

DRDC Northern Watch Technology Demonstration Project



Spill Contingency Plan

1 March 2018

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Appendix A – Topographical map – identifies camp location, locations of fuel storage sites, spill kits and contents of spill kits.

Appendix B – MSDS – Aviation fuel, diesel fuel, and gasoline

Introduction

The following contingency plan presents the prescribed course of action to be taken in the case of unanticipated spill events during the NWTDP's Arctic field trial on Devon Island (Gascoyne Inlet), Nunavut. The plan will enable persons in a particular situation to maximize the effectiveness of the environmental protection response and meet all regulatory requirements for reporting to the appropriate authorities.

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Scope and Purpose

This plan applies to all activities and facilities pertaining to the construction and operational activities at the NWTDP camp at Gascoyne Inlet.

The purpose of the plan is to:

- Provide a clear statement of the procedures to be followed in response to all spills;
- Minimize the potential environmental impact of spills by establishing predetermined action plans;
- Protect the health and ensure the safety of the personnel involved in the Spill Response activities;
- Provide a reporting network for spills;
- Identify the roles and responsibilities of all parties involved in the Spill Response activities; and,
- Identify sufficient personnel, materials, and equipment needed to provide an adequate response to a spill.

The following substances could potentially be spilled at the NWTDP site:

- Diesel fuel
- Gasoline

The following equipment will be onsite during NWTDP field trials.

- ATVs (up to 4)
- Diesel Generator (4)
- Diesel Space Heaters (6)
- Hot Water Ice Drill (1)

Site Information

It is estimated that the camp operation will require approximately:

- 4715 litres of diesel stored in 23 drums located within the lined (impermeable resin membrane) bermed drum storage area;
- Two times 1230 litres diesel fuel, this volume of fuel is contained in tanks connected to the on-site generators, these tanks have been installed in their own self-contained lined (impermeable resin membrane) bermed areas;
- 410 litres of gasoline stored in 2 drums located within the lined (impermeable resin membrane) bermed drum storage area;
- 100 litres of lubricant (partial drum) located within the lined (impermeable resin membrane) bermed drum storage area.

- **Fuel will be stored at least 50 metres from any bay of water or drainage course.**

Location of Spill Kits and Equipment on Site

The spill kits will be located in the generator building (at the main camp) and at the drum storage area. The camp will also be equipped with a portable filtration system to separate petroleum products from water. It will be located in the generator building closest to the highest potential risk area requiring it.

Training of Site Personnel

Select personnel will have formal training provided by Department of National Defence (DND) in Land/Marine Spill Response and Clean-up/Remediation. These personnel will be on site and will be the response team leaders. When other personnel arrive at the trial site, they will receive the following training during the initial Camp Safety Brief :

