesel fuel.
Maximum Volume Spilled	10,000L
Estimated Time to Spill Entire Volume	10 mins
Immediate Receiving Medium	Soil or surrounding environment. It is important to note that no iso-tank will be located within 100m of a water body.
Most Probable Direction of Spill Migration	As iso-tanks will be utilized around the project. So the direction of spill migration will depend on the specific location. That said iso tanks will be placed on relatively flat laydown areas, where the potential flow of spills will be more readily managed.
Distance and Direction to Closest Body of Water	Varies
Resources to Protect	Varies
Emergency Response Level	Level 2 (medium) or 3 (high) – Refer to ERP (depends on quantity and whether there is potential for impact to water body and to public safety)
Estimated Emergency Spill Response Time	15mins
Spill Response Procedures	In the event that both walls of an iso-tank is ruptured and a spill occurs the emergency spill response team will be immediately notified. Personnel in the immediate area will act as first responders making every effort to plug the puncture point. Temporary berms, ditches, trenches and sumps will be set up downstream of the spill. The downstream wall of trenches will be lined with plastic material to ensure that exposed soil does not come in contact with the fuel. Absorbent material will be utilized where required. Once the spill has been contained it will be sucked up by a vacuum truck and brought to an appropriate storage/treatment facility. If necessary, contaminated soil will be removed and brought to the landfarm for treatment. New, uncontaminated soil will be laid down in the exposed area.

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#### 5.1.1.3 SCENARIO 3: TOTE ROAD ACCIDENT TANKER TRUCK SPILL


Description of Incident	Spill of the contents of a tanker truck or fuel re-supply truck to ground or stream. Spill occurs in an isolated area along the Tote Road between Milne Port and Mary River.
Potential Causes	Human error, vehicle mechanical failure, traffic accident, poor weather or visibility.
Product Spilled	1. Tote Road: Diesel fuel, Jet-A Fuel 2. Ice Road: Diesel fuel
Maximum Volume Spilled	20 000 to 50 000 L (content of a tanker truck) This would require the rupture of the tanker.
Estimated Time to Spill Entire Volume	Spillage can be limited depending on severity of incident/accident 10 minutes to 48 hours – depending on severity of rupture or piping/valving associated with the tanker truck.
Immediate Receiving Medium	Soil, streams, lakes
Most Probable Direction of Spill Migration	Varies with specific location of spill
Distance and Direction to Closest Body of Water	1. Tote Road - Downstream and into Phillips Creek; the road between Mary River and Milne Port follows Phillips Creek, and crosses many streams (that discharge into Phillips Creek) over a distance of approximately 50 km. Phillips Creek eventually discharges into the ocean at Milne Port. 2. Ice Road – depends on location of accident
Resources to Protect	1. Tote Road: Streams, Phillips Creek and the ocean via Milne Inlet. 2. Ice Road: various water ways and lakes along the ice road
Emergency Response Level	Level 2 (medium) or 3 (high) – Refer to ERP (depends on quantity and whether there is potential for impact to water body and to public safety)
Estimated Emergency Spill Response Time	60 minutes after spill is reported to site personnel (assuming worst case scenario where the truck driver is injured and cannot commence spill response procedures).
Spill Response Procedures	1. Contain and recover diesel slick downriver as described in Section <b>Error! Reference source not found.</b> , protect shorelines using sorbent booms. Collect free-product for temporary storage. Clean-up soiled shorelines. If the response crew arrives before the complete spill, seal the leak where feasible, contain and recover oil spill on ground using dykes and trenches and spill berms. If the truck driver is not injured, he will act as a first responder and immediately initiate the spill contingency plan as defined in section 2 using the spill kit kept in the fuel trucks. 2. Once the treatment is achieved, the content of the reservoir is normally pumped by a vacuum truck to be discharged elsewhere. Therefore a vacuum truck is available in the area. In case of a spill of non-treated wastewater (sewage), the slick would be pumped using the vacuum truck. The piping would be repaired and the content of the truck would be discharged back in the oily water treatment unit. Impacted soils (if any) would be excavated and placed within the contaminated soil treatment area (landfarm).

#### 5.1.1.4 SCENARIO 4: MARINE RESUPPLY SPILL – MILNE PORT

Refer to Milne Port OPEP.

