



NORTHWEST TERRITORIES  
**POWER  
CORPORATION**

*Empowering Communities*

**SPILL CONTINGENCY PLAN**

**FORMER PLANT SITE SOIL REMEDIATION PROJECT  
AKLAVIK, NORTHWEST TERRITORIES**

**Issue Date: August 3, 2016**

AUTHORIZATION	
Prepared by: _____	Date: _____
Approved by: _____	Date: _____

### **Spill Contingency Plan Maintenance and Control**

The Director, Health, Safety & Environment is responsible for the distribution, maintenance and updating of the Spill Contingency Plan. This Spill Contingency Plan will be updated:

- i. Annually, taking into account changes in the law, environmental factors, NTPC policies, and Facility characteristics; and/or
- ii. Following a major spill incident.

Changes in phone numbers, names of individuals, etc. that do not affect the intent of the plan are to be made on a regular basis. Plan updates will be issued as per the Spill Contingency Plan distribution list. The Spill Contingency Plan holder is responsible for adding new and/or removing obsolete pages upon receipt of updates.

DOCUMENT HISTORY				
Revision #	Revised Section(s)	Description of Revision	Prepared by	Issue Date

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# 1 INTRODUCTION

The Northwest Territories Power Corporation (NTPC) has prepared this Spill Contingency Plan (SCP) for the former power plant site (the Site) soil remediation project located in Aklavik, Northwest Territories (NWT). The SCP is also referred to as the Spill Response Plan (SRP) in other documents associated with this application.

The community of Aklavik (68° 13'N and 135° 00'W) is situated 60 km west of Inuvik on the west bank of the Peel River. The community has a population of 633 (2011 Census).

Aklavik is accessible by air from Inuvik year round and bulk supplies and food are barged in during the summer months. An ice road links Aklavik to Inuvik in the winter.

This SCP demonstrates that NTPC has appropriate response capabilities and measures in place to effectively address potential spills at the former power plant site in Aklavik.

## 1.1 COMPANY INFORMATION

Contact information for the Site is as follows:

Northwest Territories Power Corporation  
4 Capital Drive, Hay River, Northwest Territories X0E 1G2  
Phone: 874-5200; Fax: 874-5251

Project Mailing Address: 4 Capital Drive, Hay River, Northwest Territories X0E 1G2  
Project Main Contact: Joshua Clark, Environmental Analyst  
Phone: (867) 874-5248; Fax: 1-888-371-9433  
Email: [jclark@ntpc.com](mailto:jclark@ntpc.com)

## 1.2 PURPOSE

The purpose of this SCP is to outline response actions for potential spills of hazardous materials of any quantity, including a worst case scenario, at the Site. The plan identifies key response personnel and their roles and responsibilities in the event of a spill, as well as the equipment and other resources available to respond to a spill. It details the spill response procedures that will minimize potential health and safety hazards, environmental damage, and clean-up efforts. The plan has been prepared to ensure quick access to all the information required in responding to a spill. More specifically, the purpose is:

- to comply with NTPC's Corporate Environmental Policy (see Section 1.4);
- to identify the organization, responsibilities, and reporting procedures of the Site response team in the event of a spill;
- to provide readily accessible emergency information to the cleanup team, management, and government agencies in the event of a spill;
- to comply with federal and territorial regulations and guidelines pertaining to the preparation of contingency plans and notification requirements;
- to promote the safe and effective recovery of spilled materials;
- to minimize the environmental impacts of spills to land or water; and, to provide site information on the Site and contingencies in place if a spill or malfunction should occur.

This SCP has been prepared in general accordance with the following reference documents:

- Government of Northwest Territories. 1993. Spill Contingency Planning and Reporting Regulations R-068-93. Yellowknife, N.W.T.
- Government of Northwest Territories. January 2002. Guide to the Spill Contingency Planning and Reporting Regulations. Resources, Wildlife & Economic Development.
- Indian and Northern Affairs Canada (INAC). 2007. Guidelines for Spill Contingency Planning. Yellowknife, N.W.T: Water Resources Division of INAC.
- Government of Northwest Territories. 1993. Northwest Territories Waters Regulations SOR/93-303. Yellowknife, N.W.T. Note that the the *Northwest Territories Devolution Act* repealed the *Northwest Territories Waters Act*, reflecting its provisions in the amended *Mackenzie Valley Resource Management Act*. The *Northwest Territories Devolution Act* transferred the Northwest Territories Waters Regulations under the authority of the *Mackenzie Valley Resource Management Act*, and deemed the regulations to remain in force until they are repealed or replaced.
- Canadian Council of Ministers of the Environment (CCME). 2003. Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products. Winnipeg, Manitoba.

## **1.3 SCOPE**

This SCP applies to the accidental and/or uncontrolled release of a contaminant into the environment that has the potential for adverse impact. The SCP applies to all NTPC employees, Matrix Solutions Ltd. and their contractors who conduct work or provide services at the Site. This SCP covers activities and operations conducted at the Site.

## **1.4 ENVIRONMENTAL POLICY AND PROCEDURES**

The NTPC Corporate Environmental policy is outlined as follows:

### **Policy**

The NTPC is committed to sustainable development by providing reliable energy to the people of the NWT while conserving and protecting the natural environment.

### **Directive**

To achieve the goal of sustainable development, NTPC will:

- comply with all applicable environmental legislation and other environmental commitments;
- use natural resources as efficiently as possible;
- promote the efficient use of energy to customers;
- take reasonable measures to prevent and reduce pollution to air, water, and soil;
- continually improve environmental performance by complying with and maintaining an environmental management system;
- manage hazardous waste in a manner that minimizes risk to the environment;
- provide employees with the appropriate training and education to help them fulfill their environmental responsibilities;
- communicate regularly with government, regulators, industry, community groups, and the public regarding NTPC activities; and
- respect the heritages of the people and communities that we serve.

NTPC handles several hazardous substances at its power generation facilities and has a responsibility to protect and conserve the environment. Prevention of spills is important for the protection of the health and safety of employees, the community, and the environment. Operating procedures are regularly updated and personnel trained to ensure safe and environmentally sound operations. At a minimum the SCP will be reviewed and updated annually.

The SCP is presented to all employees and contractors during their on-site orientation sessions. All employees and contractors are made aware of the locations of the SCP at the Site. All employees and contractors working on site are made aware of the locations where spill response



material is stored, and their individual responsibilities to respond to spills. NTPC is committed to keeping personnel up to date on the latest technologies and spill response methods.

## **1.5 MATERIAL SAFETY DATA SHEETS**

In the event of a hazardous materials spill, all responders and/or affected parties must be aware of the hazards and properties associated with the spilled product(s). The NTPC maintains Material Safety Data Sheets (MSDS) for all controlled products used, stored, and/or handled at NTPC work sites. The MSDS are maintained up-to-date and are located in binders at each plant, mechanics garage, and office.

The Corporation's MSDS are also available online at <http://eservice.msds.com>

**User name: ntpc**

**Password: msds**

This login information is also available on the NTPC Intranet PowerLine site (the PowerLine) under Divisions/Health, Safety and Environment/Environment

## **1.6 GENERAL RESPONSIBILITIES**

### **1.6.1 General**

- No person should handle a substance unless that person is familiar with the hazards.
- No person should use a substance unless that person is familiar with the proper use.

### **1.6.2 Contractor and Subcontractors**

- Know the location of the SCP, spill response materials, first aid kits, emergency and safety equipment, MSDS, and muster stations;
- Wear appropriate personal protective equipment (PPE);
- Know basic spill prevention requirements;
- Know the spill reporting procedures;
- Report all emergencies and spills to the Plant Operator; and
- Comply with all NTPC and Facility policies and procedures when performing duties.

### **1.6.3 Matrix Solutions On-Scene Coordinator**

- ensuring the safety of all personnel and the site;

- ensuring all new site personnel and contractors are oriented and have access to all the required documentation;
- ensuring all contractors and sub-contracts adhere to the requirements of the SCP;
- acting as the On-Scene Coordinator in responding to spills;
- activating and coordinate the SCP and any other required contingency plans in the case of an emergency or spills involving hazardous materials or wastes and direct any cleanup activity until completion or until authority is passed to other personnel;
- notifying NTPC management and local contractors as required;
- reporting the spill to the NWT 24-HOUR SPILL REPORT LINE and Water Resource Officer;
- assisting in developing and implementing spill response training programs and exercises; and
- participating in annual reviews of the SCP with the NTPC's Environmental Analyst.

#### **1.6.4 NTPC Environmental Analyst**

- Maintain and complete the annual review of the SCP.
- Ensure that all SCP documentation remains up-to-date and the updated versions are distributed out to the personnel on site, external agencies and organizations. A formal record is kept of all distribution and amendments.
- Liaise with Matrix Solutions Ltd. and the appropriate environmental regulatory body to ensure that the response to a spill at the Site is completed in accordance with existing environmental laws and regulations.
- In coordination with Matrix Solutions Ltd., prepare and submit any formal reports (within the required time frame) to regulators and NTPC management regarding the management of hazardous materials and spill response.

