SPILL CONTINGENCY PLAN

FOR

BAF-3

(Brevoort Island, Nunavut)

Prepared for: Nunavut Water Board

Date: 25 Nov 2008

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Table of Contents

LIST OF ACRONYMS AND ABBREVIATIONS

CMO	Contractor Management Office
DND	Department of National Defence
EMT	Electronics Maintenance Technician
EPM	NWS Environmental Protection Manual
EPP	Environmental Protection Plan
ERT	Emergency Response Team
FMT	Facilities Maintenance Technician
Hazmat	Hazardous Materials
LHCN	Long-Haul Communication Network
LOGS	Logistics Department
LRR	Long Range Radar
LSS	Logistics Support Site
NWS	North Warning System
NWSCC	North Warning System Control Centre
NWSSC	North Warning System Support Centre
NWSO	North Warning System Office
NWT	Northwest Territories
O&M	Operation and Maintenance
PCBs	Polychlorinated biphenyls
PGS	Power Generating System
PMI	Preventive Maintenance Inspection
POL	Petroleum, oil and lubricants
PRO	Procedure
SCADA	Supervisory Control and Data Acquisition
SOW	NWS O&M Contract Statement of Work
TDG	Transportation of Dangerous Goods
WHMIS	Workplace Hazardous Materials Information System

1.0 PURPOSE

This plan establishes policy, responsibilities and instructions for response to spills of petroleum, oil and lubricants (POL) and other hazardous materials (Hazmat) which may occur at the North Warning System (NWS) radar site BAF-3 during operations and maintenance (O&M) activities, as defined by the NWS O&M Contract Statement of Work (SOW), and as performed by the contracting agency, the contractor or subcontractors. Full definitions of 'spill' and 'Hazmat' are provided in Section 4.0 below.

The purposes of this plan are to:

a) provide a clear statement of procedures which will be carried out in response to POL & Hazmat spills;

b) minimize the environmental impacts of POL & Hazmat spills by establishing pre-determined responses and plans of action;

c) protect the health and ensure the safety of (i) personnel involved in POL & Hazmat spill response activities and (ii) local communities;

d) provide a reporting network for POL & Hazmat spills;

e) ensure site environmental restoration through appropriate remedial activities;

f) identify the roles and responsibilities of all parties involved in POL & Hazmat spill response activities; and

g) identify sufficient personnel, materials and equipment needed to make an adequate response to POL & Hazmat spills.

2.0 SCOPE

This plan applies to all activities and facilities pertaining to the NWS radar site BAF-3 (Brevoort Island). Note that BAF-3 is an unattended site with occasional site visits from LSS-Q (Iqaluit, Nunavut) personnel; it is ramped up (in attended mode) as required, usually in the summer. Since BAF-3 is in the zone managed by the LSS-Q Manager (in Iqaluit), this plan refers to the LSS-Q Manager where required.

3.0 APPLICABLE DOCUMENTS

This plan is an integral component of Nasittuq's Environmental Protection Plan (EPP), consistent with the requirements and provisions of:

i) Nasittuq's Corporate Environmental Policy;
ii) Nasittuq's Corporate Environmental Protection Plan (EPP) for the O&M of the NWS;
iii) NWS O&M Contract SOW;
iv) NWS Environmental Protection Manual (EPM); and
v) Nasittuq's NWS Incident Reporting Procedure, PRO-4.9-37.

4.0 GENERAL

4.1 Spill Definition

A 'spill' is defined as *the accidental and/or unwanted discharge of any volume of POL or Hazmat from its storage container or structure, vehicle, pipe or other container: (a) into the natural environment or (b) within a building.*

This definition covers all discharges including 'leaks' and 'weepage'. The discharged substance can be in solid, liquid or gaseous form. A POL spill involves petroleum, oil or lubricants; a Hazmat spill may involve one or more of the following substances:

a) polychlorinated biphenyls (e.g. PCB-containing oil or paint)
b) chlorinated and non-chlorinated solvents (e.g. cleaner-degreasers)
c) flammable gases (e.g. acetylene)
d) waste petroleum products (e.g. used engine oil)
e) corrosives (e.g. battery acid)
f) glycol (e.g. antifreeze)
g) asbestos (e.g. pipe insulation)
h) halocarbons (e.g. FM-200), and/or
i) other contaminants.

There may be circumstances where the discharge of a substance not on the above list may be considered hazardous by personnel discovering the spill, e.g. large volumes of spilled wastewater. When in doubt, report the spill to the LSS-Q Manager, who in turn can seek guidance from the Environmental Services Supervisor. Reporting procedures for Halocarbon release are in the EPP Section 5-XIV, Halocarbon Management Plan.

4.2 Spill Risk

Nasittuq has expended considerable effort to reduce the likelihood and limit the impact of Hazmat spills. For example, only a limited number of Hazmat products may be purchased and stored on NWS sites on approval of Environmental Services.

Except for the large volumes of glycol used in power generation/heating systems, most hazardous products are stored and used in small quantities, e.g. consumer-sized packages/containers such as an aerosol can. Furthermore, it is likely that any Hazmat spill will occur indoors given the controlled storage requirements for these materials.

By far the biggest risk, in terms of likelihood of occurrence and volume of potential spilled material, is that associated with POL spills, particularly Jet A-1 fuel. Millions of litres of fuel are transported, transferred, stored, and consumed annually by the NWS.

In recognition of this risk, the details of this Spill Plan tend to focus on issues related to fuel spills. Nevertheless, the procedures described herein apply to all manner of POL or Hazmat spills. Alternative or additional procedures will be clearly indicated where requirements differ significantly between POL and Hazmat spills (e.g. Spill Crew wearing Personal Protective Equipment when handling toxic substances).

4.3 Bulk Fuel Description and Characteristics

The fuel used for all purposes on the NWS sites is Jet A-1, Arctic Grade, aviation turbine fuel, kerosene type. This fuel type is flammable with a flash point of 38°C. It contains paraffin, olefin, naphthalene and aromatics. The aromatics and naphthalene fractions are both highly volatile and toxic.

Due to its high volatility and low density, Jet A-1 will rapidly disperse on top of a water surface, is easily carried by flowing water, and is visibly detectable as a thin sheen. It will sink rapidly into unfrozen ground and will migrate along the active layer and the permafrost zone.

Land spills of Jet A-1 may cause contamination of soil quality. Water spills of Jet A-1 may cause short-term toxicity to aquatic life forms and potentially long-term physical impairment to aquatic ecosystems.

4.4 POL Bulk Storage and Distribution System

BAF-3 has fuel storage tanks and piping systems for fuel distribution.[1] The main components of the POL bulk storage and distribution system are shown in Figure 1.