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## 5.2 EXPLOSIVES TRANSPORT AND STORAGE

For an overview of the anticipated on-hand quantities of explosives during 2014, see TABLE 5-3. For the location of the explosives storage facilities at Milne Port, and the Mine Site, see the site layout drawings in Appendix A. The Explosives Management Plan deals with explosives management at the Mary River sites.

Large quantities of ammonium nitrate (AN) will be transported to and stored at Milne Port, in one tonne tote bags stored within sea containers. In addition, smaller quantities of AN emulsion pre-packaged explosives will be used to begin development of the quarry sites. AN materials will be transported across the sites. The spill of ammonium nitrate prill to the environment during transportation is thus unlikely to occur as the contents of a ruptured tote bag would be contained within the Sea Can container. Prepackaged AN emulsions pose very little danger to the environment given the hydrophobic nature of emulsion explosives.

**TABLE 5-3: QUANTITIES OF EXPLOSIVES STORED ONSITE (2014)**

Material	Purpose	Total Quantities 2013 (kg)	Storage Type	Total Quantities Stored on Site (at one time) (kg)
Pre-Packaged Explosives	Explosive agent	200,000	Magazines	100,000
Ammonium Nitrate	Polymer	2,200,000	20,000 kg per Seacan, 37,000 kg per magazine	2,200,000

### 5.2.1 POTENTIAL SPILL SCENARIOS RELATED TO EXPLOSIVES

#### 5.2.1.1 SCENARIO 1: SPILL OF AMMONIUM NITRATE (AN)


Ammonium nitrate dissociates readily in water to form ammonia, which in its un-ionized form, is toxic to aquatic organisms and fish. Storage on land, away from water sources largely eliminates the risk of ammonia losses to water bodies.

All partially full contaminated or ripped bags of prill, spilled prill and used empty bags are collected and stored in a dedicated contained location for reuse on site or shipment off site for disposal. Spills within the storage facility are completely contained and will be cleaned up by personnel trained in explosives management. All spills are recorded on a spill report and all tote bags are inspected regularly by the explosives contractor.

Limited AN is expected to be used to produce explosives emulsion however it will be transported to various project areas, therefore the greatest potential for an AN spill will occur is during transport. One major opportunity exists for a spill to occur during transport which is as a result of an accident on the Tote Road.

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<b>Description of Incident</b>	<b>Explosives transport truck rolls over or collides with another vehicle or object. Transport container as well as individual tote bags rupture resulting in a spill.</b>
Potential Causes	Collision, poor driving conditions or visibility, equipment error, operator error.
Product Spilled	Ammonia Nitrate
Maximum Volume Spilled	1 tonne
Estimated Time to Spill Entire Volume	Instantaneous
Immediate Receiving Medium	Depending on the location either on land or in a water body.
Most Probable Direction of Spill Migration	Depending on location
Distance and Direction to Closest Body of Water	Depending on location
Resources to Protect	Nearby water bodies
Emergency Response Level	Level 1 (low) or Level 2 (medium) – Refer to ERP (depends on quantity and whether there is potential for impact to water body and to public safety)
Estimated Emergency Spill Response Time	15min – 60mins
Spill Response Procedures	<p>a) In the event that a spill occurs on land the emergency response team will be contacted immediately. If the driver is unharmed he will act as the spill response first responder. All spilled prills will be contained, with the use of berms if required. Once the spill has been contained the prills will be cleaned up by a trained crew and transported and stored in a dedicated contained location until they can be shipped off site.</p> <p>b) In the event that a spill occurs in water the emergency response team will be contacted immediately. Booms and other spill control devices will be deployed downstream and undissolved prills will be removed from the water body. Recovered material will be stored in a dedicated containment area before it can be shipped off site.</p>

For an AN spill to occur during transportation this would require the explosives transport truck to be in a major collision. In addition to the breakage of individual AN prill tote bag this would also require the facilitation of a significant rupture of the sea can magazine the AN is being transported in. Even this would pose little chance of contamination unless deposited directly into a stream/water body. This will not be an issue during the winter months and if the spill occurs on land the either the driver or response team will be able to quickly and effectively mitigate the spill before any contamination is likely to occur.


Any and all accidental spills of ammonium nitrate from an explosives truck will be cleaned up immediately, reported to the Environmental Supervisor and logged as required by regulations. A copy of a Standard Nunavut Spills Report Form can be seen in Appendix E. Clean up will be done by employees licensed to handle explosives and the contaminated material will be handled as per spills occurring within the storage area.