### **1.7 DISTRIBUTION LIST**

The SCP and the most recent revisions are distributed internally to:

- i. NTPC Environmental Health and Safety Department
- ii. Matrix Solutions Ltd. and all sub-contractors
- iii. NTPC Intranet PowerLine site

## 2 AKLAVIK FORMER POWER PLANT SITE

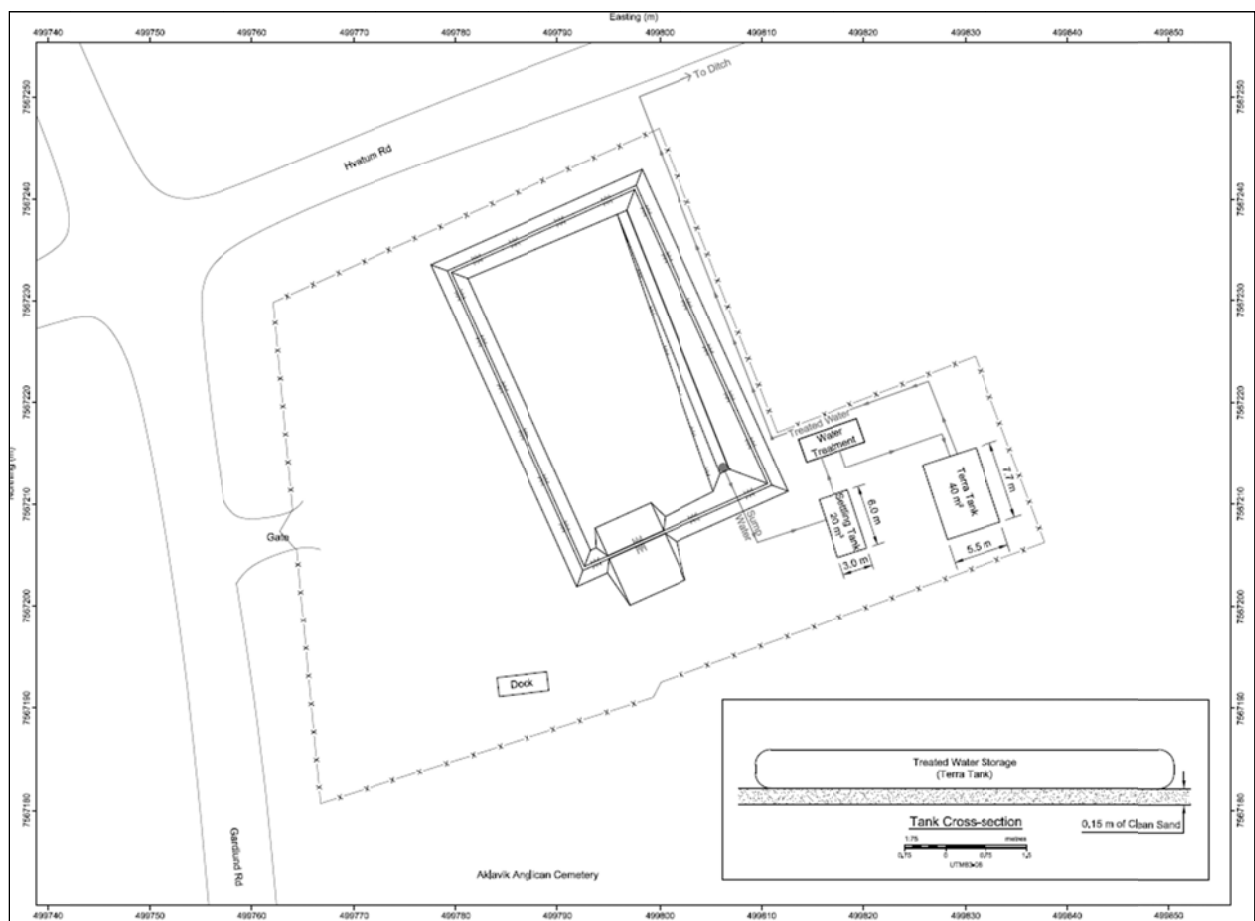
### 2.1 SITE DESCRIPTION

The community of Aklavik (68° 13'N and 135° 00'W) is situated 60 km west of Inuvik on the west bank of the Peel River (Figure 2-1). The community has a population of 633 (2011 Census).

Aklavik is accessible by air from Inuvik year round and bulk supplies and food are barged in during the summer months. An ice road links Aklavik to Inuvik in the winter.

The former plant site is centrally located in Aklavik and is surrounded with a chain-link fence. Access to the Site is through a vehicle gate located on the west side of the lot. A biotreatment cell will be constructed on the northeast side of the site with a water treatment system located on the southeast side (Figure 2-2)

**Figure 2-2: Site Diagram with Biotreatment Cell and Water Filtration System**



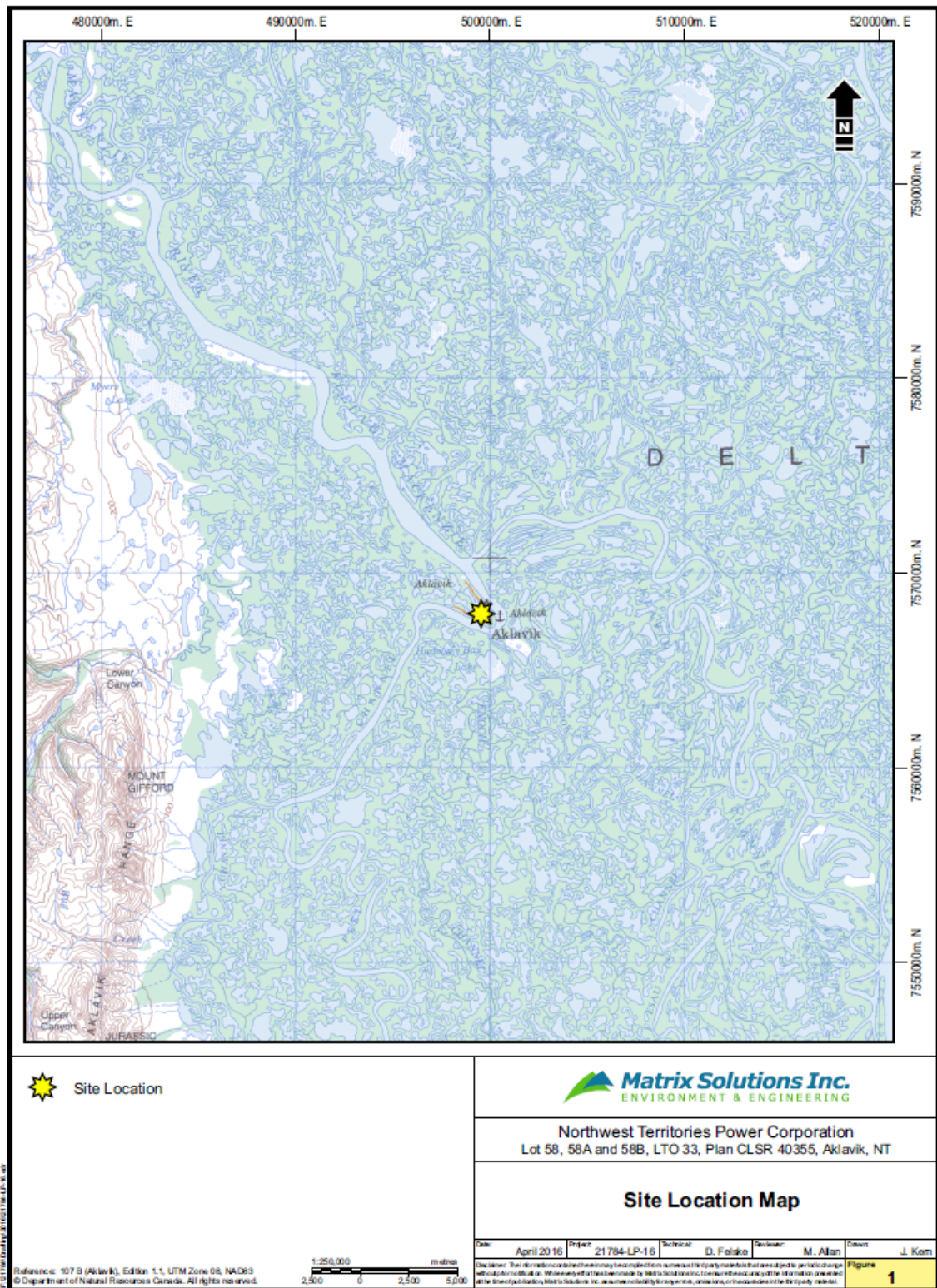


Figure 2-1: Site Location Map

## **2.2 LOCATION AND LIST OF MATERIALS ON-SITE**

Diesel fuel, hydraulic oil and glycol are the three hazardous materials used on-site. The hazardous materials will only be used in small quantities for heavy equipment operation. No hazardous materials will be stored on-site. All refueling and maintenance of equipment will occur offsite.

Water (captured percolation and groundwater seepage) collected from the biotreatment cell sump will be stored in a 20 m<sup>3</sup> settling tank. Although not hazardous, in the event of a spill of the untreated water the water will be conveyed to the sump of the biotreatment cell and pumped back into the onsite water treatment system.

If soil is affected by an untreated water spill or small spill of diesel fuel, hydraulic/motor oil or glycol from onsite heavy equipment the soil will be excavated and placed in the biocell for treatment.

BioReclaim (see MSDS in Appendix G) is non-hazardous and will be stored onsite. A spill of BioReclaim would be harmless to the environment.

**Table 2-1: List of Materials On-Site**

Material	Storage Container	Normally On-Site	Maximum On-Site	Storage Location and Uses
Diesel Fuel	None	<450 L  (Contained inside heavy equipment fuel tank)	450 L  (Contained inside heavy equipment fuel tank)	Storage: not applicable  Uses: operation of heavy equipment.  No diesel fuel will be stored onsite. All refuelling of heavy equipment will occur offsite.
Hydraulic and Motor Oil	None	<100 L  (Contained inside heavy equipment engine/hydraulic system)	100 L  (Contained inside heavy equipment engine/hydraulic system)	Storage: not applicable  Uses: operation of heavy equipment.  No hydraulic or motor oil will be stored onsite. All maintenance of heavy equipment will occur offsite.
Glycol	None	< 100 L  (Contained inside heavy equipment coolant system)	100 L  (Contained inside heavy equipment coolant system)	Storage: not applicable  Uses: operation of heavy equipment.  No glycol will be stored onsite. All maintenance of heavy equipment will occur offsite.
Untreated captured water	20 m <sup>3</sup>	< 20 m <sup>3</sup>	20 m <sup>3</sup>	Storage: untreated water settling tank located on the southeast side of the site near the water filtration system (See Figure 2-2)



## **3 SPILLS**

### **3.1 WHAT IS A SPILL?**

For the purposes of this SCP, a spill is defined as an accidental release of a contaminant into the environment that has the potential for adverse impact.