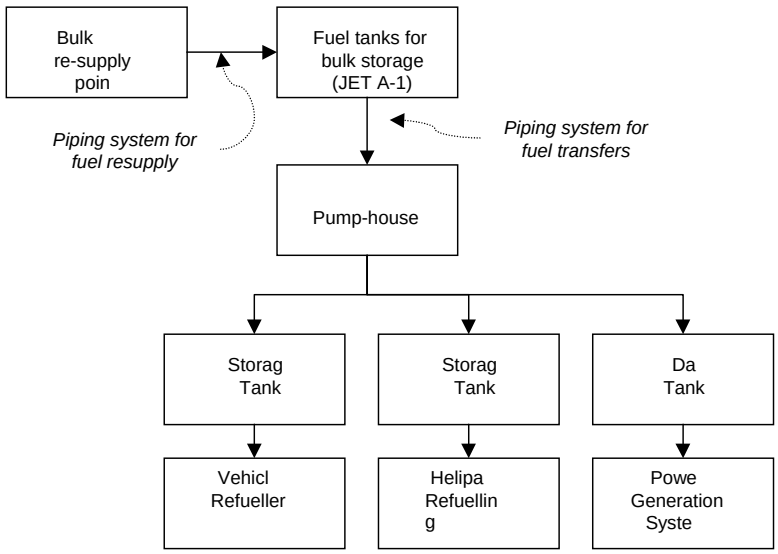

Figure 1. POL storage and distribution system.

[1] "Fuel re-supply" refers to the operation of bringing fuel to the site by ship (sealift) and storing it in primary on-site storage tanks; "fuel transfer" refers to the pumping of fuel from the primary tanks to secondary storage tanks for short-term use.

All fuel tanks are located above ground and range in size from 200-litre capacity to about 800,000 litre capacity. Bulk storage tanks are of vertical or "self-dyked" (i.e. with integral secondary containment) types. Single-walled vertical tanks are located inside earthen containment berms with a geotextile membrane.

Oils and lubricants, used in the operation of power generating systems (PGS) and vehicles, are stored in site specific POL storage areas and in dedicated POL storage sheds. Waste POL products are stored in dedicated areas prior to disposal by retrograde activity.

4.5 Fuel and Use

Bulk fuel re-supply of BAF-3 takes place during the summer season every two years.. Bulk fuel is transported to BAF-3 by sealift (ship). Contractors and sub-contractors engaged in fuel re-supply operations must have their own POL Spill Contingency Plans to cover their area of responsibility (see Section 5.4, Division of Responsibility). This document will be the source document for contractors and sub-contractors.

Uses of fuel at BAF-3 include: (a) operation of the power generating system,
(b) aircraft/helicopter re-fuelling, (c) vehicles, and (d) furnaces.

5.0 RESPONSIBILITY & AUTHORITY

The contracting agency, the contractor and sub-contractors, where applicable, will be involved in POL and/or Hazmat spill prevention, detection, and response actions during NWS O&M activities. The roles and responsibilities of the parties are described below.

5.1 Nasittuq

As the O&M contractor, Nasittuq's responsibilities include:

a) Maintaining an up-to-date Spill Contingency Plan (this document);

b) Practicing spill prevention through (i) regular maintenance of all POL systems and (ii) use of proper methods for handling POL and Hazmat products;

c) Maintaining operational competence through staff training;

d) Identifying the requirements of sub-contractors involved in NWS O&M activities; and

e) Responding appropriately to POL and Hazmat spills.

When a POL or Hazmat spill is reported at an NWS site, Nasittuq will mobilize personnel, materials and equipment to respond immediately upon receipt of the spill report or as soon as practicable.

In-house resources will be used for most spills unless the circumstances of the spill are deemed, by the Environmental Services Supervisor, to require external resources (e.g. a very large spill clean-up of particularly toxic materials). Details of individual responsibilities are provided in Section 6.0.

When required, additional assistance will be requested from: (i) other NWS sites, (ii) the Department of National Defence (DND), and/or (iii) the Canadian Coast Guard. Additional assistance may also be hired from: (i) Northern residents, (ii) local communities, and (iii) commercial spill response firms.

Nasittuq will also consider lending assistance to other agencies or local communities when requested.

5.2 North Warning System Office

As the contracting agency, the North Warning System Office (NWSO) is responsible for ensuring that adequate POL spill detection and response capabilities are in place and monitored for all NWS operations.

5.3 Fuel Contractors and Sub-Contractors

Responsibilities of contractors and sub-contractors engaged in fuel re-supply activities at NWS sites include:

a) Provision of a POL Spill Response Plan[2] which describes:
   i. spill response action plans for initial response;
   ii. containment, clean-up, disposal and site remediation of spills;
   iii. chain of command and responsibilities of personnel;
   iv. materials and equipment available for deployment; and

b) Provision of sufficient personnel, materials and equipment for adequate response to any POL spills which may occur during fuel re-supply operations.

In the event that a spill occurs during fuel re-supply operations, Nasittuq personnel, material and equipment will assist in spill response activities to the fullest extent, when and where possible. Detailed contents of POL Spill Response kits are included in this Plan.

5.4 Division of Responsibility During Re-Supply

The dividing line of responsibility for spill response and reporting between Nasittuq and the sealift/airlift contractors/subcontractors is the pipeline beach head or airlift de-fueling head.

a) If a fuel spill occurs between the sealift pipeline beach head and the barge, the sealift contractor's POL Spill Contingency Plan is implemented. The sealift contractor assumes the role of Spill Control Manager and reports the spill to the required authorities.

b) Similarly, if the spill occurs between the airlift de-fueling head and the aircraft tank or bladder, the airlift contractor assumes the role of Spill Control Manager and reports the spill to the required authorities.

[2] This document will serve as the source document for all contractor and sub-contractor POL Spill Contingency Plans.

c) In all other instances, the Nasittuq Spill Contingency Plan is implemented. The LSS-Q Manager becomes the Spill Control officer; the CMO Environmental Services Supervisor becomes the Spill Control Manager and reports the spill as per Section 6.3.1 below.

d) In all instances, the individual discovering the spill must take steps to ensure that personnel on the barge or aircraft are contacted to stop the pumps and close the isolation valves, as applicable.

e) In all instances, the NWSCC must be informed even if the spill has occurred within the contractor's area of responsibility in order to inform the LSS-Q Manager, CMO and NWSO. In cases where the responsibility resides with the contractor, Nasittuq will provide assistance, as requested by the sealift or airlift contractor, in implementing their Spill Contingency Plan.

6.0 PROCEDURE

Nasittuq's management of spill risk incorporates three aspects: (1) spill prevention, (2) spill detection, and (3) spill response. Spill prevention and detection are discussed briefly below, but this document focuses on spill response.

6.1 Spill Prevention

Nasittuq has developed comprehensive programs for reducing the likelihood of POL or Hazmat spills. The following measures are taken to minimize the potential for Hazmat spills:

a) Establishment of secure storage areas for Hazmat;
b) Labelling of Hazmat following Workplace Hazardous Material Information System (WHMIS) guidelines;
c) Transportation of Hazmat compliant with the Transportation of Dangerous Goods (TDG) Regulations;
d) Packaging of Hazmat compliant with the TDG Regulations; and
e) Training of personnel in correct usage and storage of hazardous materials.