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#### 5.2.1.2 SCENARIO 2: SPILL OF EMULSION

Emulsion materials are acutely toxic to aquatic life. Release of emulsions to receiving water could have adverse impacts on aquatic life and fish. Therefore, emulsion material is stored in either the form of pre-paged explosives in an explosives magazine or at the emulsion plant where spills can be contained 100% within the confines of the building. Spills in confined areas are cleaned by employees licensed to handle explosives. Clean-up materials will be segregated in an appropriate area; incompatible materials will not be stored together, pursuant to MSDS and WSCC regulations.

When and if a spill occurs, a spill report will be filled by the explosives contractor and Environmental Supervisor. If a spill exceeds reportable quantities, notification will be made under the spill reporting regulations applicable in Nunavut.


#### 5.2.1.3 SCENARIO 3: SPILL OF PRE-PACKAGED EMULSION DURING TRANSPORT

Given the precautions taken in the design of the storage facilities and the suitability of containers used for storage and transport, major spills are most likely to be caused by traffic accident involving the pre-packaged explosives transport truck. If such an accident occurs, explosive material will be recovered by employees licensed to handle explosives and the contaminated material will be handled as disposed of in a designated area before they can be shipped on site.

Description of Incident	Emulsion transport truck rolls over or collides with another vehicle or object. Transport container as well as pre-packaged explosives.
Potential Causes	Collision, poor driving conditions or visibility, equipment error, operator error.
Product Spilled	AN emulsion
Maximum Volume Spilled	10,000 L
Estimated Time to Spill Entire Volume	Instantaneous
Immediate Receiving Medium	Depending on the location either on land or in a water body.
Most Probable Direction of Spill Migration	Depending on location
Distance and Direction to Closest Body of Water	Depending on location
Resources to Protect	Nearby water bodies
Emergency Response Level	Level 2 (medium) or Level 3 (high) – Refer to ERP (depends on quantity and whether there is potential for impact to water body and to public safety)
Estimated Emergency Spill Response Time	15min – 60mins
Spill Response Procedures	<p>a) In the event that a spill occurs on land the emergency response team will be contacted immediately. If the driver is unharmed he will act as the spill response first responder. All spilled prills will be contained, with the use of berms if required (though unlikely). Once the spill has been contained the emulsion will be cleaned up by a trained crew and transported and stored in a dedicated contained location until they can be shipped off site.</p> <p>b) In the event that a spill occurs in water the emergency response team will be contacted immediately. Booms and other spill control devices will be deployed downstream and emulsions will be collected and removed from the water body. Recovered material will be stored in a dedicated containment area before it can be shipped off site.</p>

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#### 5.2.1.4 SCENARIO 4: SPILL OF EMULSION DURING BLAST HOLE LOADING

Emulsion spills are unlikely to occur during blast hole loading given the nature of emulsion explosives. Pre-packaged explosives are in self contained tubes that are simply dropped into the hole. Emulsion from the emulsion plant will be pumped into blast holes via a hose. Given the hydrophobic nature of emulsion explosives a spillage is unlikely to be absorbed into a waterway and will be able to quickly and easily be mitigated by the trained personnel filling the blast holes.

Description of Incident	Emulsion spilled whilst loading pre-packaged emulsion in blast holes.
Potential Causes	Faulty packaging, operator error.
Product Spilled	AN emulsion
Maximum Volume Spilled	<10kg
Estimated Time to Spill Entire Volume	Instantaneous
Immediate Receiving Medium	Land
Most Probable Direction of Spill Migration	No expected to migrate
Distance and Direction to Closest Body of Water	Depending on location
Resources to Protect	Nearby water bodies
Emergency Response Level	Level 1 (low) – Refer to ERP
Estimated Emergency Spill Response Time	5mins
Spill Response Procedures	In the event that a spill occurs on land the blasting technician will respond. The spilled emulsion will immediately be cleaned up and stored in a dedicated contaminated explosives area until it can be shipped off site.

### 5.3 UNTREATED SEWAGE

There will be three camps (the Mine Site, Steensby Port and Milne Port) producing sewage in 2014. The Mine Site and Milne Port are equipped with a dedicated wastewater treatment facility (WWTF) (refer to: Fresh Water, Sewage and Wastewater Management Plan) with Membrane Bio Reactor units (MBR). Steensby Port is expected to have limited to no activity occurring on site in 2014. If sewage is produced at Steensby Port it will be treated using a latrine system. At remote areas, such as the mine maintenance/mine office, explosives handling facility, non-serviced railway camps, wastewater will be collected in local holding tanks and transported by tanker truck for treatment at the closest WWTF.