### **3.2 MATERIALS & REPORTABLE SPILLS ON SITE**

According to the NWT Spill Contingency Planning and Reporting Regulations, where there is a reasonable likelihood of a spill or accidental release (including in frozen conditions) in an amount equal to or greater than the amounts set out in Table 3-1, the spill must be reported to the NWT 24-HOUR SPILL REPORT LINE at 867-920-8130 and the GNWT's Water Resource Officer at 867-678-0623.

The On-scene Coordinator, or their designate, is responsible for reporting spills at the Site. The On-scene Coordinator must be notified immediately of any spill, regardless of quantity.

As a precaution, if there is any doubt as to whether the quantity spilled meets the minimum reportable thresholds listed in Table 3-1, the spill incident shall be reported to the NWT 24-HOUR SPILL REPORT LINE and the GNWT ENR Water Resource Officer.

The Site will maintain a detailed log of all spills of hazardous materials, including non-reportable spills. Procedures will be implemented to encourage all site workers to communicate non-reportable spill incidents to the On-scene Coordinator.

**Table 3-1: Immediately Reportable Quantities**

Transportation Class	Description of Contaminant	Amount Spilled
1	Explosives	any amount
2.1	compressed gas (flammable)	any amount of gas from containers with a capacity greater than 100 L
2.2	compressed gas (non-corrosive, non-flammable)	any amount of gas from containers with a capacity greater than 100 L
2.3	compressed gas (toxic)	any amount
2.4	compressed gas (corrosive)	any amount
3.1, 3.2, 3.3	flammable liquid	any amount
4.1	flammable solid	25 kg
4.2	spontaneously combustible solids	25 kg
4.3	water reactant solids	25 kg
5.1	oxidizing substances	50 L or 50 kg
5.2	organic peroxides	1 L or 1 kg
6.1	poisonous substances	any amount
6.2	infectious substances	any amount
7	radioactive substances	any amount
8	corrosive substances	5 L or 5 kg
9.1 (in part)	miscellaneous substances	50 L or 50 kg
9.2	environmentally hazardous	1 L or 1 kg
9.3	dangerous wastes	5 L or 5 kg
9.1 (in part)	PCB mixtures of 5 ppm or more	0.5 L or 0.5 kg
None	other contaminants	100 L or 100 kg

Notes: L = litre; kg = kilogram; PCB = polychlorinated biphenyls; ppm = parts per million.



### **3.3 SPILL PREVENTION MEASURES**

The first step in hazardous materials spill response is to take steps to prevent the spill from occurring. Planning for emergency situations is imperative, due to the nature of the materials stored on site as well as the remoteness of the site.

The following general preventative measures are in place to minimize the risk and impact of a potential spill or release:

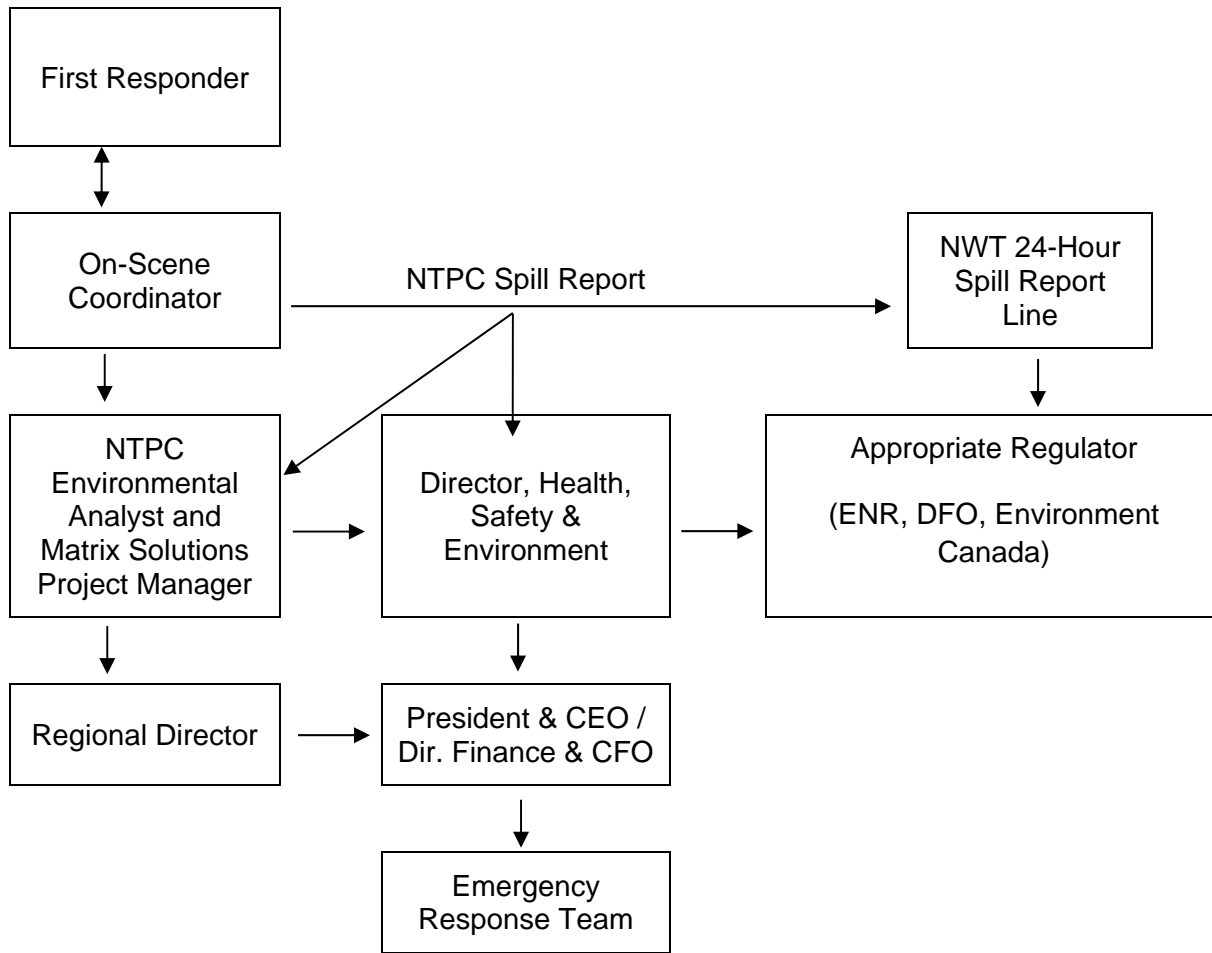
- Prior to starting work at the Site, all contractors and sub-contractors are required, as a minimum, to go through an orientation session to familiarize themselves with this SCP, the hazardous materials present at the Site and the Site spill response procedures;
- Safe practices include wearing required PPE.
- Spill kits and response material are located at the Aklavik Power Plant Facility located on the northeast side of the community. The spill kits and their contents are regularly inspected to ensure that adequate supplies are available;
- Fuel and chemical storage areas are provided with secondary containment; and,
- The On-scene Coordinator or their designate conducts regular visual inspections of the water treatment system and heavy equipment to check for leaks or damage.

## **4 RESPONSE ORGANIZATION**

### **4.1 RESPONSE ORGANIZATION**

The flow chart depicted in Figure 4-1 identifies the response organization and the chain of command for responding to a spill. In accordance with the action plan described in Section 5, the response organization details the roles and responsibilities of each party involved in the spill and their contact information, including the 24-hr phone numbers for the responsible personnel. Note that post Devolution (as of April 1, 2014), the Government of the Northwest Territories (GNWT) department of Environment and Natural Resources (ENR) has taken over the duties of Indian and Northern Affairs Canada (INAC) Inspectors for issued water licenses.

**Figure 4-1: Spill Response Organizational Communication Flowchart**



## **4.2 RESPONSE TEAM ROLES AND RESPONSIBILITIES**

### **4.2.1 First Responder**

The person who has caused a spill or is the first to observe the spill is the first responder. This includes Matrix Solutions Ltd. employees and their contractors working at the Site. The roles and responsibilities of the first responder are as follows:

- to ensure site and personnel safety;
- to assess the preliminary severity and source of the spill;
- to identify and contain the spill, if it is safe to do so;
- to immediately report to and work with the On-Scene Coordinator
- contractor employees are to report through their Supervisors, who in turn are required to report to the On-Scene Coordinator ; and
- to participate in spill response as a member of the cleanup crew if requested by the On-Scene Coordinator and trained to do so.

### **4.2.2 On-Scene Coordinator (Matrix Solutions Ltd.)**

The On-Scene Coordinator must be knowledgeable with regard to site operations, initial response actions, and spill response equipment and facilities. Responsibilities of the On-Scene Coordinator , or their Designate are as follows:

- to assume complete authority over clean up personnel and the spill scene, as well as assume responsibility for all mitigation efforts, as required;
- to evaluate the initial situation and assess the magnitude of the problem;
- to report the spill to the NWT 24-HOUR SPILL REPORT LINE at 867.920.8130 and the GNWT ENR Water Resource Officer at 867-678-0623. as soon as possible;
- to activate the initial response plan;
- to alert and assemble key personnel, as deemed appropriate, to handle the situation;
- to develop the overall plan of action for containment and clean up of the specific incident, as well as direct and implement the plan;
- to ensure assigned responsibilities are carried out and the activities of spill response team members are coordinated;
- to assess the requirements for people, equipment, materials, and tools to contain the spill in light of what resources are immediately available; urgency will depend on the nature of the spill;
- to assist NTPC's Environmental Analyst with regulatory and licensing reporting requirements, including gathering relevant information and submitting any formal reports (within the required time frame) to the applicable regulatory agencies, detailing the occurrence of a spill; this includes submitting an incident reporting form;

- to ensure that the spill response team is provided with proper PPE; and, to ensure that all spill response personnel receive adequate training to fulfil their responsibilities in responding to a spill.