The following measures are taken to minimize the potential for POL spills:

a) Annual site conditions surveys to identify items of concern (e.g. bent pipe, damaged pipe supports, rusting);
b) preventive Maintenance Inspections (PMIs) of POL system components (e.g. pumps, valves);
c) regular maintenance of bulk fuel storage tanks (e.g. cleaning, inspection and refurbishment);
d) training of Bulk Fuel Technicians in standard operating procedures (e.g. fuel transfers, fuel re-supply); and
e) safeguards for POL systems at unattended sites (e.g. "Time-Outs" for fuel pumps during transfer operations).

The above are enhanced by "in-house" and NWSO audits of NWS operations.

6.2 Spill Detection

Methods employed for detection of POL spills include:

a) *Visual & odour detection.* The visual method is most successful during summer months when daylight is abundant and there is an absence of snow cover. Snow cover and reduced staffing levels significantly lower the probability of sighting pools of fuel or stained soils. The strong odour of fuel (and other Hazmat) can be an indicator of a spill (but every effort should be taken to limit exposure);

b) *Fuel tank dipping.* This method of measurement provides data comparing actual with estimated consumption figures, which may indicate a spill occurrence; and

c) *Remote monitoring*. Alarms are sent to the NWSCC when fuel levels of indoor day tanks vary by more than the expected amount or fuel pumps operate with greater than expected frequency at unattended sites. Remote monitoring of bulk POL storage tanks at NWS sites is limited due to technological limitations; however, additional appropriate technologies for use in the Arctic environment are currently being tested.

6.3 Spill Response

Details of Nasittuq's spill response procedures are provided below; the flowchart summarizing the procedures is provided in Figure 2.

6.3.1 Spill Reporting

Spill reporting will be in accordance with PRO-4.9-37. All outdoor spills (fuel, glycol, etc.) that occur or are discovered outdoors, regardless of the volume, are to be reported. All spills that occur indoors must also be reported.

The responsibilities of the different levels of reporting hierarchies are outlined below. (Telephone numbers for key individuals are provided in Appendix 1. Emergency Contacts List.) *The following subparagraphs. 6.3.1.1, 6.3.1.2, 6.3.1.2.1 6.3.1.3, and 6.3.1.4 appear in a checklist format to facilitate a stepwise verification of the reporting procedures.*

6.3.1.1 Person Discovering the Spill

Identify the spill (in association with the LSS-Q Manager whenever possible).

Make immediate verbal report to NWSCC. The report must contain the following information:

☐ a) Location of the spill;

☐ b) Known or suspected time of the spill;

☐ c) Substance spilled;

- ☐ d) Estimated volume spilled[3];
- ☐ e) Cause, if readily identifiable;
- ☐ f) Tracking of the spill (movement, speed and direction);
- ☐ g) Size of area contaminated, and depth of contamination, if possible;
- ☐ h) Conditions at the spill site including: (i) weather, (ii) depth of snow cover (if present), (iii) terrain, (iv) proximity of the spill to bodies of water, (v) wind speed and direction, and (vi) wave height (if a marine spill);
- ☐ i) Containment of the spill (none, natural, booms, dykes);
- ☐ j) Actions taken or proposed;
- ☐ k) Hazards to the safety of personnel or property; and
- ☐ l) Hazards to the environment.

Give a sketch map of the spill area, detailing the location and extent of the spill, to the LSS-Q Manager.

If the NWSCC operators suspect a spill as a result of SCADA (remote monitoring) inputs, they will advise the LSS-Q Manager, the Environmental Services Supervisor, and NWSO via telephone.

6.3.1.2 NWSCC

Upon being notified as per subparagraph 6.3.1.1, the NWSCC shift technician must:

- ☐ a) Ensure the LSS-Q Manager is informed as soon as possible;
- ☐ b) Phone initial contact persons within 30 minutes, i.e. phone one person for each group of the Environmental Incident reporting group (Environmental Services, NWSO, etc.); and
- ☐ c) Prepare a report using the ***form B2-A – Incident Initial Notification: Environmental Spill*** based on the information provided. E-Mail report, within 3 hours of notification, to the designated addressee groups indicated on the form. The addressee groups include the Environmental Services Supervisor and NWSO, as shown in **Figure 2 – Spill reporting and response procedures.**

6.3.1.2.1 Spills reported by the Canadian Rangers/Third Parties

[3] 'Dip' tanks to calculate current volume and to estimate consumption since last dip/reconciliation to determine amount spilled.

Upon being notified by the Canadian Rangers or third parties, the NWSCC shift technician must immediately proceed with the notification steps outlined above (subparagraph 6.3.1.2).

6.3.1.3 LSS-Q Manager

Upon being notified as per subparagraph. 6.3.1.1 or 6.3.1.2, the LSS-Q Manager must proceed with the reporting procedures as follows:

☐ a) Raise Work Order for spill response and clean-up.

☐ b) Prepare report using form ***C2-A-1 – Incident Follow-Up Internal Report: Environmental Spill***. E-mail report to designated addressee groups indicated on the form within 12 hours of the telephone notification from NWSCC. The addressee groups include the Environmental Services Supervisor and NWSCC, as shown in **Figure 2 – Spill reporting and response procedures.**

☐ c) Attach or FAX a sketch site plan depicting the contaminated location(s) impacted by the spill to the designated addressee groups outlined above.

See Appendix 3 for a sample copy of Form C2-A-1.