#### 5.3.1 POTENTIAL SPILLS SCENARIOS RELATED TO SEWAGE

##### 5.3.1.1 SCENARIO 1: SEWAGE SPILL AT MILNE PORT

Description of Incident	Spill from the RBC reservoir or MBR tank. A pipe is accidentally dislodged and non treated wastewater escape the reservoir.
Potential Causes	Pipe or mechanical failure, human error.
Product Spilled	Raw sewage
Maximum Volume Spilled	80,000 litres
Estimated Time to Spill Entire Volume	60 minutes
Immediate Receiving Medium	Milne Port
Most Probable Direction of Spill Migration	MilneInlet
Distance and Direction to Closest Body of Water	150 m.
Resources to Protect	Milne Port

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<b>Description of Incident</b>	<b>Spill from the RBC reservoir or MBR tank. A pipe is accidentally dislodged and non treated wastewater escape the reservoir.</b>
Emergency Response Level	Level 1 (low) or 2 (medium) – Refer to ERP (depends on quantity and whether there is potential for impact to water body)
Estimated Emergency Spill Response Time	15 minutes after spill is noticed.
Spill Response Procedures	Report Spill, Contain with berm or sump/ditch. Direct spill to the desired location and suck up spill with a vacuum truck. Put recovered sewage in a pond or return to the sewage treatment plant. Resurface area with fresh soil.

#### 5.3.1.2 SCENARIO 2: MINE SITE SEWAGE SPILL


<b>Description of Incident</b>	<b>Spill from the RBC reservoir or MBR tank.</b>
Potential Causes	A pipe has accidentally being dislodged and non treated wastewater escapes the reservoir
Product Spilled	Raw sewage
Maximum Volume Spilled	72,000 litres
Estimated Time to Spill Entire Volume	60 minutes
Immediate Receiving Medium	Soil
Most Probable Direction of Spill Migration	Downstream and into a local depression east of the MBR wastewater treatment facility. That local depression dries in the summer and intercepts the maximum spilled volume.
Distance and Direction to Closest Body of Water	200 m.
Resources to Protect	One stream and Sheardown Lake.
Emergency Response Level	Level 1 (low) or 2 (medium) – Refer to ERP (depends on quantity and whether there is potential for impact to water body)
Emergency Spill Response Time	15 minutes after spill
Spill Response Procedures	A vacuum truck is available at the Mine Site. In case of a spill of non-treated wastewater (sewage), the slick would be pumped using the vacuum truck. The piping would be repaired. Put recovered sewage in a pond or return to the sewage treatment plant. Resurface area with fresh soil.

#### 5.3.1.3 SCENARIO 3: SEWAGE TRANSPORT TRUCK SPILL

<b>Description of Incident</b>	<b>Spill from the tanker truck transporting raw sewage from one of the temporary camp site to one of the permanent WWTF</b>
Potential Causes	Road accident
Product Spilled	Raw sewage
Maximum Volume Spilled	10 000 litres
Estimated Time to Spill Entire Volume	Depends on severity of accident and damage sustained by the tanker truck
Immediate Receiving Medium	Soil
Distance and Direction to Closest Body of Water	Depends on location of accident
Resources to Protect	Soil and waterways
Emergency Response Level	Level 1 (low) or 2 (medium) – Refer to ERP (depends on quantity and whether there is potential for impact to water body)
Estimated Emergency Spill Response Time	Immediate if driver is not injured; up to 60 minutes for ERP Team to arrive.
Spill Response Procedures	Spillage is contained. Impacted soils (if any) is left to naturally attenuate or excavated for disposal in landfarm. Possibly cover impacted area with fresh soil. Dispose of residual sewage in PWSP or discharge back to MBR.

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## 5.4 LUBRICANTS AND OILS

Lubricants and machinery oils will be used on site throughout the course of construction and operations. Lubricants and oils have the ability to contaminate waterways and soils if exposed to the environment. That being said the risk of a lubricant or oil spill on site is expected to be minimal. All Lubricants and oils will be handled by trained staff following proper procedures and guidelines. The vast majority of the time lubricants will be stored and transported in small quantities and in the event of a spill appropriate spill response equipment and procedures will be readily available.