### **4.2.3 Project Manager (Matrix Solutions Ltd.)**

In terms of spills, the Project Manager is responsible to:

- provide technical advice on the anticipated environmental impacts of the spill;
- advise on the effectiveness of various containment and recoveries, and suggest the most appropriate approach;
- if authorized by the NTPC Environmental Analyst act as a spokesperson with the public, media, and government agencies, as required;
- monitor the effectiveness of the clean up operation and recommend further work, if necessary;
- communicate with the various regulatory agencies as required; and
- complete and fax (867-873-6924) or email (spills@gov.nt.ca) a NWT SPILL REPORT Form to the NWT 24-HOUR SPILL REPORT LINE.

## **4.3 ORGANIZATIONAL COMMUNICATION PLAN**

When a spill has been identified, report the spill to the On-Scene Coordinator, or their designate. They are in charge of the Site and of activating the SCP. They will also inform NTPC's Environmental Analyst for tracking spills in the company database and notify NTPC's Environmental Analyst in the event of public inquiries.

## 4.4 CALLS THAT MUST BE MADE

**Note:** all phone numbers use **area code 867** unless otherwise specified.

When a spill of any size is discovered, the On-Scene Coordinator notifies:

- **24-Hr Spill Report Line** (920-8130 phone, 873-6924 fax)
- GNWT's Water Resource Officer (867-678-0623 cell).
- NTPC Environmental Analyst (867-874-5248 phone, 1-888-371-9433 fax)
- Matrix Solutions Ltd. Project Manager (780-239-5170 office phone, 780-989-8348 cell)

Table 4-3: Local Agencies (in case of emergency only)

Contact	Phone (867)
Department of Fisheries and Oceans (DFO)	669-4900
Emergency Measures Organization (EMO)	873-7554
Environment and Natural Resources (ENR) North Slave Region	678-0623
Public Works - Fort Simpson Region	695-2325
Public Works - Fort Smith Region	872-5526
Public Works - Inuvik Region	777-1298
Public Works - Yellowknife Region	873-1517
Inuvialuit Water Board	678-8609

## 5 ACTION PLAN

### 5.1 POTENTIAL DISCHARGE EVENTS – WORST CASE SCENARIOS

In Table 5-1, a list of potential discharge events, with associated discharge volumes and directions is presented for the primary hazardous materials stored on-site. The most likely discharge volume is indicated and the spill clean up procedures will focus on the spills of this quantity. A worst case scenario is also presented. Specific discharge rates are not indicated for each fuel type, as these would vary from a few minutes to several hours, based on the source of leak or puncture.

**Table 5-1: List of Hazardous Materials, Potential Discharge Events, Potential Discharge Volumes (Worst Case Scenario in Brackets) and Direction of Potential Discharge**

Material (sources)	Potential Discharge Event	Discharge Volume (worst case)	Direction of Potential Discharge
Diesel Fuel (heavy equipment)	Leak from heavy equipment fuel tank due to collision / accident	Likely < 450 L (max 450 L if catastrophic failure of heavy equipment fuel tank at 100% full)	Small spills associated with hydraulic and motor oil from heavy equipment will spread out over a small area of land and move in the direction of downward slope with little potential for underground infiltration.
Hydraulic and Motor Oil (heavy equipment)	Leak from heavy equipment hose failure or seam/joint failure	Likely < 10 L (max 100 L if catastrophic failure of heavy equipment hydraulic system at 100% full)	Small spills associated with hydraulic and motor oil from heavy equipment will spread out over a small area of land and move in the direction of downward slope with little potential for underground infiltration.
Glycol (heavy equipment)	Leak from heavy equipment hose failure or seam/joint failure	Likely < 10 L (max 100 L if catastrophic failure of heavy equipment coolant system at 100% full)	Small spills associated with glycol from heavy equipment will spread out over a small area of land and move in the direction of downward slope with little potential for underground infiltration.
Untreated water (settling tank)	Leak from punctured tank or seam/joint failure	Likely < 5m <sup>3</sup> (max 20 m <sup>3</sup> if catastrophic failure of settling tank at 100% full)	Spills associated with untreated water will spread out over a small area of land and move in the direction of downward slope with potential for ground infiltration.

## 5.2 POTENTIAL ENVIRONMENTAL IMPACTS OF SPILLS (INCLUDING WORST CASE SCENARIO)

### 5.2.1 Flammable and Combustible Liquids

Flammable liquids have flash points below 37.8°C, evaporate quickly, and within a short period of time can reach high vapour concentrations in air. Flammable liquids at the Facility include, but are not limited to, gasoline and aviation fuel. Although not stored on site, aviation fuel will be present in helicopters landing at the Facility. Spills of flammable liquids represent an extreme fire and explosion hazard if vapour concentrations exceed the lower explosion limit (LEL). They are generally harmful if inhaled and can also be absorbed through the skin.

Combustible liquids such as diesel fuel have a **flash point above 37.8°C but below 93.3°C** and are not fire hazards at room temperature. The principal hazard from non-flammable, volatile liquid spills is exposure to the vapour by inhalation or skin absorption.

The most common flammable and combustible materials used on site are liquids such as diesel, and oils for the operation of heavy equipment. For the purposes of spill response actions, lubricants and motor oil have been included with the flammable and combustible compounds given their petroleum hydrocarbon based nature. Glycol spills will also be handled as flammable/combustible materials. NOTE: No hazardous products will be stored onsite.

#### Diesel

Environmental impacts: Diesel may be harmful to wildlife and aquatic life. It is not readily biodegradable. Diesel burns slowly and thus the risk to the environment is reduced during recovery as burn can be more readily contained compared with volatile fuels. It has a relatively low solubility in water and is less dense than water, and hence can form a layer of NAPL floating on top of water if released in sufficient quantities. Runoff into water bodies must be avoided.

Worst case scenario: Heavy equipment fuel tank failure or seam/joint failure, contents seeped into surrounding soil causing environmental impacts to local soil.

Recovery procedure: Any soils impacted by a diesel fuel spill will be excavated and moved to the biocell for treatment.

#### Oil Product

Environmental impacts: Raw oil product may be harmful to wildlife and aquatic life. Oil products are not readily biodegradable. These compounds generally have a low solubility in water, thereby separating into NAPL. Runoff into water bodies must be avoided.

Worst case scenario: Heavy equipment hose failure or seam/joint failure, contents seeped into surrounding soil causing environmental impacts to local soil.

Recovery procedure: Any soils impacted by oil products spill will be excavated and moved to the biocell for treatment.

### **Glycol**

Environmental impacts: Raw glycol (ethylene glycol) product may be harmful to wildlife and to a lesser extent aquatic life. Glycol does not bioaccumulate and readily biodegrades in the environment. Glycol is not flammable or combustible. Glycol readily dissolves in water.

Worst case scenario: Heavy equipment hose failure or seam/joint failure, contents seeped into surrounding soil causing environmental impacts to local soil.

Recovery procedure: Any soils impacted by glycol products spill will be excavated and moved to the biocell for treatment.

## **5.2.2 Untreated Water**

Environmental impacts: Untreated water collected from the biocell could potentially contain hydrocarbons above applicable criteria.

Worst case scenario: Storage tank punctured, contents seeped into surrounding area causing environmental impacts to local soil.

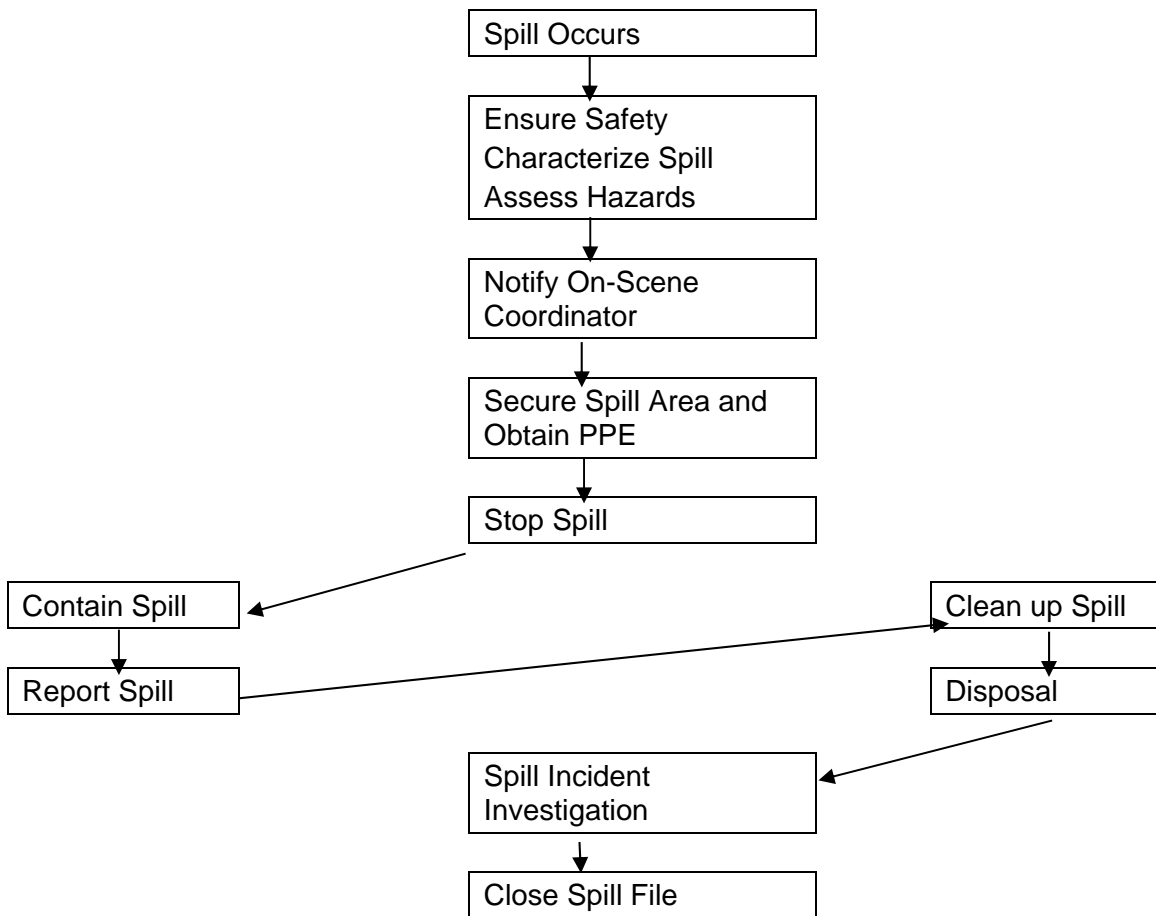
Recovery procedure: Any untreated water will be diverted back to the biocell sump for treatment in the water filtration system. Any soil impacted by untreated water will be excavated and moved to the biocell for treatment.