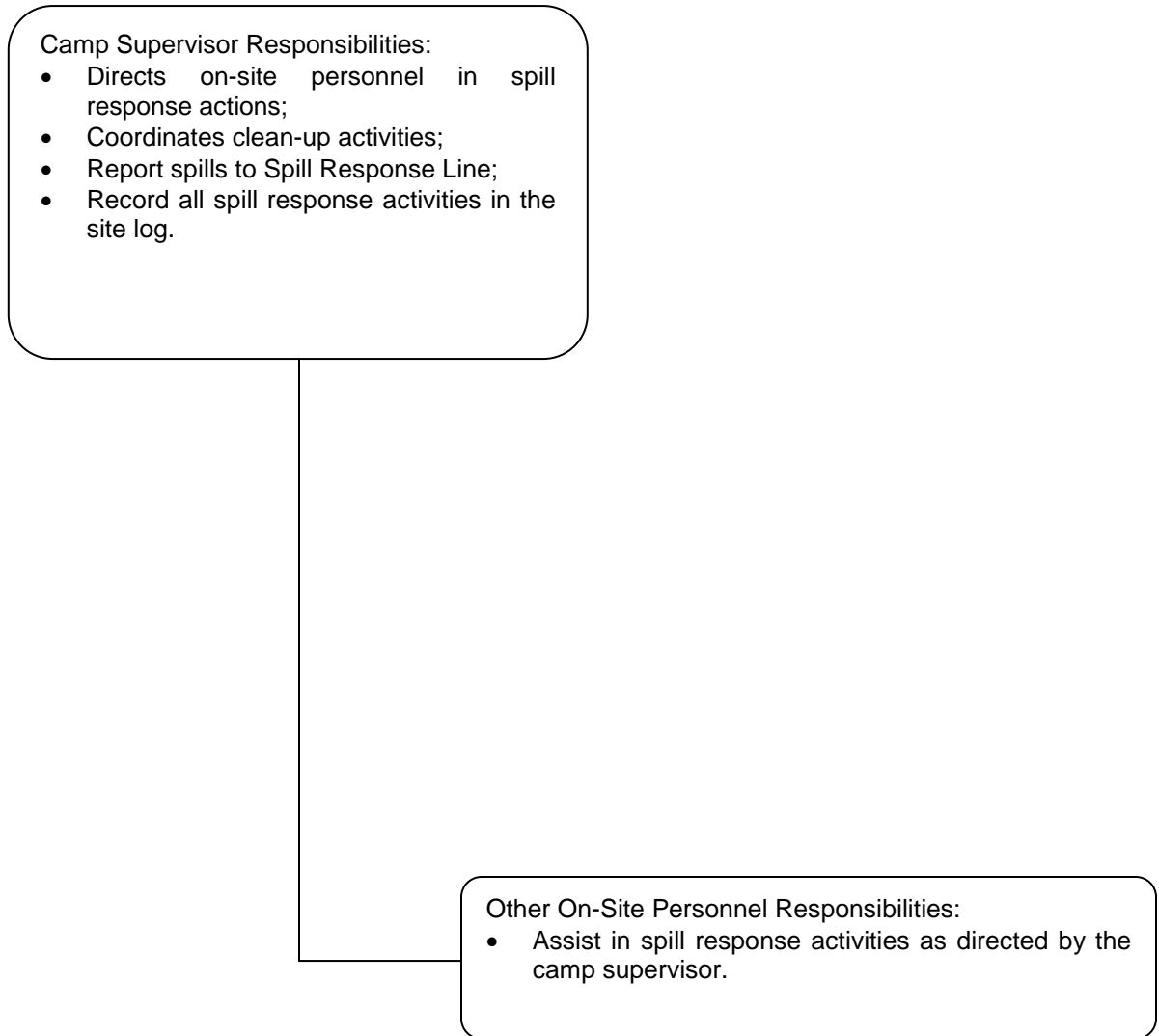
- Fuel storage locations
- Locations of spill kits
- Re-fuelling procedures
- Roles and responsibilities of the Spill Response team members
- Spill Response Action Plan
- Contact Numbers and Reporting Procedures

Roles and Responsibilities

All on site personnel have the potential to be involved in spill response actions in the event of a spill during NWTDP field trials. Their roles and responsibilities are described as follows (and summarized in Figure 1):

- Review proper fuel handling practices and spill response activities with all camp personnel.
- Practise spill prevention by performing regular maintenance on all fuel systems and by using proper methods for handling of fuel products.
- Provide personnel, materials, and equipment necessary for adequate response to fuel spills.
- Establish communications and verbally report all spills to the camp supervisor as soon as practical.
- Isolate and eliminate all ignition sources.
- Ensure safety and security at the spill site.
- Stop or reduce discharge, if it is safe to do so.
- Make every effort to contain the spill by dyking with earth or other barriers on land.
- Assess potential for fuel recovery.
- Use pumps to return spilled fuel to drums.
- Follow all guidelines and regulations for disposal of spilled materials, associated debris, contaminated soil and water as established by appropriate government agencies.
- Assess potential terrain and wildlife disturbance, erosion and archaeological site disturbance in any areas to be affected by clean up operations and contact relevant authorities.
- Document all events/actions.
- Report the spill to the Spill Report Line and follow up with a written spill report. This report shall summarize the initial report information; confirmation of spill volume; actions taken; future remediation/monitoring requirements; and a sketch map and/or photographs of the spill area.

Figure 1: Spill Response Team Organization



Satellite telephone and e-mail are available to on-site personnel to maintain communications with off-site parties. All on-site personnel are provided with two-way radios for all intra-site communications. Table 1 provides all other contact numbers.

24 hour Contact On-Site

For the 2015 trial, the Camp Supervisor will be available at all times. He can be reached at the camp via one of two Iridium phones. The two Iridium numbers are 011-8816-316-62000 and 011-8816-316-62002. He can also be reached by contacting the Polar Continental Shelf Program Operations Desk (they will pass on a message) in Resolute at 867-252-3872.