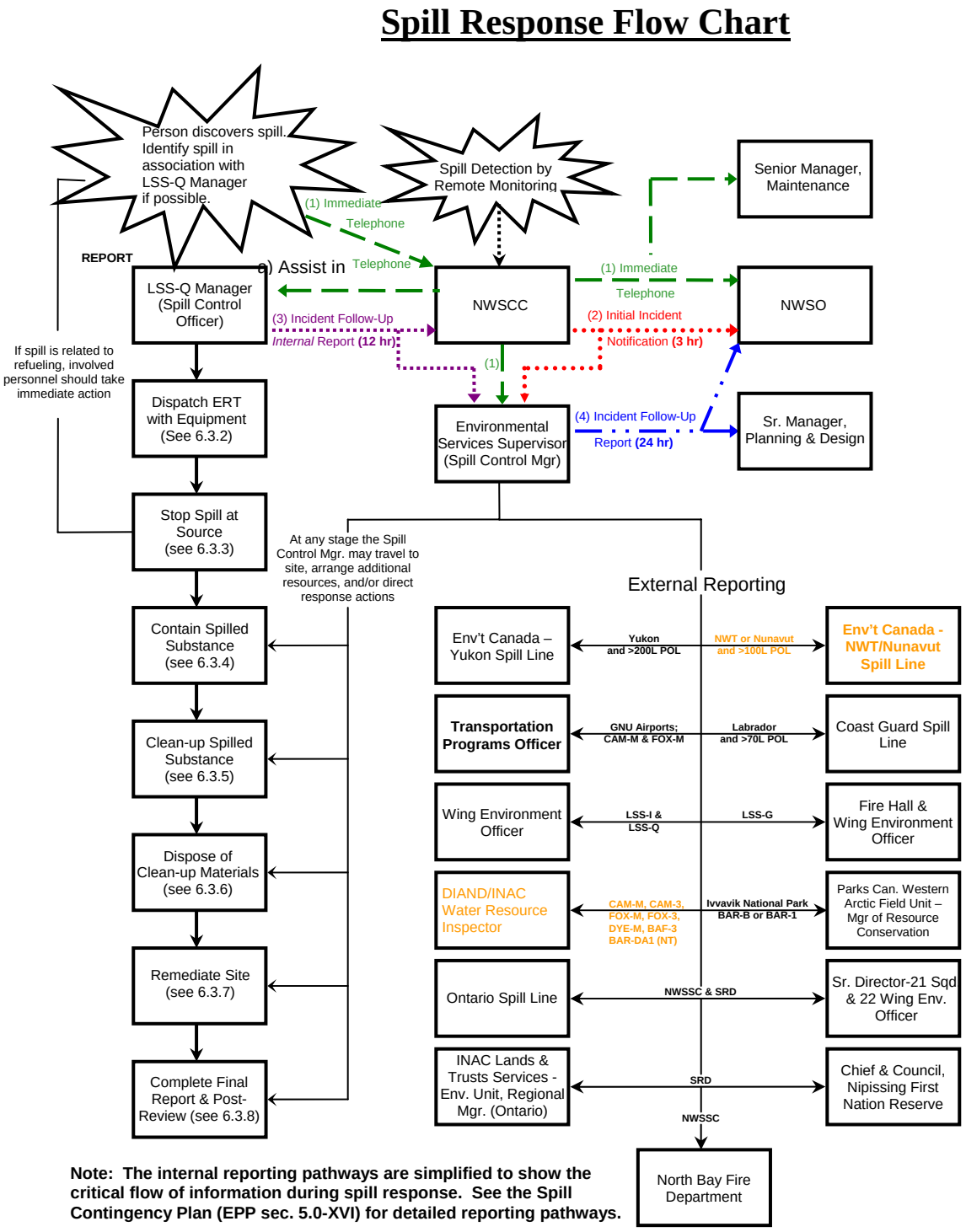

Figure 2. Spill reporting and response procedures; corresponding sections are referenced by their section numbers.

6.3.1.4 Environmental Services Supervisor

Nasittuq's Environmental Services Supervisor will assume the position of Spill Control Manager with authority over all spill response activities as shown in Figure 2.

Upon notification of a spill[4], the Environment Services Supervisor will proceed with the following steps.

☐ a) Prepare a report using the form ***C2-A-2 – Incident Follow-Up Report: Environmental Spill*** based on the information provided by the LSS-Q Manager's report (see 6.3.1.3). E-Mail report to addressee groups indicated on the form within 24 hours of notification. These groups include NWSO and Senior Manager of Planning and Design, as shown in **Figure 2 –Spill reporting and response procedures.**

☐ b) Notify spill line as required[5].

☐ c) Maintain regular/daily contact with NWSO on spill status.

☐ d) Notify DIAND/INAC Water Resource Inspector (the Nunavut Water Board representative) for spills at BAF-3.

6.3.2 Dispatch of Emergency Response Team

Nasittuq's Environmental Services Supervisor will assume the position of Spill Control Manager. The LSS-Q Manager will assume the position of Spill Control Officer and have authority over the Emergency Response Team (ERT) activated at, or dispatched to, the spill site. The LSS-Q Manager will also raise the appropriate Work Order(s) to identify and track the necessary repairs, clean-up activities, and disposal actions. Communications will be maintained between the ERT and the LSS-Q Manager throughout the duration of all spill response. The typical responsibilities and composition of an ERT is presented in Figure 3.

[4] Given our broad definition of a 'spill' (i.e., a discharge of <u>any volume</u> of POL or Hazmat, inside or outside of a building), the Environmental Services Supervisor must often exercise judgement in determining whether a spill is reportable to external (non-NWS) agencies. All agencies give criteria for reporting POL spills, but only some give criteria for other Hazmat spills (those available are provided in Appendix 4). When in doubt, the Environmental Services Supervisor will contact NWSO for direction.

[5] The spill lines will subsequently contact government departments and agencies, as well as aboriginal groups and organizations (e.g. Inuvialuit Land Administrator).

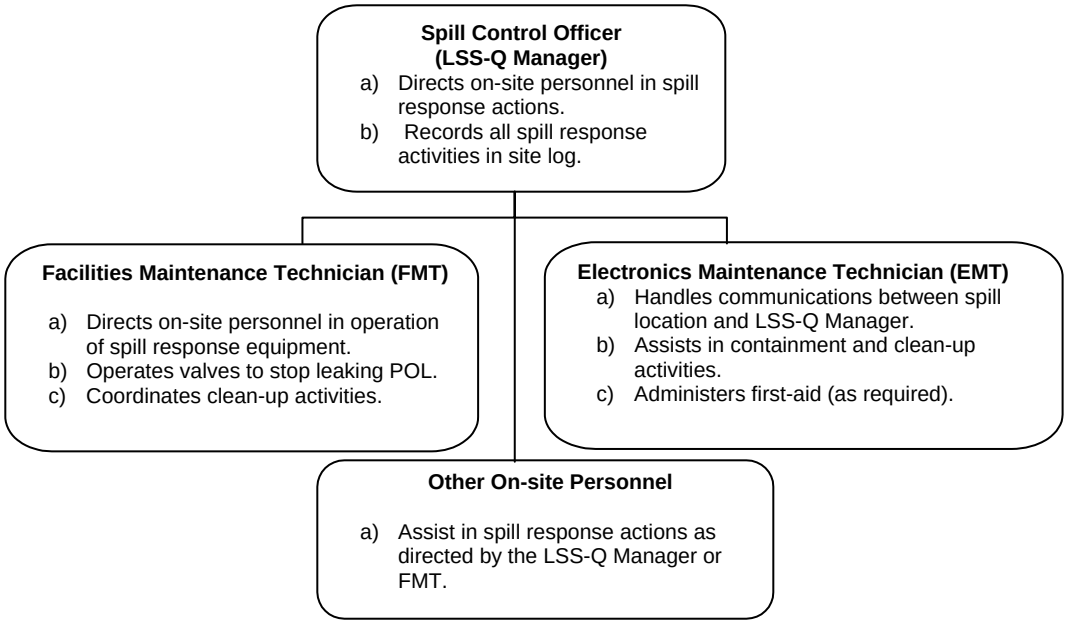

Figure 3. Typical responsibilities and composition of an Emergency Response Team (ERT).

6.3.3 Cessation of Leakage/Flow at Source

If not already completed by the individual discovering and reporting the (fuel) spill, the ERT dispatched by the LSS-Q Manager will take measures to stop further spillage. This would include shutting off pumps, closing isolation valves, applying chemical cold patch to tanks, transferring fuel to another tank, attaching a dresser coupling to the pipe or valve, attaching a blind flange or pipe cap, or other appropriate actions, as determined by the Spill Control Officer.

Since sealift and airlift bulk fuel operations involve third-party contractors and subcontractors, responsibility for coordinating response, including stopping the flow, containment, clean-up, remediation and reporting, are shared. The division of responsibility is outlined in Section 5.4.

The ERT will activate measures to stop further fuel flow. This would include closing isolation valves within the POL distribution system, if not already done, and other means as determined by Spill Control Officer.