## 5.3 SPILL PROCEDURES

The following flowchart (Figure 5-1) outlines the overall steps to be taken in the event of a spill. The detailed description of what is required at each step is outlined in the Spill Response Procedure (Section 5.3.1).

**Figure 5-1: Spill Response Flowchart**



### 5.3.1 Spill Response Procedures

#### STEP 1 – Ensure safety, identify spill and assess hazards and risks

Initial actions for spills include ensuring personnel and site safety. Ensuring personnel and site safety is the responsibility of all parties, particularly the first responder who has the most knowledge of the spill. Upon the identification that a spill or release has occurred, the first responder shall perform the following:

- Ensure safety of yourself and all personnel;
- Alert all persons in the immediate area that a spill has occurred;
- Characterize Spill:
  - identify the material and its hazard potential (refer to MSDS if necessary);
  - identify the source of the spill; and,
  - identify the amount and the extent of the spill.
- Assess the spill hazards and risks to persons, property and the environment.

**Note:** *Where life or property is in danger, there is an emergency. **Get help.** Contact the local fire department, police or municipal authority.*

#### STEP 2 – Notify the On-Scene Coordinator

After the details about the spill are known, the First Responder shall contact the On-Scene Coordinator who will activate the SCP.

#### STEP 3 – Secure Area and Obtain Personal Protective Equipment

Upon determining what the spilled product is and its hazard potential, the On-Scene Coordinator shall perform the following:

- Keep all personnel not directly involved with the spill response away from the spill area.
- Ensure all personnel involved in the spill response are aware of the hazards of the spilled product, spill response and the environment.
- Obtain the required response equipment and PPE for the spill response team members.

#### STEP 4 – Stop Spill

If Safe to do:

- Locate the spill source and stop it/shut it off (e.g. shut down heavy equipment, turn off pumps, etc.).
- Shut off ignition sources.
- Shut off operating equipment.
- Attend to the injured (refer to MSDS for first aid response).

#### STEP 5 - Contain Spill

- Determine the direction and speed the spill is moving. Determine what is causing the spill to move (wind, gravity, water, etc.);
- Determine what will be affected by the spill (environment, property);
- Determine the best location where the spill can be contained with available staff and equipment;
- Determine actions to reduce risk/damage to human health, the environment and property as a result of the spill.
  - Contain the spill. Refer to Appendix E for containment methods. Refer to Section 6 and Appendix F for a list of spill response equipment.
  - First attempt to contain the spill so as to prevent its entry directly into a potable water source, water body or into a ditch or conveyance that eventually discharges in to a water body.
  - **Should the spill reach the water, IMMEDIATELY** shut down the generator and stretch a sorbent boom across at the tailrace narrows, and use sorbent pads and booms to collect product from the water's surface.

#### STEP 6 - Report Spill

- Completely fill out a Spill Report Form (Appendix A) and fax to the 24-HOUR SPILL REPORT LINE, Health, Safety & Environment Department, and Project Manager. Form also available on PowerLine.
- Contact GNWT ENR at 867-678-0623 (see also Table 4-3)
- Refer to Section 5.3.2 for additional information on spill reporting procedures.
- Contact GNWT ENR at 867-678-0623 (see also Table 4-3)

#### STEP 7 - Spill Recovery / Cleanup and Disposal

- Refer to Sections 5.2.1, 5.2.2 and 5.6 to 5.9 of this SCP for information on product recovery / clean up, storage, disposal, and site clean up procedures.
- Upon completion of clean up fill out a Spill Update Form (Appendix C) and fax as directed on form. Form also available on PowerLine.

#### STEP 8 – Spill Incident Investigation

- The On-Scene Coordinator in consultation with the Environmental Analyst and Project Manager to conduct an internal review of the spill cause, effects, and effectiveness of the SCP procedures.
- Investigation findings to be used to develop corrective actions.

#### STEP 9 - Close Spill File

- The Environmental Analyst and Project Manager will follow up with the appropriate regulatory body to ensure that a satisfactory clean up and/or remediation of affected areas has been completed.

### **5.3.2 Spill Reporting Procedures**

NTPC policy is to report all spills of fuel or hazardous materials adjacent to or into a water body, regardless of quantity, or spills of hazardous materials over 5 litres unless the minimum quantity specified in the NWT Spill Contingency Planning and Reporting regulation is more stringent (i.e., less than 5 L).

A person reporting a spill shall give as much of the following information as possible:

- a) Date and time of spill.
- b) Location of spill.
- c) Direction the spill is moving.
- d) Name and phone number of a contact person close to the location of spill.
- e) Type of containment spilled and quantity spilled.
- f) Cause of spill.
- g) Whether the spill is continuing or has stopped.
- h) Description of existing containment.
- i) Action taken to contain, recover, clean up and dispose of spilled contaminants.
- j) Name, address and phone number of person reporting spill.
- k) Name of owner or person in charge, management or control of contaminants at time of spill.

Reporting shall not be delayed because of the lack of knowledge of any of the factors listed. No person shall knowingly make a false report of a spill or potential spill.

It is the responsibility of the On-Scene Coordinator or their designate to report the spill to the 24-HOUR SPILL REPORT LINE at (867) 920-8130, and they shall perform the following:

1. Fill out the SPILL REPORT Form as completely as possible. The form is available through the NTPC Intranet Powerbox (Appendix A). If required for a large fuel spill, follow the Fuel Spill Calculation Procedures (Appendix B) to determine the spill volume.
2. Fax or phone in the Spill Report Immediately to the 24-HOUR SPILL REPORT LINE at:

**Fax: (867) 873-6924**  
**Phone: (867) 920-8130**

**NOTE:** Collect telephone calls can be made by informing the On-Scene Coordinator that you wish to report a spill. RCMP communications may be used if other means are not available.

3. Fax Spill Report to Health, Safety & Environment Department. See phone list (Table 4-1) for contact info.

NTPC's Environmental Analyst must also contact the GNWT ENR Water Resource Officer at 867-678-0623.

## 5.4 CONTAINMENT

The following section describes various methods which may be employed to contain a spill to land, water, ice or snow.

### 5.4.1 Containment of Spills on Land

It is important to note that soil is a natural sorbent, thus spills on soil are generally less serious than spills on water as contaminated soil can be more easily recovered. Generally spills on land occur during the late spring, summer or fall when snow cover is at a minimum. It is important that all measures be undertaken to avoid spills reaching open water bodies.

The following methods are described in more detail in Appendix E:

- Dykes
- Trenches
- Dams

Any soil impacted from a hazardous product spill can be excavated and moved to the biocell for treatment.

## 5.4.2 Containment of Spills to Water

**Note: The Site is located approximately 250 m from the nearest water body (i.e., the Peel River) and hazardous products will be used in such low quantities that a spill reaching the river is not possible.**

Spills on water such as rivers, streams or lakes are the most serious types of spills as they can negatively impact water quality and aquatic life. All measures need to be undertaken to contain spills on open water.

The following methods are described in more detail in Appendix E:

- Booms
- Weirs
- Barriers

## 5.4.3 Containment of Spills On or Under Ice

**Note: The Site is located approximately 250 m from the nearest water body (i.e., the Peel River) and hazardous products will be used in such low quantities that a spill reaching the river is not possible.**

Spills on ice are generally the easiest spills to contain due to the predominantly impermeable nature of the ice. For small spills, sorbent materials are used to soak up spilled fuel. Remaining contaminated ice/slush can be scraped and shovelled into a plastic bag or barrel. However, all possible attempts should be made to prevent spills from entering ice covered waters as no easy method exists for containment and recovery of spills if they seep under ice.

The following methods are described in more detail in Appendix E:

- Dykes
- Trenches
- Snow Fence and Sorbent Barrier
- Burning
- Ice Slotting
- Vertical Barriers

It should be noted that burning on ice is not anticipated to occur and in the event that this mitigation method should be chosen (as an emergency response), authorization from GNWT ENR Inspectors will be secured prior to any action (refer also to Section 5.8.2).

### **5.4.3.1 Containment of Spills on Snow**

Snow is a natural sorbent, thus as with spills on soil, spilled fuel can be more easily recovered. Generally, small spills on snow can be easily cleaned up by raking and shovelling the contaminated snow into the biocell sump for treatment.

The following methods are described in more detail in Appendix E:

- Dykes

## **5.5 RECOVERY / CLEANUP**

In most cases, spill recovery / clean up is initiated at the far end of the spill and contained moving toward the centre of the spill. Fuel recovery methods generally include direct suction, mechanical removal, and the use of sorbent material. Most spills of hazardous product at the Site will be recovered through excavation of impacted soil and moved to the biocell for treatment.

All materials mentioned in this section are available in the spill kits located at the Aklavik Power Plant Site. Following clean up, any tools or equipment used will be properly washed and decontaminated, or replaced if this is not possible.

### **5.5.1 Manual and Mechanical Recovery**

Manual recovery by use of hand tools (e.g. cans, buckets, shovels, rakes) is an effective means of recovering fuel from small spills or from areas that are inaccessible to larger equipment. This is often the only method available, and in some cases is preferred as it causes the least amount of damage to an area.

Mechanical recovery using heavy construction equipment can be used in some cases for recovery and loading of material for disposal. Caution must be used when operating such equipment around a spill site. In some instances, more damage can be caused from the operation of the equipment than from the spilled product. Escaping petroleum vapours may also be present and pose the danger of explosion and fire.