Environment Canada Emergency Contact and General Contact List

Table 1: Spill Contingency Plan - Contact List

Resource	Location	Phone No.
24 Hour Spill Line	NWT/Nunavut	867-920-8130
Environment and Climate Change Canada – Enforcement Officer	Iqaluit	867-975-4644
Government of Nunavut – Environmental Protection	Iqaluit	867-920-8130
Indigenous and Northern Affairs Canada – Water Resources Inspector	Nunavut Regional Office	867-975-4550
Indigenous and Northern Affairs Canada– Land Administration Minister	Nunavut Regional Office	867-975-4280
Defence R&D Canada - Atlantic	Gary Fisher, SO Environment Officer	902-427-3432

Reporting Procedures

Any incidents and spills that may have an adverse affect on human health or the environment must be reported to the appropriate authorities. This also applies to any spill that may be reported in the media or that has legal implications in accordance with DAOD 2008-3 Issue and Crisis Management. In the case of a spill, the following steps must be taken to complete the reporting process.

- 1) Report the spill immediately to the Camp Supervisor.
- 2) Report the spill to the 24hour Nunavut Spill Line and complete the Nunavut Spill Report Form.
- 3) Inform the SOEnv at DRDC Atlantic who will decide whether a DRDC report is necessary based on the requirements set out in ED 4003-1: Spill Reporting. SOEnv reports the spill to Environment Canada within 24 hours of the incident when the spill is:
 - (i) A toxic substance into water;
 - (ii) Of unknown hazardous products;
 - (iii) A toxic substance regulated in Schedule 1 of CEPA;
 - (iv) A halon of any amount; or

- (v) A halocarbon falling under the Federal Halocarbon Regulations
- 4) Notify the DG, respecting the chain of command.
- 5) Record the spill in DND's SPILLNET database, which can be found on the DND intranet at <http://131.134.224.16/spillnet>.

When reporting a spill to the 24 Hour Spill Report Line and completing the Nunavut Spill Report Form, the following information shall be included:

- Date and time of the spill;
- Location of the spill and direction the spill may be moving;
- Name and phone number of a contact person close to the location of the spill;
- Type of contaminant spilled and quantity spilled;
- Cause of the spill;
- Whether the spill is continuing or has stopped;
- Description of the existing containment;
- Action taken to contain, recover, clean up and dispose of spilled material;
- Name, address and phone number of the person reporting the spill; and
- Name of owner or person in charge, management or control of the contaminants at the time of the spill.

As required under Part G (5)(c) a final(follow up) spill report will be submitted to the Aboriginal Affairs and Northern Development Canada – Manager of Field Operations no later than 30 days after initially reporting the spill to the spill report line. A copy of the NU Spill Report Form and Instruction Sheet are attached to this plan.

Action Plan

In the event of a spill, protection of human health and safety is paramount. Contamination of personnel involved in a clean up is a real possibility, as is contamination of the surrounding workplace and environment.

The individual discovering a spill shall:

- Warn the people in the immediate vicinity and evacuate if necessary.
- Isolate or remove any ignition sources.
- Identify the spilled material, if possible, and take all safety precautions before approaching it.
- Locate the source of the spill.
- Attempt to stop the leakage and contain the spill, if safe to do so.
- Assess the likely size, extent and condition of the spill.
- Report to the camp supervisor the spill location, type of material, volume and extent, status of spill (direction of movement), and prevailing meteorological conditions.

Once the Camp Supervisor has been contacted and arrives at the spill site, the following actions are to be taken:

- Assess the severity of the spill via direct observation and/or information from communications.
- Deploy equipment and personnel to initiate containment and clean up.
- Prepare the Nunavut Spill Report Form.
- Notify all other pertinent parties, including other government agencies.

General Procedures (Clean-up)

The environmental protection measures outlined in the following sections are to be taken by all workers on-site to reduce the chance of environmental impairment due to a spill, release or other incident. The following general clean up procedures shall apply for all spill areas:

- Wear protective clothing (contained in spill kits) as required for handling spills.
- Spills on tundra (soil or rock) will be contained by construction of earthen dykes using available material. Sorbent material will be placed in and around the path of the spill. As the sorbent barrier becomes saturated, continually replace it and place the sodden pad in a hazmat disposal drum. Fuel or other liquids lying in pools, trenches or in specially constructed troughs are to be removed with pumps, buckets or skimmers. On completion, sodden earth and stone will be removed from site and disposed of in accordance with all applicable regulations.
- Spills on snow will be contained by the creation of snow dykes and absorbent material. Sodden snow and material, (which can easily be identified by discoloration) will be removed and placed in a shallow pan or receptacle. It will then be placed in a warm environment to melt the snow. Fuel/oil will be separated from water using a filtration system. Water will be placed out to evaporate or poured into a drum for disposal and fuel/oil will be placed into a clearly marked drum for disposal.
- Spills on ice will be contained by the creation of snow dykes. Sodden snow and ice will be removed and handled the same way as previously described for snow procedures. If the ice is broken up and is in water then the procedure for spills in water will be carried out.
- Spills in water will be contained using a floating boom (provided in spill kit). If required, a pump will be used to assist with the removal of large amounts of fuel. Small amounts of fuel will be absorbed with floated sorbent pads and then put into a hazmat disposal drum. Fuel/oil/water mixture will be separated using a filtration system.
- Assess potential for disturbance of wildlife, fish and archaeological sites by spill or clean up operations and notify the relevant authorities.
- Notify environmental authorities to discuss disposal and final clean up options.
- Conduct required clean up operations.
- Assess and appropriately treat any areas disturbed by clean up activities.
- Ensure the site has been completely restored and leave the site only when all work is finalized.

Fuel Storage Areas

In order to prevent spill or accidents at fuel storage areas, the following procedures apply:

- Avoid sites that slope towards waterways or other environmentally sensitive areas, exhibit ponding or flooding, have high groundwater tables, and/or excessive seepage or ice-rich (thaw sensitive) soils.
- Avoid archaeological resources.
- Conduct fuelling and equipment lubrication in a manner that avoids spillage. When refuelling equipment, operators are to use leak-free containers, reinforced rip and puncture proof hoses and nozzles, and drip trays. Sorbent pads will be placed under the drip tray to catch any splatter during fuel transfers. Operators are to be in attendance for the duration of the refuelling operation and are to ensure that all storage container outlets are properly sealed after use.
- All storage and transfer sites will be equipped with sorbent pads, an absorbent dust material, containment barrel and quick patch kits.
- Smoking is prohibited within 7.5 metres of the fuel storage facility.
- Inspect fuel storage facilities at least once a day when personnel are on-site and record results in the Camp log.

- All barrels shall be individually identified. The label is to be to industry standards and should provide all information necessary for health and safety, and environmental purposes. Material Safety Data Sheets for all materials maintained in the construction camp will be available for all personnel.
- Conduct regular inspections of all machinery hydraulic, fuel and cooling systems. Repair leaks immediately.
- Pre-assemble and maintain emergency spill response equipment including at least two fuel pumps, empty 200 litre barrels and absorbent materials.
- Remove all barrels, redundant fuel storage sites and associated materials and equipment from the site at the conclusion of the field trials.
- A final inspection of all storage areas (berms) and fuel barrels enclosed will be carried out and logged in the Camp log prior to final departure of site.

Potential Safety Hazards

The most significant potential safety hazard related to a fuel spill at the Gascoyne Inlet site is the possible soil and water contamination from the spill. The fuel storage area is located away from waterbodies and watercourses to avoid this hazard. Although soil contamination is a real potential hazard, the likelihood is small and spill volumes are small.

Potential Risk/Mitigation

1. Risk Levels

Table 2: Spill Contingency Plan - Risk Levels

Material Risks	Risk during activity (High, Moderate, Low, Negligible)							
	Fuelling	Container Transfer	Transport	Long-term Storage	Container Leakage	Machine Damage	Machine Operation	Maintenance
Diesel fuel	M	M	L	N	L	M	L	L
Gasoline	H	M	L	N	L	M	L	L
Lubricants	N	N	N	N	L	M	M	M
Solvents	N	N	N	N	L	N	N	M

2. Mitigation

Table 4: Spill Contingency Plan – Mitigation of Risks

Risk Material	Comment	Mitigation
Diesel fuel	Fuelling risk of small spill. Transfer risk of large spill if accident occurs. Machine damage risk of large spill if fuel continues to pump.	Fuelling done on impermeable pan/mat, Smooth transfer route to eliminate risk of accident. Check machinery often and set diesel generators up on pans
Gasoline	Greatest risk of spill is during fuelling because operators may not be familiar with pumps	Operator training and use of spill pans at fuelling point. Training in vehicle operation and limitation on where they can be operated to reduce possibility of accident
Lubricants	Risk is from damage to operating equipment and during oil changes.	Diesel generators to operate on pans. Mobile equipment to be in good repair and operated safely
Solvents	Risk is during maintenance and cleaning only	Conduct maintenance on impermeable surface. Have spill control material at work site