### 5.4.1 POTENTIAL SPILL SCENARIOS RELATED TO LUBRICANTS AND OILS


#### 5.4.1.1 SCENARIO 1: CONTAINMENT PUNCTURE DURING TRANSPORT

The most likely spill scenario to occur with regards to lubricants and oils is a puncture of an individual storage unit during transport. Lubricants and oils will be stored in 1m by 1 m units within a sea can container. When Lubricants or oils are required a single unit will be removed from the contained via forklift. In the event that the container is punctured by the forklift a maximum spill volume of 1,000 litres could potentially occur. The likelihood of this occurring is minimal as all equipment operators will be trained in proper lubricant and oil transfer procedures, in addition to this in the event that a container is punctured the operator will see the puncture immediately and will be able to take steps to contain the spill and implement mitigation procedures.

Description of Incident	Lubricant or oil container is punctured by a forklift during transport
Potential Causes	Operator error. Equipment failure.
Product Spilled	Lubricant or oil.
Maximum Volume Spilled	1,000 L
Estimated Time to Spill Entire Volume	5 minutes
Immediate Receiving Medium	Land
Most Probable Direction of Spill Migration	Depends on area
Distance and Direction to Closest Body of Water	Depends on area
Resources to Protect	Any nearby water bodies.
Emergency Response Level	Level 1 (low) or 2 (medium) – Refer to ERP (depends on quantity and whether there is potential for impact to water body)
Estimated Emergency Spill Response Time	>5 minutes
Spill Response Procedures	If the forklift driver is not injured, he will act as a first responder and immediately initiate the spill contingency plan utilizing the spill kit kept in the vicinity. The spill will be contained through the use of temporary berms and ditches until it can be vacuumed up and transported to the oily water treatment plant or an appropriate storage facility. Any contaminated soil will be removed and processed in the contaminated soil treatment area (landfarm)

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#### 5.4.1.2 SCENARIO 2: SPILL DURING EQUIPMENT ROLLOVER

It is possible that the equipment carrying a lubricant or oil container could rollover or has a collision causing a spill of the entire 1 m3 container. In the event that this occurs it will be managed the same way as detailed above. The event of a rollover is unlikely given the safe driving procedures, speed limits, road signage and training procedures in place. In addition to this all lubricant and oil containers will be securely fastened inside the vehicle in which they are being transferred making a spill unlikely.

Description of Incident	Spill during equipment rollover
Potential Causes	Operator error. Equipment failure. Poor visibility or adverse weather. Collision.
Product Spilled	Lubricant or oil.
Maximum Volume Spilled	1,000 L
Estimated Time to Spill Entire Volume	instantaneous
Immediate Receiving Medium	Land
Most Probable Direction of Spill Migration	Depends on area
Distance and Direction to Closest Body of Water	Depends on area
Resources to Protect	Any nearby water bodies.
Emergency Response Level	Level 1 (low) or 2 (medium) – Refer to ERP (depends on quantity and whether there is potential for impact to water body)
Estimated Emergency Spill Response Time	15mins-60mins
Spill Response Procedures	<p>If the driver is not injured, he will act as a first responder and immediately initiate the spill contingency plan as defined in section 6 utilizing the spill kit kept in the vicinity. The spill will be contained through the use of temporary berms and ditches until it can be vacuumed up and transported to the oily water treatment plant or an appropriate storage facility. Any contaminated soil will be removed and processed in the contaminated soil treatment area (landfarm)</p> <p>In the event a spill occurs in a water body the lubricants and oils will be contain and recovered downriver as described in Section 2, with shorelines protected using sorbent booms. All free-product will be collected for temporary storage and soiled shorelines cleaned-up. If the forklift driver is not injured, he will act as a first responder and immediately initiate the spill contingency plan as defined in Section 1.2 utilizing the spill kit kept in the vicinity. Once the spill is contained the content of the reservoir will be pumped up by a vacuum truck to be discharged to the oily water treatment plant.</p>


#### 5.4.1.3 SCENARIO 3: SPILLS DURING TRANSFER

It is possible that a minor spill may occur during the transfer of lubricants or oil to equipment. This will most likely be the result of equipment failure such as the pump or hoses or operator error.

As proper maintenance procedures will be in place to reduce the chance of equipment malfunctions, along with proper training procedures it is unlikely a spill will occur in this event. In addition to this drip tray will be utilized in all oil and lubricant transfers in the field.