### **5.5.2 Sorbent Material**

Sorbent materials are commonly used for final clean up and recovery of small amounts of oil or to remove oil in places that are inaccessible to other means of recovery. They are effective in recovering thin as well as thick layers of oil, however large volumes of sorbent are often required. Used sorbent materials are to be placed in drums for future disposal. The types of sorbent materials available at the Facility and generally available for spill response are listed in Section 6 and Appendix F.

Snow and soil can be used as effective sorbent materials. Once mixed, the oil in snow or soil mixture can be shovelled or picked up using construction equipment and taken to a suitable treatment site.

## **5.6 STORAGE**

Storage options generally consist of pails or drums. In most cases impacted soil or water will be moved to the biocell for treatment.

### **5.6.1 Glycol Spill Response**

As noted above, only very limited quantities of glycol (ethylene glycol) are used at the Site (for heavy equipment operation). Details on amounts, storage and potential spill scenarios are provided in tables 2-1, 2-2 and 5-1.

Studies have shown that ethylene glycol is readily biodegradable under both aerobic and anaerobic conditions in soils and water. Research has also demonstrated that ethylene glycol has a low toxicity to aquatic organisms. Accidental glycol spills on the ground (and in the snow) will be treated as described for PHC in the sections above. Considering the small quantities used, it is considered unlikely that accidentally spilled glycol will cause significant environmental impacts.

## **5.7 SITE RESTORATION**

As the project being conducted at the site is an onsite soils remediation project any soils impacted during the project will be included to the original volume of soil for treatment in the biocell.

### **5.7.1 Natural Assimilation (Biodegradation)**

Oil can be degraded naturally by microorganisms under proper temperature and nutrient conditions. Tilling the affected soil to increase exposure of the soil organisms and oil to oxygen can also be beneficial.



## 6 RESOURCE INVENTORY

The Aklavik Power Plant Facility maintains numerous resources to support spill response.

### 6.1 ON-SITE RESOURCES

Spill materials and/or spill kits are located at the Aklavik Power Plant Facility at all designated hazardous materials and waste storage areas. Further details on the types of spill material and spill kits that may be present at the Facility is presented in Appendix F.

There are three (3) spill kits at the Facility as follows:

- 2 large overpack spill kits
- 1 ten-gallon spill kit (inside plant)

Spill kits in use are yellow plastic overpack oil-only spill kits with a sorbent capacity of 305 L. Contents of the kits are as follows:

- 1 - 95 US gallon polyethylene overpack drum
- 4 oil only socks (5" x 10')
- 5 oil only socks (3" x 4')
- 50 oil only pads (17" x 19")
- 5 oil only pillows (12" x 13")
- 1 oil only roll (19" x 115')
- 1 drain cover (36" x 36" x 1/16")
- 1 - 1 lb. plugging compound (pre-mixed)
- 1 caution tape (3" x 1000')
- 2 pair nitrile gloves
- 2 pair safety goggles
- 2 protective coveralls
- 10 printed disposal bags (24" x 48")
- 1 instruction book

Additional spill response equipment is also in storage at the Aklavik Power Plant Facility:

- Universal sorbent pads
- Universal sorbent rolls
- 205 L steel salvage drums
- Hand tools – shovels, rakes, etc.
- Personal protective equipment – goggles, gloves, coveralls (each plant)

In addition, earth moving and other equipment available in the community is also listed below.

- Backhoe
- Dozer
- Pump truck
- Skid steer
- Service truck
- Trash pump and 2" hose
- Wheel loader

**APPENDIX A**  
**NWT SPILL REPORT FORM**



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**

<b>A</b>	REPORT DATE: MONTH – DAY – YEAR		REPORT TIME		<input type="checkbox"/> ORIGINAL SPILL REPORT, OR <input type="checkbox"/> UPDATE # _____ TO THE ORIGINAL SPILL REPORT	<b>REPORT NUMBER</b> _____-_____
	<b>B</b> OCCURRENCE DATE: MONTH – DAY – YEAR		OCCURRENCE TIME			
<b>C</b>	LAND USE PERMIT NUMBER (IF APPLICABLE)			WATER LICENCE NUMBER (IF APPLICABLE)		
	<b>D</b> GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION				REGION <input type="checkbox"/> NWT <input type="checkbox"/> NUNAVUT <input type="checkbox"/> ADJACENT JURISDICTION OR OCEAN	
<b>E</b>	LATITUDE			LONGITUDE		
	DEGREES	MINUTES	SECONDS	DEGREES	MINUTES	SECONDS
<b>F</b>	RESPONSIBLE PARTY OR VESSEL NAME		RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION			
<b>G</b>	ANY CONTRACTOR INVOLVED		CONTRACTOR ADDRESS OR OFFICE LOCATION			
<b>H</b>	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	
<b>I</b>	SPILL SOURCE		SPILL CAUSE		AREA OF CONTAMINATION IN SQUARE METRES	
<b>J</b>	FACTORS AFFECTING SPILL OR RECOVERY		DESCRIBE ANY ASSISTANCE REQUIRED		HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT	
<b>K</b>	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS					
<b>L</b>	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE	
<b>M</b>	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE	

**REPORT LINE USE ONLY**

<b>N</b>	RECEIVED AT SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLED	REPORT LINE NUMBER
		STATION OPERATOR		YELLOWKNIFE, NT	(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					

**APPENDIX B**  
**SPILL UPDATE FORM**

## Spill Update

<b>Report Update to Supervisor &amp; Environment Dept.</b> Refer to <i>Policy EV-05, Hazardous Materials Spill Reporting</i> for more information				<b>Environment Dept.</b> Phone: (867) 874-5327 Fax: 1-888-371-9433	
<b>1</b> Report Date			<b>2</b> NWT Spill Number and/or Date and Time of Incident		
<b>3</b> Stage of Cleanup	Cleanup Not Required <input type="checkbox"/>	Cleanup Continuing <input type="checkbox"/> Expected Completion Date:	Cleanup Completed <input type="checkbox"/> Date Completed:		
<b>4</b> Initial Action Plan: Describe each step.					
		Y	N	Brief Description	
Step 1: Identify product and hazards		<input type="checkbox"/>	<input type="checkbox"/>		
Step 2: Shut off source of spill		<input type="checkbox"/>	<input type="checkbox"/>		
Step 3: a) Spill containment		<input type="checkbox"/>	<input type="checkbox"/>		
b) Report spill		<input type="checkbox"/>	<input type="checkbox"/>	Supervisor <input type="checkbox"/> Env. Dept. <input type="checkbox"/> NWT 24-hr Spill Report Line <input type="checkbox"/>	
Step 4: Spill cleanup and disposal		<input type="checkbox"/>	<input type="checkbox"/>		
Step 5: Debriefing		<input type="checkbox"/>	<input type="checkbox"/>		
Cleanup Personnel:					
Reported by:		Position:		Location:	
Spill Update reported to (please check boxes):		Environmental Department <input type="checkbox"/>		Supervisor (enter details below) <input type="checkbox"/>	
Reported to:		Position:		Location:	
				Telephone No:	

\* Place additional comments and notes on page 2.

\*\* Ensure to note any potential impacts to sensitive human or ecological receptors, and any impacts to offsite areas.

## Spill Update

Additional Comments

## **APPENDIX C**

### **EMERGENCY RESPONSE POLICY**



Rev. 01	Policy:	Spill Reporting	Page 1 of 2
	Monitor:	Manager, Corporate Health, Safety & Environment	No.: EV-05
	Approval:	March 17, 2010	Documentation of long standing policy

## Policy

NTPC maintains a “Report All Spills” policy that surpasses spill reporting requirements legislated by the Environmental Protection Act.

## Directive

NTPC shall report:

- all hazardous materials spills released to water, regardless of size;
- all hazardous materials spills greater than 5 L (including spills to ground/snow and contained (e.g., within plants and berms)).

NTPC shall clean up all hazardous materials spills to meet applicable environmental criteria.

When a spill incident occurs the following steps shall be taken as per the *NTPC Spill Response Plans*:

1. Identify Product and Assess Hazards
  - Complete the following steps only if safe to do so; if not get help
2. Shut off Source of Spill
  - Stop product from spilling
3. Contain Spill
  - Stop product from spreading
4. Report Spill immediately
  - Complete *NTPC Spill Report Form EV-05-01*, send to NWT Spill Line, Manager, Environmental Analyst
5. Spill Cleanup and Disposal
  - Dispose of all recovered product, impacted soil/snow, and cleanup materials according to *NTPC Hazardous Waste Management Plan* and *Transportation of Dangerous Goods Regulations*
6. Debriefing with Personnel
  - Review cause of spill and ways to prevent similar spills
  - Review spill response and ways to improve the spill response process

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	Approval:	March 17, 2010	Documentation of long standing policy

7. Close Spill File

- Complete *NTPC Spill Update Form EV-05-02*, send to Manager and Environmental Analyst

## **APPENDIX D**

### **SPILL CONTAINMENT METHODS**

- **Containment of Spills on Land**
- **Containment of Spills on Water**
- **Containment of Spills on and Under Ice**
- **Containment of Spills on Snow**

## **Specific Spill Containment Methods For Land, Water, Ice And Snow**

The following section describes various methods which may be employed to contain a spill to land, water, ice or snow.

### **Containment of Spills on Land**

Spills on land include spills on rock, gravel, soil and/or vegetation. It is important to note that soil is a natural sorbent, thus spills on soil are generally less serious than spills on water as contaminated soil can be more easily recovered. Generally spills on land occur during the late spring, summer or fall when snow cover is at a minimum. It is important that all measures be undertaken to avoid spills reaching open water bodies.

#### **Dykes**

Dykes can be created using soil surrounding a spill on land. These dykes are constructed around the perimeter or down slope of the spilled fuel. A dyke needs to be built up to a size that will ensure the containment of the maximum quantity of fuel that may reach it. A plastic tarp can be placed on and at the base of the dyke such that fuel can pool up and the subsequently be removed with sorbent materials or by pump into barrels or bags. If the spill is migrating very slowly a dyke may not be necessary and sorbents can be used to soak up fuels before they migrate away from the source of the spill.