6.3.4 Spill Containment

The ERT will deploy materials from the on-site spill control kit and utilize such on-site equipment as may be available to contain the spill, possibly including the construction of temporary containment berms. In cases where the spill exceeds the capabilities of on-site resources, the Spill Control Manager will make arrangements for additional personnel, equipment and materials from:

a) other NWS sites;
b) DND;
c) the Canadian Coast Guard;
d) local communities; and
e) commercial spill response contractors.

Depending on the nature of the spill or as directed by NWSO, the Spill Control Manager may travel to the spill site to supervise response activities.

6.3.5 Clean-Up of Spilled Material

Following successful containment of the spill, the ERT will deploy absorbent materials, salvage drums, POL pumps, slip tanks, the sorbent wringer and other equipment, as available, for recovery of the spilled fuel.

Additional resources may be dispatched to the spill site by the Spill Control Manager in cases where the spill clean up exceeds the capabilities of the on-site resources.

Clean-up actions are identified and tracked through the spill's Work Order. A spill clean-up Work Order cannot be closed until all actions are completed, or the remaining requirements transferred to a separate Work Order.

6.3.6 Disposal of Clean Up Materials

The wastes generated during spill response activities typically include used sorbent materials, POL/water mixtures, contaminated snow and contaminated soil. Each of these wastes has different properties, and although all may be contaminated with the same product, different collection and disposal methods are required. The following procedures are to be implemented by the ERT, in consultation with the Spill Control Manager, following spill clean-up activities.

Used Sorbent Materials

Sorbent materials found on the sites include loose material in plastic bags, individual squares of sheet material, rolls of sheet material, and sock booms. Sorbent materials may be "universal" in that they pick-up all liquids, or specific. Hydrophobic sorbents adsorb organic liquids such as fuel, but not water. [6]

To minimize the amount of used sorbent material requiring disposal, saturated sorbent materials, with the exception of bags of loose sorbent, are to be squeezed through a sorbent wringer and reused. The liquid extracted from the sorbent is to be handled as described below, and the wrung-out sorbent dealt with as detailed below.

a) All used sorbent materials, regardless of type, are to be placed in salvage drums with secure lid. The contents of the drum are to be marked with permanent marker or spray paint as follows: "Used Sorbent, <substance absorbed (i.e. Jet A1, oil)>,<site>, <date >."

b) The waste drums of sorbent material must be marked, labeled and stored as per EPP section 5-XV- Storage and Tracking of Waste Hazmat. They will be retrograded as per EPP section 5-XIX Hazardous Materials Retrograde.

c) Rinse salvage drums with water three times and strain rinse water through hydrophobic sorbent material. The rinseate is to be captured in a drum(s) and handled according to EPP section 5-XV – Storage and Tracking of Waste Hazmat. The Environmental Services

[6] 'Adsorption' means that the liquid attaches to the surface of the sorbent particles, rather than being absorbed into the molecular structure of the sorbent particles.

Supervisor will decide the appropriate means of disposal on a case-by case basis. Rinsing activities are to take place at least 30 m (100 ft) from any water body. Set drums upside down, allow to drain/air dry, and remove or block out markings.

d) Return salvage drum(s) to spill site for future use. Notify LSS-Q Logistics (LOGS) personnel as to the spill response kit items which were used and require replacement. Items will be restocked in accordance with existing supply procedures.

POL/Water Mixture

POL/water mixtures may be dealt with in-place during the clean-up phase, and/or collected and drummed for treatment/disposal. As decisions regarding clean-up phase activities are at the discretion of the Spill Control Manager, these procedures simply address disposition of collected POL/water mixtures.

As a general rule of thumb, recovery of fuel for reuse is considered practical if more than 200 L of fuel can be collected. Recovered fuel must be dewatered and filtered prior to use, using filter units located on-site, and can only be used for vehicles.

Quantities of fuel of less than 200 L must also be recovered from the environment.

a) Let mixture sit in 205 L (45 gal) drum(s), allowing mixture to separate into layers. Salvage drums are not to be used, as they are not approved as primary containers for liquids if the drum needs to be transported. Drums are to be placed in a level area at least 30 m (100 ft) from any water body.

b) Evaluate the POL/water ratio. For instance, coat a dipstick with water indicating paste and insert in drum to determine relative thickness of POL and water layers.

c) If the POL/water ratio is low, say less than 25 % POL, and the volume of mixture is low, say less than 800 L (i.e., less than four 45 gal drums) then recovery for reuse is not justified. Therefore the POL can be captured and retained with sorbent material.

   i. Use hydrophobic sorbent sheets to remove as much POL from the top layer of the drum(s) as possible and then strain the mixture through hydrophobic sorbent material. To maximize contact with the surface of the sorbent, coil socks/booms of hydrophobic sorbent material in a drum funnel set over a clean drum or other support, and slowly pour the mixture over the coils. The strained water is to be captured into drums and handled according to EPP section 5-XV – Storage and Tracking of Waste Hazmat. The Environmental Services Supervisor will decide the appropriate means of disposal on a case-by case basis. Straining must be done at least 30 m (100 ft) from any water body.
   ii. Dispose of used sorbent as discussed in the preceding section.
   iii. Rinse drums with water three times and strain rinse water through hydrophobic sorbent material. The rinseate is to be captured in a drum(s) and handled according to EPP section 5-XV – Storage and Tracking of Waste Hazmat. The Environmental Services Supervisor will decide the appropriate means of disposal on a case-by case basis. Set clean drums upside down, allow to drain/air dry, remove or block out markings, and

return to stockpile. Rinsing activities are to take place at least 30 m (100 ft) from any water body.

iv. Notify LSS-Q Logistics (LOGS) personnel as to the spill response kit items which were used and require replacement. Items will be restocked in accordance with existing supply procedures.

d) If the POL/water ratio is higher, more than 25% POL, or the volume of mixture is higher, more than 800 L, a fuel/water separator is to be used.

e) If the POL/water mixture must be stored until separation can be conducted, each drum is to be marked as to its contents with permanent marker or spray paint as follows: "<substance>/water mixture, <site>, <date >". The drums are also to be labeled and shipped as flammable liquids, as per Transportation of Dangerous Goods (TDG) requirements.

i. Pump or pour POL/water mixture from drums into separator. Separation activities are to be conducted on site property, a minimum of 30 m (100 ft) from any water bodies, and 15 m from structures, tanks, or piping.

ii. Follow instructions for use included with the separator unit. Designs may vary but most separators are based on separation of the mixture into layers due to differences in fluid density. Water, being "heavier" than POL products, sinks to the bottom and can then be drained off.

iii. Slowly drain water from separator, straining it through hydrophobic sorbent material to remove any POL residue prior to discharge. To maximize contact with the surface of the sorbent, coil socks/booms of hydrophobic sorbent material in a drum funnel set over a clean drum, and slowly pour the mixture over the coils. The strained water is to be captured into drums and handled according to EPP section 5-XV – Storage and Tracking of Waste Hazmat. The Environmental Services Supervisor will decide the appropriate means of disposal on a case-by case basis. Straining activities are to take place at least 30 m (100 ft) from any water body. Dispose of used sorbent as discussed in Used Sorbent Materials, above.