Mitigation Notes:

1. Only Environment friendly (green) cleaning materials will be used at the Gascoyne Inlet Camp and science sites.
2. When HAZMAT is required, it shall be fully documented and used under strict control. Clean up kits specific to the HAZMAT shall be brought in with the HAZMAT material and the OPI shall have had training in handling and cleanup of that material.
3. All fuel containers at Gascoyne inlet shall be marked to indicate the owner in accordance with the Land Use Permit. Unmarked containers and those owned by others (non- DRDC) are the responsibility of the owner. Unmarked containers will be reported, in writing to the Nunavut Land Use Office and to the Nunavut Water Board
4. DRDC Atlantic will maintain a fuel inventory record and a site plan to clearly indicate what fuels and lubricants are at the site, where they are stored regardless of who owns them.
5. DRDC fuels, lubricant and solvent containers shall be marked with the date they were brought into camp. Unused material will be returned to DRDC Atlantic if unused after four years.
6. Used Lubricant shall be stored in a barrel of its own. It may be mixed with discarded diesel fuel but not with gasoline or aviation fuel. The content of the used oil barrel shall be marked on the barrel. The barrel shall be returned south for disposal action when three-quarters full or at the four year mark.

Nunavut Spill Report Form



NUNAVUT SPILL REPORT (Oil, Gas, Hazardous Chemicals or other Materials)

[illegible]

24-Hour Report Line 24-**മി** ഫോൺ നമ്പർ 24-**എസ്**

Phone/Fax (867) 920-8130

Fax/Telephone (867) 873-6924

A Report Date and Time ከጥቅምት ፳፻፲፱ ዓ.ም. ጋር ተዛምዶ		B Date and Time of Spill (if known) ከጥቅምት ፳፻፲፱ ዓ.ም. ጋር ተዛምዶ (እንደተታወቀ)		C <input type="checkbox"/> Original Report የጥቅምት ፳፻፲፱ ዓ.ም. ላይ <input type="checkbox"/> Update No. _____ ለጥቅምት ፳፻፲፱ ዓ.ም. ላይ		Spill Number ፳፻፲፱	
D Location and Map Coordinates (if known) and Direction (if moving) ሕገ ልዩ ቀረጽ ወይም አቅጣጫ (እንደተታወቀ) ቀረጽ ወይም አቅጣጫ (አቅጣጫ)							
E Party Responsible for Spill (Full Name and Address) የሆነ ልዩ ስም (ልዩ ቀረጽ ወይም አቅጣጫ)							
F Product(s) Spilled and Estimated Quantities (provide metric volumes/weights if possible) የሆነ የጥቅምት ፳፻፲፱ ዓ.ም. ላይ የተጠቀሱት የጥቅምት ፳፻፲፱ ዓ.ም. ላይ የተጠቀሱት							
G Cause of Spill የሆነ ልዩ ስም							
H Is Spill Terminated? ልዩ ስም		I If Spill is Continuing, Give Estimated Rate የሆነ ልዩ ስም		J Is Further Spillage Possible? ልዩ ስም		K Extent of Contaminated Area (in square metres if possible) የሆነ ልዩ ስም	
<input type="checkbox"/> Yes/አ <input type="checkbox"/> No/አይ		<input type="checkbox"/> Yes/አ <input type="checkbox"/> No/አይ		<input type="checkbox"/> Yes/አ <input type="checkbox"/> No/አይ		<input type="checkbox"/> Yes/አ <input type="checkbox"/> No/አይ	
L Factors Affecting Spill or Recovery (weather conditions, terrain, snow cover, etc.) የሆነ ልዩ ስም				M Containment (natural depression, dykes, etc.) የሆነ ልዩ ስም			
N Action, if any, taken or Proposed to Contain, Recover, Clean Up or Dispose of Product(s) and Contaminated Materials የሆነ ልዩ ስም							
O Do You Require Assistance? <input type="checkbox"/> No <input type="checkbox"/> Yes, describe: ልዩ ስም				P Possible Hazards to Persons, Property or Environment e.g. fire, drinking water, fish or wildlife የሆነ ልዩ ስም			
Q Comments and/or Recommendations የሆነ ልዩ ስም							
Reported By የሆነ ልዩ ስም				Position, Employer, Location የሆነ ልዩ ስም			
Reported To የሆነ ልዩ ስም				Position, Employer, Location የሆነ ልዩ ስም			
Telephone የሆነ ልዩ ስም				Telephone የሆነ ልዩ ስም			