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Description of Incident	Spill during transfer
Potential Causes	Operator error. Pump failure. Hose failure.
Product Spilled	Lubricant or oil.
Maximum Volume Spilled	1,000 L
Estimated Time to Spill Entire Volume	5m - 15mins
Immediate Receiving Medium	Land
Most Probable Direction of Spill Migration	Depends on location
Distance and Direction to Closest Body of Water	Depends on location
Resources to Protect	Nearby water bodies.
Emergency Response Level	Level 1 (low) or 2 (medium) – Refer to ERP (depends on quantity and whether there is potential for impact to water body)
Estimated Emergency Spill Response Time	5mins-15mins
Spill Response Procedures	<p>If this spill occurs in a building it will be contained as all buildings are fully lined and no contaminants will be able reach the natural environment. The spill will be cleaned up by qualified personnel and disposed of as a hazardous material.</p> <p>If a spill occurs during transfer all transfer activities will be halted immediately and clean up of the spill with the available spill kit will commence. The spill will be contained using berms, ditches, sumps and booms where necessary. The downstream wall of trenches will be lined with plastic material to ensure unexposed soil does not come in contact with the lubricant. Absorbent material will be utilized where required. Once the spill has been contained it will be sucked up by a vacuum truck and brought to an appropriate storage/treatment facility. If necessary contaminated soil will be removed and brought to the landfarm for treatment. New soil will be laid down in the exposed area.</p>

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## 6 REPORTING REQUIREMENTS

Reporting requirements, procedures and protocols for all spills are provided in the Emergency Response Plan, Section 8.

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## **Appendix A - Current Site Layouts (2014) for Milne Port, Mary River Mines Site, Mid-Rail Camp, and Steensby Camp**

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The following drawings provide site layouts that emphasize the spill response elements of the site. The drawings identify spill response equipment, fuel storage areas, water bodies and infrastructure. The following figures are as follows:

1. Figure 1- Milne Port Approximate Spill Kit Locations
2. Figure 2- Mine Site Approximate Spill Kit Locations
3. Figure 3- Mid-Rail Camp Approximate Spill Kit Locations
4. Figure 4- Steensby Port Approximate Spill Kit Location.

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## Appendix B - Spill Response Supplies

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## B.1 TYPICAL SPILL RESPONSE KITS AT BAFFINLAND'S MARY RIVER PROJECT

Kit #1	twelve (12) kits
Kit #2	eight (8) kits
Kit #3	eight (8) kits
Kit #4	thirty-six (36) kits
Kit #5	sixteen (16) kits

Kit No./Details	Contents	Quantity
<b>1</b> <b>20 GALLON LAB PACK</b> Absorbs up to 18 Gallons Lab Pack Container	Sorbent Pads (19" x 17" x 3/8") Sorbent Socks (3" x 4ft) Sorbent Pillows Nitrile Gloves (pair) Disposal Bag Epoxy Putty	20 5 4 2 3 1
<b>2</b> <b>PORTABLE RESPONSE KIT</b> Absorbs up to 65 Gallons Durable Yellow Rollout Container 2 convenient sizes - 64 Gallon 96 Gallon	Sorbent Pads (19" x 17" x 3/8") Sorbent Socks (3" x 4ft) Xsorb (6 quart) Hand broom/dust pan Nitrile Gloves (pair) Disposal Bag Disposable Coveralls Drain Cover Splash resistant goggles	150 6 1 1 2 4 2 2 2
<b>3</b> <b>SPILL CHEST</b> Absorbs up to 170 Gallons Heavy duty plastic Yellow Container Can be moved with a forklift	Sorbent Pads (19" x 17" x 3/8") Sorbent Socks (3" x 4ft) Sorbent Booms (5" x 10ft) Sorbent Pillows (15" x 9ft) Sorbent Roll (38" x 144ft) Nitrile Gloves (pair) Disposal Bag Epoxy Putty Barricade Tape (roll)	100 8 4 16 1 2 4 1 1