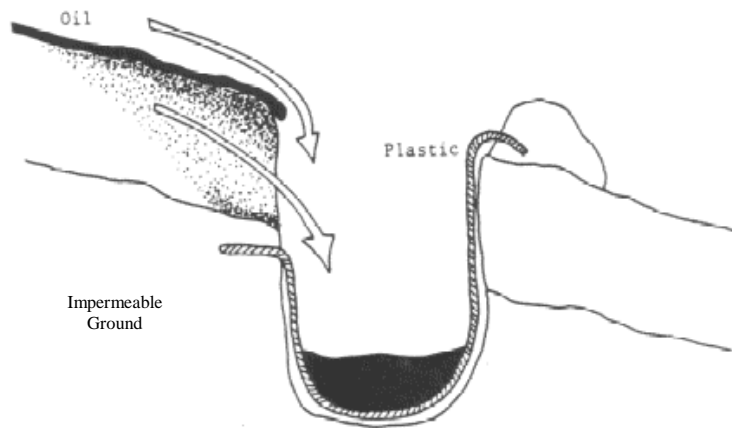
#### **Trenches**

Trenches can be dug out to contain spills as long as the top layer of soil is thawed. Backhoes, loaders, shovels, or pick axes can be used depending on the size of the trench required. It is recommended that the trench be dug to the bedrock or permafrost, which will then provide containment layer for the spilled fuel. Fuel can then be recovered using a pump or sorbent materials.

If water is present in the excavated trenches, it should be assumed that groundwater contamination may result and eventually be discharged into surface waters. A waterproof liner should be placed on the bottom and sides of the trench.

Shallow trenches placed downslope of the spill will be effective in trapping fuel travelling both on the surface and below the surface (Figure E-1). Sorbent pads, socks, and booms should be placed in the trench to collect spilled product.

**Figure E-1: Trench**



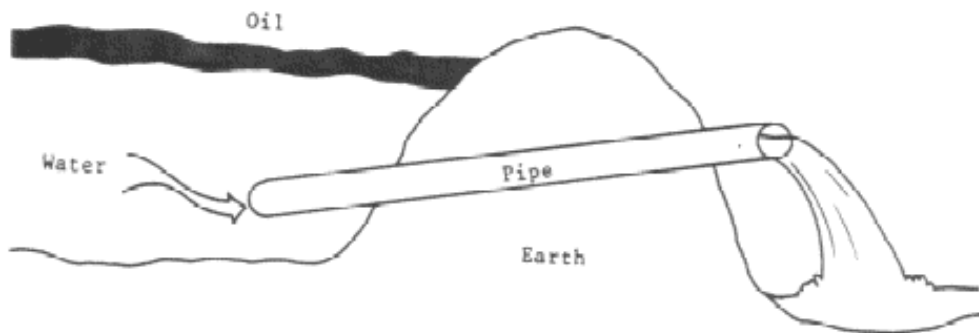
## Dams

Dams constructed across ditches can be used to contain a spill and stop its flow. A dam may be built with earth, wood, sandbags, and/or snow. The dam should be lined with plastic sheeting to make it impermeable to the spilled product. In freezing conditions water may be sprayed on a dam to form ice, thereby making the dam impermeable.

Care should be taken to ensure that a dam is large enough to contain the entire spill; insufficient capacity may result in overtopping failure.

For ditches with flowing water or for small streams, it may be necessary to allow water flow to continue while retaining the lighter-than-water liquids (i.e.: hydrocarbons). This can be achieved by building water bypass dams: an earth dam is built stopping the flow of water and oil in the ditch; a pipe is then installed below the water level and passing through the dam. This allows the water to continue flowing while the dam retains the lighter-than-water products (Figure E-2).

**Figure E-2: Water Bypass Dam**



## **Containment of Spills to Water**

Spills on water such as rivers, streams or lakes are the most serious types of spills as they can negatively impact water quality and aquatic life. All measures need to be undertaken to contain spills on open water.

### **Booms**

Booms are commonly used to contain a spill of floating liquid or debris, to deflect or divert material to a defined area so that it may be recovered, and to protect sensitive areas from contamination (Figure E-3). Booms are designed to float and have absorbent materials built into them to absorb fuels at the edge of the boom.

Boom deployment is important, as the angle of the boom in relation to the speed of the water affects how well the oil may be contained. The faster the stream, the more angled the boom must be (Figure E-4).

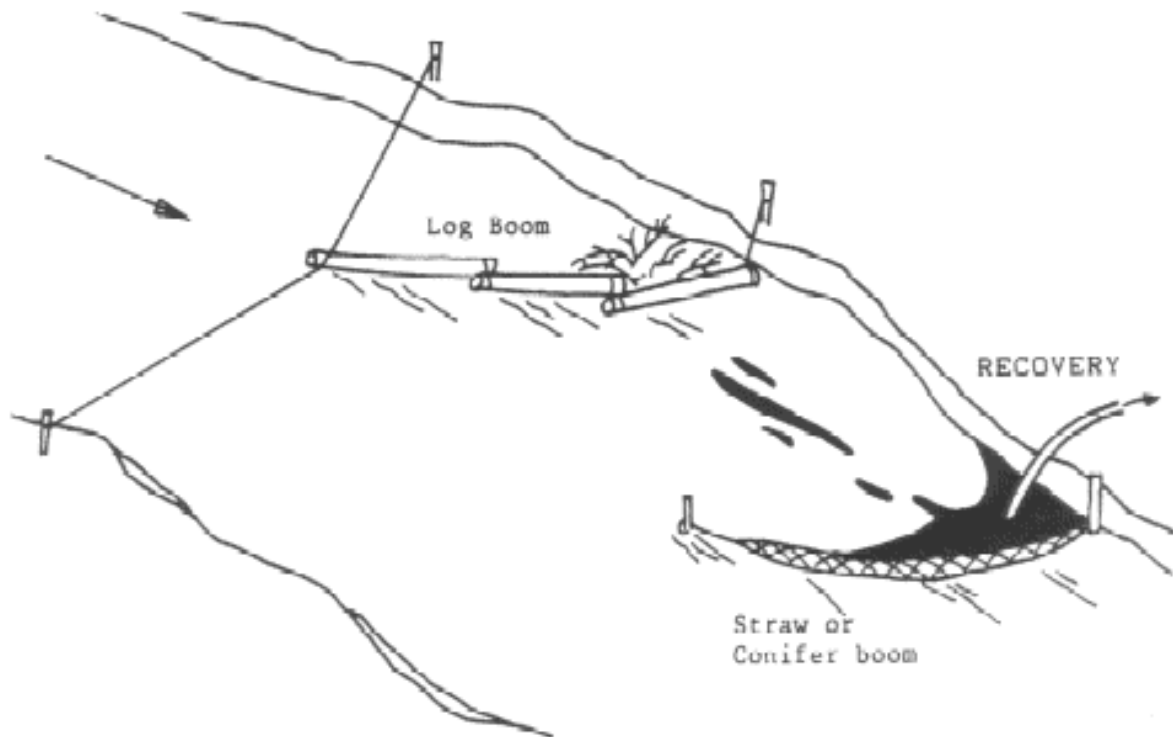
Several booms arranged in parallel may be necessary to contain all of the product. These should be spaced to allow product, which may escape the first boom, to float to the surface and be contained by the next boom. In addition, the use of several booms permits one boom to be removed at a time for cleaning.

Booms may be either commercially made or homemade. Commercially made booms are designed to float and keep product from escaping under the boom. Homemade booms may be constructed from logs, railroad ties, power poles, trees, lumber, inflated fire hose, or Styrofoam. These may be used to deflect floating material to shore or to keep floating material within a contained area. Individual sections are connected together by rope, chain, or wire. A seal around the joints to prevent leakage can be made by wrapping with plastic sheets or burlap.

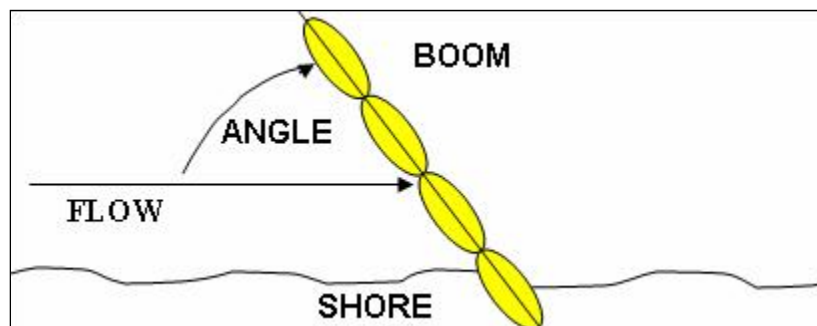
Wooden or other floating booms can be used to contain the spilled fluid itself or the sorbent containing the product. They can also be used upstream of sorbent booms to improve the efficiency and longevity of the sorbent material.

Fuel contained within the boom will need to be recovered using sorbent materials or pumps and placed into barrels or bags for disposal.