iv. Drain recovered POL into 205 L (45 gal) drum(s). Each drum is to be marked as to its contents with permanent marker or spray paint as follows: "Recovered <substance>, <site>, <date >".

f) If 200 L or more of POL are recovered, the fuel is to be filtered.

g) Once dewatered and filtered, the fuel is transferred to the vehicle refueller tank. Recovered fuel must not be placed in PGS or aviation fuel tanks.

h) Rinse drums with water three times and strain rinse water through hydrophobic sorbent material. The rinseate is to be captured in a drum(s) and handled according to EPP section 5-XV – Storage and Tracking of Waste Hazmat. The Environmental Services Supervisor will decide the appropriate means of disposal on a case-by case basis. Set drums upside down, allow to drain/air dry, remove or block out markings, and return to stockpile. Rinsing activities are to take place at least 30 m (100 ft) from any water body. Dispose of used sorbent as discussed Used Sorbent Materials above.

i) Notify LSS-Q Logistics (LOGS) personnel as to the spill response kit items which were used and require replacement. Items will be restocked in accordance with existing supply procedures.

Contaminated Snow

Small volumes of contaminated snow are to be shoveled into an open head drum, along with a hydrophobic sorbent mat, pillow or sock. Each drum is to be marked as to its contents with permanent marker or spray paint as follows: "Snow with <substance>, <site>, <date>." Drums may be stored in a level area outside to await spring thaw, or moved indoors to speed melting. The melted snow is to be treated as POL/water mixture, as discussed in the preceding section.

Large areas of contaminated snow may be removed/isolated and surrounded with hydrophobic absorbent booms to gradually filter meltwater. Decisions in such a situation will be at the discretion of the Spill Control Manager.

Contaminated Soil

Decisions regarding remediation of contaminated soil must be made by the Spill Control Manager on a case-by-case basis. Commonly, a small area of contaminated soil would be left to aerate at the spill site. The area would be "tilled" by hand and the soil spread out in a thin layer, to maximize evaporation of fuel from the soil. Should contaminated soil need to be excavated and contained, the following points are to be noted:

a) Do not mix soil with other spill wastes.

b) Do not overfill open head drums; they may need to be moved without the aid of heavy equipment.

c) Each drum is to be marked as to its contents with permanent marker or spray paint as follows: "Soil with <substance>, <site>, <date>.

Reporting Disposal Actions

The LSS-Q Manager is to advise the Spill Control Manager of disposal actions taken by the ERT, through e-mail or Internal Spill Report updates.

Spill clean-up Work Orders are to include the removal and disposal actions for spill wastes, the number of drums involved and their contents. A spill clean-up Work Order cannot be closed until the disposal actions are completed or the remaining requirements are transferred to a separate waste disposal Work Order.

6.3.7 Site Remediation

Site remediation will be undertaken by trained Nasittuq personnel or by experienced commercial spill response firms, as per NWSO's acceptance.

6.3.8 Final Report and Post-Spill Review

The final report summarizes the following spill information:

a) Initial report information;
b) Confirmation of spill volume;
c) Actions taken;
d) Future remediation/monitoring requirements; and
e) Sketch map and/or photographs of spill area.

A joint review of all spill response activities and involved parties will be held by Nasittuq and NWSO in order to:

a) Document all events from the initial spill report through to site remediation;
b) Analyze spill response actions taken and their effectiveness in order to:
    i. Revise action plans as required;
    ii. Amend spill response procedures as required; and
    iii. Amend the spill response training program.

A post-spill review will take place for every major spill (e.g. greater than 5000 L) and for any lesser spill (Hazmat or POL) when requested by Nasittuq or NWSO.

6.4 Spill Response - POL Re-Supply Activities

Transport of the bulk POL is performed by contractors and subcontractors who must each possess their own spill contingency plan. The re-supply contractor will be responsible for spill response when the spill originates from the contractor's equipment, i.e. occurs between the vessel and the junction with NWS piping. Response to a spill originating from NWS piping or facilities during re-supply will be the responsibility of Nasittuq, and will be reported and responded to as per this Plan.

Even when the contractor is the responding authority, the NWSCC must be notified as per section 5.4.

6.5 Spill Reporting Exercises

Environmental Services will conduct annual spill reporting exercises at selected radar sites to identify and mitigate deficiencies. Mock spill scenarios assigned to sites should initiate a response consistent with the correct internal spill reporting process. External reporting to spill lines and/or other contacts is not a component of the spill exercise, and all associated verbal or written communications must clearly announce: 'Exercise. Exercise. Exercise.' The reporting procedure will be tracked by Environmental Services and evaluated according to criteria outlined in the Spill Exercise Report Template in Appendix 6.

6.6 Spill Response Training Program

Spill response training (part of job training course JT-63) is provided to all NWS site personnel and all CMO personnel involved in the O&M of NWS sites.

7.0 FORMS & QUALITY RECORDS

Incident Initial Notification (B2-A): Environmental Spill (ILM # 196553)
Incident Internal Follow-Up Report (C2-A-1): Environmental Spill (ILM # 196554)
Incident Follow-Up Report (C2-A-2): Environmental Spill (ILM # 196555).

APPENDIX 1

Emergency Contacts List

NASITTUQ Emergency Contact List

NWSCC LHCN/Facilities Group (for Zones 1, 2, NWSSC)	(705) 494-6011 ext. 8000
NWSCC Radar/Facilities Group (for Zones 3, 4, 5)	(705) 494-6011 ext. 4000
Barb Thomson, Supervisor, Environmental Services	(613) 831-1844 (H)
Scott Charland, Senior Manager, Planning and Design	(613) 521-4689 (H)
John Boyle, Senior Manager Maintenance, NWS Operations	(705) 498-2918 (Cell)
Peter Lundy, Manager, NWSSC	(705) 498-2633 (H)
Kelly Landon, Senior Manager, Logistics and Program Development	(613) 823-9716 (H)
Frank Carroll, Supervisor, Fire & Safety	(613) 592-6923 (H)

NWSO Emergency Contact List

Kim Kalen, Environmental Officer (R&CS 3-4-3)	(613) 998-8482 (W) (613) 728-9562 (H)
Maj. A. Cameron (R&CS 3-4)	(613) 998-8602 (W)

24 Hour Spill Lines

Northwest Territories/Nunavut	(867) 920-8130

1 Canadian Air Division Emergency Contact List

Location	Base	Contact	CSN*
LSS-Inuvik	4 Wing Cold Lake, AB	Wing Env. Officer	690-8447
LSS-Iqaluit	3 Wing Bagotville, PQ	Wing Env. Officer	661-4004 & 661-4086 (fax)
LSS-Goose Bay	5 Wing Goose Bay, NF	Fire Hall	568-7777
		Wing Env. Officer	568-6101 & 568-6975 (fax)
NWSSC, SRD	22 Wing North Bay, ON	Senior Director	628-6400
NWSCC		Wing Env. Officer	628-2044 & 628-2190 (fax)
		Commercial tel#:	705-494-2011 ext. 2333