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Kit No./Details	Contents	Quantity
<b>4</b> <b>HEAVY DUTY DRUM KIT</b> Absorbs up to 75 Gallons Heavy duty plastic Yellow Container Drum sizes include 65 & 94 US gallons or an economy 45 gallon steel drum	Sorbent Pads (19" x 17" x 3/8") Sorbent Booms (5" x 10ft) Xsorb (6 quart) Nitrile Gloves (pair) Disposal Bag Disposable Coveralls Drain Cover Splash resistant goggles	100 4 1 2 4 2 1 2
<b>5</b> <b>EXTRA LARGE DRUM KIT</b> Absorbs up to 120 Gallons Heavy duty plastic Yellow Container	Sorbent Pads (19" x 17" x 3/8") Sorbent Socks (4ft) Sorbent Socks (8ft) Sorbent Pillows (large) Sorbent Pillows (small) Plug Putty Drain Cover Disposal Bag (roll) Disposable Coveralls Barrier Tape (roll) Granular Absorbent (12.5kg)	300 8 8 12 8 2 7 1 2 1 1


## B.2 ADDITIONAL SPILL RESPONSE EQUIPMENT TO BE STORED IN 2 SEA-CAN CONTAINERS AT MILNE INLET FOR BAFFINLAND'S MARY RIVER PROJECT:

Description of additional equipment
Oil containment boom, anchors and towing bridles (300 m) Multisorb granular absorbent (500 bags) Custom pump skid for emergency fuel transfers from one tank to another 2" x 25' transfer hose for emergency transfer pump (8 sections) 18" x 18" x 6" Arctic min berm for under fittings (12 units) 36" x 36" x 6" Arctic min berm for under fittings (12 units) Insta berm 10' x 10' x 15" Arctic (2 units) Oil sheets for replenishing spill kits (300 bags) Oil Skimmer Marine Near Shore Work Boat Spill response Hazardous Materials Trailer complete with spill equipment storage, pump and storage tank

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## Appendix C - Hazardous Materials List

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## C.1 List of MSDS of Hazardous Materials Used on site

- ACE Starting Fluid (2p.)
- Acetylene (6p.)
- Agricultural Lime (6p.)
- Aluminum Sulphate (7p.)
- APS 703d #3 Floc Log (2p.)
- APS 705 Silt Stop (2p.)
- APS 706b Floc Log (2p.)
- Aviation Fuel (7p.)
- Butane (5p.)
- Calcium Chloride Flake (4p.)
- CAT Arctic DEO Synthetic SAE 0W-20 (7p.)
- CAT Extended Life Coolant (7p.)
- Co-op D-MO Gold 10W30 Diesel Motor Oil (5p.)
- Detonating Cord (3p.)
- Diesel Fuel (8p.)
- DR-133 Polymer (4p.)
- Duron-E Synthetic 5W40 (7p.)
- Dustbane Room Deodorizer (2p.)
- Dynamic Varsol Paint Thinner & Cleaner (5p.)
- Ecopure EP61 Glass and Surface Cleaner (6p.)
- Ecopure EP70 Washroom Cleaner (5p.)
- Electric Detonators (4p.)
- Emulsion Explosives - Dyno AP (3p.)
- EZ-MUD (6p.)
- Flexand High Performance Putty (9p.)
- Formazin Turbidity Standard 4000 NTU (7p.)

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- Gasoline (8p.)
- Gojo Original Formula Hand Cleaner (2p.)
- Hertel Plus Disinfectant (5p.)
- Howes Lubricator Diesel Fuel Conditioner (2p.)
- Howes Lubricator Diesel Treat (6p.)
- Hydrogen Peroxide (3%) (6p.)
- Jet-A1 (8p.)
- Kleen Flo Quick Melt (2p.)
- Kleen-Flo Gas Line Antifreeze (2p.)
- Kleen-Flo Lock Deicer (2p.).pdf
- Kleen-Flo Non-Chlorinated Break and Part Cleaner (2p.)
- Kleen-Flo Safe-T-Brake Air Brake Antifreeze (2p.)
- Krylon Industrial Rust Tough (6p.)
- LPS 1 (9p.)
- LPS 2 (9p.)
- LPS 3 (9p.)
- LPS Chain Mate (9p.)
- LPS QB Precision Duster (6p.)
- Lubri Plus Break Fluid DOT3 (7p.)
- Lubriplate Low-Temperature Multi-Purpose Grease (6p.)
- Lubriplate No. 630-2 Multi-purpose Lithium Grease (5p.)
- Master Appliance Butane Fuel (2p.)
- Methanol (6p.)
- Mobil 1 Turbo Diesel Truck 5W-40 (9p.)
- Model 534 (Alcohol Resistant Foam) (6p.)
- Molykote 55 O-Ring Grease (7p.)
- Muskol (7p.)

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- Non-electric Detonators (5p.)
- OFF (9p.)
- Oxygen (6p.)
- Packaged Dynamites and Blasting Gelatins (3p.)
- Packaged Emulsion Explosives (3p.)
- Pennzoil SAE OW-20 Fuel Synthetic Motor Oil (8p.)
- Permatex Fast Orange Hand Cleaner (4p.)
- Polyaluminum Chloride (Bulab 5361P) (4p.)
- Potassium Chloride (Potash) (4p.)
- Propane (7p.)
- Purrell Hand Sanitizer (2p.)
- Relton Rapid Tap (5p.)
- Shell Aeroshell 7 Grease (8p.)
- Shell Air Tool Oil S2 A 100 (4p.)
- Shell Air Tool Oil S2 A 32 (4p.)
- Shell Corena S4 R 46 (4p.)
- Shell Donax TC Multiseason (7p.)
- Shell Gadus S2 V220 2 (8p.)
- Shell Gadus S2 V30KXD 1 (8p.)
- Shell Gadus S5 U100KD 1 (4p.)
- Shell Gadus S5-U100KD 1 (7p.)
- Shell Gadus S5-V100 2 (4p.)
- Shell OMALA S4-GX-150 (4p.)
- Shell Rotella T SAE 15W-40 (7p.)
- Shell Rotella T5 SAE 0W-40 (7p.)
- Shell Spirax S3 TLV (7p.)
- Shell Spirax S6 ATF A295 (18p.)

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- Shell SPIRAX S6 AXRME 75W-90 (7p.)
- Shell Tellus T 32 (4p.)
- Shock Tube (3p.)
- Sky Blue Lake Dye (8p.)
- Sodium Bicarbonate (3p.)
- Sodium Hypochlorite (6p.)
- Stoko Gel Free (hand sanitizer) (6p.)
- Uvex Clear Lens Cleaning Solution (1p.)
- V015 (2p.)
- WD-40 (5p.)
- W-OB Polymer (4p.)


## **C.2 Environment Laboratory**

- AmVer™ High Range Ammonia Test 'N Tube™ Reagent (5p.)
- Ammonia Cyanurate Reagent (5p.)
- Ammonia Salicylate Reagent (5p.)
- COD TNTPlus™, LR (3-150 mg/L) (6p.)
- Phosphate Acid Reagent Vials (5p.)
- PhosVer® 3 Phosphate Reagent (5p.)
- Potassium Persulfate (5p.)
- Sodium Hydroxide Solution, 1.54 N (5p.)

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## Appendix D - Material Safety Data Sheets

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## Appendix E - NT-NU Spill Report

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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	<input type="checkbox"/> ORIGINAL SPILL REPORT, OR <input type="checkbox"/> UPDATE # TO THE ORIGINAL SPILL REPORT	REPORT NUMBER -
	OCCURRENCE DATE: MONTH – DAY – YEAR		OCCURRENCE TIME		
C	LAND USE PERMIT NUMBER (IF APPLICABLE) IOL - Commercial Lease: Q13C301		WATER LICENCE NUMBER (IF APPLICABLE) 2AM-MRY1325 Type "A"		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM THE NAMED LOCATION Mary River Mine Site, Baffin Island, NU			REGION <input type="checkbox"/> NWT <input checked="" type="checkbox"/> NUNAVUT <input type="checkbox"/> ADJACENT JURISDICTION OR OCEAN	
E	LATITUDE DEGREES      MINUTES      SECONDS		LONGITUDE DEGREES      MINUTES      SECONDS		
F	RESPONSIBLE PARTY OR VESSEL NAME Baffin Iron Mines Corp.		RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION 2275 Middle Road East, Suite 300, ON L6H 0C3		
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 EQUIPMENT
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

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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 <input type="checkbox"/> EC <input type="checkbox"/> CCG <input type="checkbox"/> GNWT <input type="checkbox"/> GN <input type="checkbox"/> ILA <input type="checkbox"/> INAC <input type="checkbox"/> NEB <input type="checkbox"/> TC			SIGNIFICANCE <input type="checkbox"/> MINOR <input type="checkbox"/> MAJOR <input type="checkbox"/> UNKNOWN		FILE STATUS <input type="checkbox"/> OPEN <input type="checkbox"/> CLOSED
AGENCY	CONTACT NAME		CONTACT TIME	REMARKS	
LEAD AGENCY					
FIRST SUPPORT AGENCY					
SECOND SUPPORT AGENCY					
THIRD SUPPORT AGENCY					

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