* Canadian Switch Network (i.e. from CMO: 70-2136 + number; from Sites: 88-78 + number)

Other Important Contacts

INAC Nunavut Regional Office	(867) 975-4500
INAC Water Resources Officer, Kitikmeot Region - Kugluktuk (CAM-M, CAM-3)	(867) 982-4308
INAC Water Resources Officer, Qikiqtani Region - Iqaluit (FOX-M, FOX-3, DYE-M, BAF-3)	(867) 975-4289
David Roberts, Transportations Programs Officer (North), Dep't of Economic Development and Transportation, GNU	(867) 899-7340 Email: droberts@gov.nu.ca

APPENDIX 2

Initial Incident Notification (B2-A): Environmental Spill

Document Profile is to have:

a) Title – Initial Incident Report: Environmental
b) Object Date – Date of Incident/Awareness
c) Related Info – Zone, Site (I.E. Zone 1, Bar-2)

Submit to NWSO within 3 hours

To: Incident Reports Enviro-Spill

Subject: ENV / SPILL REPORT - INITIAL NOTIFICATION

Reporting Location: Inuvik
Report Originator:
Report date (dd mmm yyyy):
Report time (Z):
Site Affected:
Location of Spill:
Date (dd mmm yyyy) of incident / awareness:
Time (Z) of incident / awareness:
Reported By (e.g. SCADA or person at site):
Substance spilled:
Leak Status: F4
Action Taken:
SM Section notified:
External Agencies notified:
News media involvement, if known:
Other pertinent information:
NWSCC Tech initials:
This reports ILM #:
Other Incident Reports directly related to this report: ILM #

ENV / SPILL Internal Report (C2-A-1, ILM #196554) to be submitted to CMO within 12 hours

ENV/SPILL Follow-up Report (C2-A-2, ILM #196555) to be submitted by CMO Environmental Services to NWSO within 24 hours

APPENDIX 3

Incident Internal Follow-Up Report (C2-A-1): Environmental Spill

SPILL REPORT – INTERNAL ONLY

(To be submitted within 12 hours)

NOTE: ***** Document Profile is to have:

a) Title – Internal Follow-up Incident Report: Environmental
b) Object Date – Date of Spill
c) Related Info – Zone, Site (I.E. Zone 1, Bar-2)

* Send by e-mail as file attachment to: Environmental Distribution
with a copy to: Incident Reports NB and Site Managers

* Use Mouse or Tab key to move between fields in the form – Mouse or **F4 key** with **up/down arrow keys** for selections.

Report Location: Select	**Report Originator:**
Phone No:	**Initial Report: ILM #** **This Reports ILM #**
Report Date (dd mmm yyyy):	**Report Time (Z):** **z**
Other Incidents directly related to this incident – ILM #	
Site affected:	**Location of Spill:**
Date (dd mmm yyyy) spill occurred:	**Time (Z) spill occurred:** **z**
Date (dd mmm yyyy) spill discovered:	**Time (Z) spill discovered:** **z**
Date (dd mmm yyyy) spill stopped:	**Time (Z) spill stopped:** **z**
Substance:	
Flow Direction: Select	**Estimated Quantity Spilled:**
Cause:	
Status of Spill: Key F4	
Extent & Depth of Contamination:	
Factors affecting spill or recovery [temp, wind, precipitation (snow, freezing rain, rain), surface conditions (snow, ice)]:	
Containment (none, natural, booms, dykes, etc.):	
Action taken or proposed to contain, recover, cleanup or dispose of substance:	
Assistance required (Suggested form):	
Hazards to persons, property or environment (e.g. Fire, potable water, other water, fish, or wildlife):	
Comments and/or recommendations:	
Sketch map provided by FAX: ☐ **Fax Date/time:**	
Date (dd mmm yyyy) spill cleaned up:	**Time (Z) spill cleaned up:** **z**
Work Order No:	

ENV/SPILL Follow-up Report (C2-A-2, ILM #196555) to be submitted by CMO Environmental Services to NWSO within 24 hours

APPENDIX 4

Reporting Criteria for Spill Lines

Minimum reportable volumes for Hazmat spills in Nunavut / Northwest Territories[3]

Item No.	TDGA Class	Description of Contaminant	Minimum Reportable Volume
1	1	Explosives	Any amount
2	2.1	Compressed gas (flammable)	Any amount of gas from containers with a capacity greater than 100 L
3	2.2	Compressed gas (non-corrosive, non-flammable)	Any amount of gas from containers with a capacity greater than 100 L
4	2.3	Compressed gas (toxic)	Any amount
5	2.4	Compressed gas (corrosive)	Any amount
6	3.1, 3.2, 3.3	Flammable liquid	100 L
7	4.1	Flammable solid	25 Kg
8	4.2	Spontaneously combustible solids	25 Kg
9	4.3	Water reactant solids	25 Kg
10	5.1	Oxidizing substances	50 L or 50 Kg
11	5.2	Organic peroxides	1 L or 1 Kg
12	6.1	Poisonous substances	5 L or 5 Kg
13	6.2	Infectious substances	Any amount
14	7	Radioactive	Any amount
15	8	Corrosive substances	5 L or 5 Kg
16	9.1 (in part)	Miscellaneous products or substances, excluding PCB mixtures	50 L or 50 Kg
17	9.2	Environmentally hazardous	1 L or 1 kg
18	9.3	Dangerous wastes	5 L or 5 Kg
19	9.1 (in part)	PCB mixtures of 5 or more parts per million	0.5 L or 0.5 Kg
20	none	Other contaminants	100 L or 00 Kg

3. From: Schedule B, Spill Contingency Planning and Reporting Regulations, N.W.T. Reg. 068-93, under the Environmental Protection Act.

APPENDIX 5

Incident Follow-Up Report (C2-A-2): Environmental Spill

Environmental Emergency / Spill

Report Follow-Up

Document Profile is to have:
a) Title – Follow-up Incident Report: Environmental
b) Object Date – Earliest Date of Occurrence/Discovery
c) Related Info – Zone, Site (I.E. Zone 1, Bar-2)

CMO Environmental Services (ES) to submit report to NWSO within 24 hours or next business day.

E-mail as ILM reference: TO: Incident Reports Enviro-Spill; KALEN.KE@forces.gc.ca
CC: Incident Reports NB and Site Managers

Date and Time		
Date and Time of Occurrence: Zulu	**Date and Time of Discovery:** Zulu	
Spill Stopped Date and Time: Zulu	**Spill Cleaned Date and Time:** Zulu	
Reported By (ES Person):	**Date:**	**Report No:**
Reference initial report ILM#:		

Spill Information			
Material Spilled			
Quantity Spilled:			
Quantity Recovered:			
Location of spill (site and location on site):			
Cause of Spill:			
Status of Spill:			
Environmental Effects:			
Human Health Effects:	**Personal Information Recorded on ILM #:** (From FOR4937-PI, ILM #397470)		
Action Taken to Mitigate Environ/Human Health Effects:			
Weather Conditions:	**Rain** ☐	**Wind** ☐	**Snow/Ice** ☐
	Temperature: °C	**Wind Speed:** km/hr	
	Wind Direction:	**Direction of Drift:**	
Distance from Surface Water:			
Distance from Property Boundary:			

Agencies				
Notified Federal Government:	**Date:**	**Time:** Zulu	**Contact:**
Notified Provincial Government:	**Date:**	**Time:** Zulu	**Contact:**
Notification Comments (e.g. Spill Line Report #, Spill Line tel #, co-ordinates of person(s) contacted: name, tel. #, position, gov't dept, city):			

Other	
Work Order #:	**Spill Closure Date:**
Remediation Action Taken:	
Comments:	

APPENDIX 6

Spill Exercise Report Template

200*X* Spill Reporting Exercise

Zone *X* Report

General

Spill reporting exercises were enacted in zone *X* on *Date*. During a spill exercise the respective LSS is required to respond to a mock spill scenario generated by Environmental Services and execute the established internal reporting procedures. In turn, NWSCC and Environmental Services are required to fulfill their respective roles in the spill reporting protocol. The effectiveness of observed spill reporting procedures are evaluated against criteria outlined in the Nasittuq Environmental Protection Plan and Procedure (PRO) 4.9-37. The results section summarizes the values measured during spill reporting exercises.

Spill Scenario: *Insert initial spill scenario*

Report Tracking*

LSS	Date and Date Notified	ES Notification by NWSCC	3-hr Initial Report from NWSCC	12-hr LSS Report Posted	24-hr ES Report Posted
LSS-X	*dd-MMM-yy h:mm am/pm*	*h:mm am/pm contactee*	*dd-MMM-yy h:mm am/pm*	*dd-MMM-yy h:mm am/pm*	*dd-MMM-yy h:mm am/pm*

** all times EST*

APPENDIX 7

Fuel and Chemicals On-Site

Fuel

Jet A1 is the fuel used on-site. Jet A1 fuel tanks and locations are listed below.

Tank Size	LOC ID	Actual Capacity*	Location	Type of fuel
943,600L	BREW22A	798,286L	Summit	Aviation/PGS
307,300L	BREW22B	259,976L	Summit	Aviation/PGS
943,600L	BREW22C	798,286L	Beach	Aviation/PGS
653,700L	BREW22D	553,030L	Beach	Aviation/PGS
9,000L	BREW22F	8,460L	Summit	PGS
46,000L	BREW20A	43,240L	Helipad	Aviation
SUMMIT TOTAL		1,109,962L		
BEACH TOTAL		1,351,316L		
TOTAL:		2,461,278L		

Tanks: The total volume of usable fuel on site is 2,461,278L.

Sealift delivers the biennial (every 2 years) fuel re-supply to the beach tanks. Fuel is then pumped to the summit tanks. Trained personnel (Bulk Fuel Technicians) walk the fuel lines before the transfer begins and monitor the transfer until it is finished. Personnel work in pairs and maintain radio communication. For site specific information, a fuel line diagram and valve matrix are posted in the pumphouse. Transfers to day tanks are done automatically on demand by systems under remote control. All trained personnel complete the course JT-16 POL Handling and Aircraft Refueling.

Chemicals are listed on the next page.

Chemicals

Items such as batteries, aerosols, and cleaning products are stored in the Technical Services Module and in the buildings where they are used. Drums of oil and glycol are stored in the Technical Services Module, while cylinders are stored in the Garage. See **Annex B** BAF-3 Site Plan Drawing (Serial H-B199/2-8400-102) attached to the Exploration/Remote Camp Supplementary Questionnaire previously submitted for BAF-3.

As requested in the NWB letter dated 29 Oct 2008 and in the subsequent 06 Nov 2008 telephone conversation with Mr. Deon Bridge, Technical Advisor, drummed chemicals are listed below.

Site Name	Maximo Item #	Description	Container	Location	Quantity
BAF-3	1014001	OIL, ENGINE, SAE 15W40, API SG/CF-4/CE/CD II, 205 L DRUM, LUBRICATING	Drum 205 L)	Technical Services Building	2
	1013378	SOLVENT, DRY CLEANING, 205 L DRUM, LIQUID (Varsol to clean parts)	Drum (205 L)	Technical Services Building	1
	1028851	COOLANT, ENGINE, ANTIFREEZE, 17-E RATED DRUM, ETHYLENE GLYCOL BASE, WITH INHIBITORS	Drum	Technical Services Building	7
	1056978	CHEMICAL, SULPHURIC ACID, DILUTED LIQUID, 4.4 GAL (20 L), (for batteries)	Container (20 L)	Technical Services Building	3
	1066149	SOLVENT, CLEANER, 20 L PAIL, CONCENTRATED, OIL & GREASE SOLVENT WITH EMULSIFIER, PENETRATES & DISSOLVES OIL GREASE & SOIL FROM METAL & OTHER SURFACES	Pail (20 L)	Technical Services Building	8
	1071190	COOLANT, ENGINE, ETHYLENE GLYCOL, 205 L DRUM, 100% GLYCOL, BLUE-GREEN COLOR, WITH INHIBITOR, WITH OVERPACK DRUM	Drum (205 L)	Technical Services Building	22

APPENDIX 8

Spill Kit

Spill Kit BAF-3

	Item Description	Quantity	Item Absorbent Capacity
1.	Slip tank, portable, 100 gal.	1	
2.	Absorbent, Material (POL and Water), bags, 25 qt ea, Maximo # 1021477, Item # 48490, can absorb 8 gallons each bag.	20 Bags	726 litres
3.	Absorbent, Material (POL), roll, 3/8" x 36" x 144', Maximo # 1021572, Item # OB300, can absorb 9 times its weight. 1 roll = 36 lbs	10 Rolls	1816 litres
4.	Absorbent, Material (POL), bags, 50 qt ea, Maximo # 1044124, Item # 48230, can absorb 10 gallons each bag.	150 Bags	6810 litres
5.	Absorbent, Sheet (POL): 200 sheets/case: 3/8" x 17" x 19",Maximo # 1021664, Item # OB200, can absorb 9 times its weight. 1 case = 20 lbs	1 Case	101 litres
6.	Boom, Oil: 40' long Maximo # 1059485, Item # OB5M, can absorb 9 times its weight. 1 boom = 5.3 lbs	1 Boom	27 litres
7.	Shovel, Round Mouth	2	
8.	Pitchfork	2	
9.	Rubber Gloves, Lined	20 pairs	
10.	Plastic Bags (3mil) 35" W x 50" H, extra strong	1 box x 100 bags	
11.	Plastic, Polyethylene (6mil), 12' 2" wide 100' long	4 rolls	
12.	Polypropylene Rope, 600'/roll	1	
13.	Safety Goggles	2	
14.	85gal Salvage Drum	2	
15.	Half Mask, Disposable Type	1	
	Total Absorption Capacity is		9480 litres

The Spill Kit has the minimum requirements. In addition BAF-3 also has:

1.	Plastic Bags (3mil) 35" W x 50" H, extra strong	11 boxes x 100 bags	
1.	85gal Salvage Drum	107	
	Total Absorption Capacity is		0 liters
	Total Absorption Capacity at BAF-3 is		9480 litres