**Figure E-3: Boom Usage**



**Figure E-4: Boom Deployment**

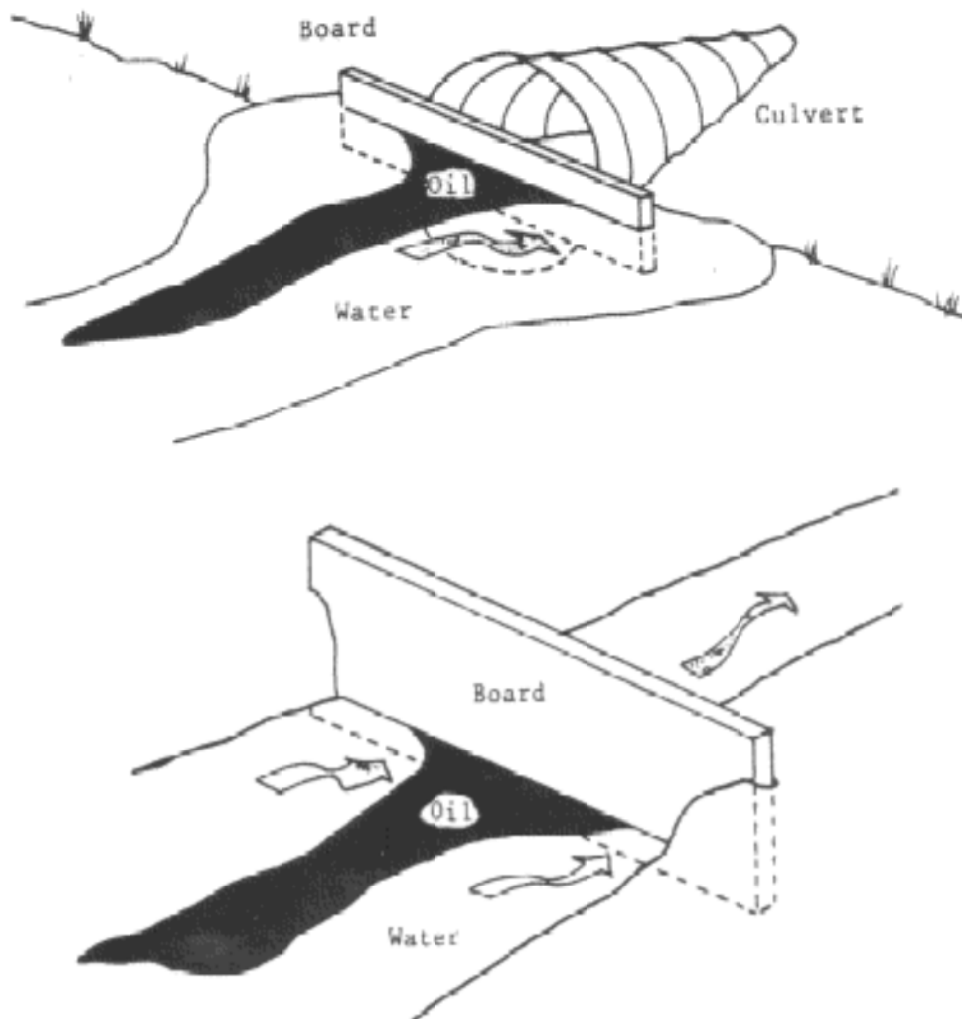


## Weirs

Weirs can be used to contain spills in streams, ditches, at culvert entrances and to prevent further migration downstream.

Materials commonly used such as plywood, lumber, and sheet metal may be placed into and across the width of the stream/ditch/culvert such that water can still flow under the weir. Spilled fuel will float on the water surface and be contained at the foot of the weir (Figure E-5). It can then be removed using sorbents, booms or pumps and placed into barrels or plastic bags.

**Figure E-5: Weirs**





## **Barriers**

In some situations, barriers made of netting or fence material can be installed across a stream, and sorbent materials placed at the base to absorb the spilled product. Sorbents will need to be replaced as soon as they are saturated. Water will be allowed to flow through. This is very similar to the weir option discussed above.

Note that in some cases, it may be appropriate to burn fuel or to let volatile fuels such as gasoline evaporate after containment on the water surface. This should only be undertaken in consultation with and after approval from the INAC or lead agency inspector.

## **Containment of Spills On and Under Ice**

Spills on ice are generally the easiest spills to contain due to the predominantly impermeable nature of the ice. For small spills, sorbent materials are used to soak up spilled fuel. Remaining contaminated ice/slush can be scraped and shovelled into a plastic bag or barrel. However, all possible attempts should be made to prevent spills from entering ice covered waters as no easy method exists for containment and recovery of spills if they seep under ice.

## **Dykes**

Dykes can be used to contain fuel spills on ice. By collecting surrounding snow, compacting it and mounding it to form a dyke down slope of the spill, a barrier is created thus helping to contain the spill. If the quantity of spill is fairly large, a plastic tarp can be placed over the dyke such that the spill pools at the base of the dyke. The collected fuel can then be pumped into barrels or collected with sorbent materials.

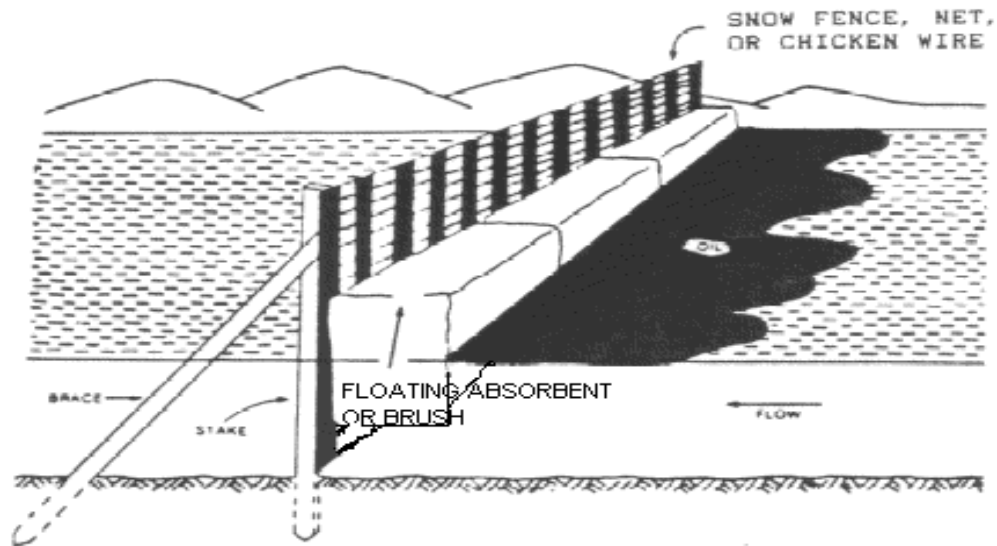
## **Trenches**

For significant spills on ice, trenches can be cut into the ice surrounding and/or down slope of the spill such that fuel is allowed to pool in the trench. It can then be removed via pump into barrels, collected with sorbent materials, or mixed with snow and shovelled into barrels or bags.

## **Snow Fence and Sorbent Barrier**

Snow fence and sorbent barriers may be used in streams (less than 1 m deep) with soft beds into which stakes can be driven. This method is limited to summer conditions. A snow fence barrier is installed to span the width of the stream, anchored at both ends, and stakes are driven into the stream bottom at 1 to 2 m intervals along the fence. Commercial sorbents are placed on the upstream side of the fence and are held against it by the current. Sorbents will float against the upstream side of the barrier, but must be replaced before they become soaked with product and sink. The barrier should be angled against the current for shore side collection. Multiple snow fence barriers can provide backup against potential losses from upstream barriers. Net or chicken wire barriers can be constructed in the same way, and are more practical for stronger currents, as water can flow through them more easily (Figure E-6).

**Figure E-6: Barrier and Sorbent**



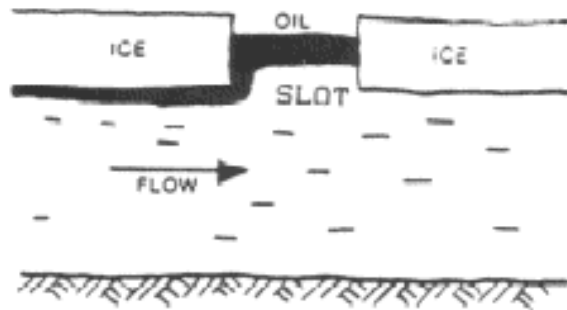
## Burning

Burning should only be considered if other approaches are not feasible, and is only to be undertaken with the permission of the GNWT ENR Inspector.

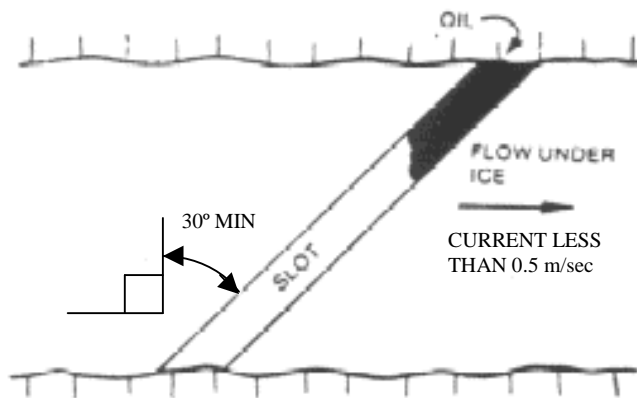
## Ice Slotting

For spills under the ice in rivers or streams when current speeds are slow (i.e., less than 0.5 m/s), ice slotting may be used. A trench is cut into the ice using a chain saw or trenching machine at an angle to the current, to deflect and concentrate product that passes through the area (Figure E-7, E-8). Because of thick ice encountered during the winter, cutting and removal of ice blocks is often difficult. Loaders or backhoes may be needed to lift blocks out of the slot, or to push blocks down. Product that accumulates in the ice slot may be pumped out, adsorbed, or burned in place.

**Figure E-7: Ice Slot**



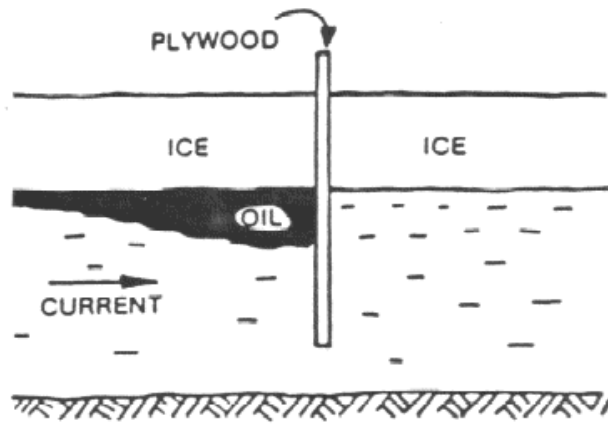
**Figure E-8: Angled Ice Slot**



## Vertical Barriers

If the spill goes under the ice in deep, slow moving water, vertical barriers such as plywood may be used to deflect product (Figure E-9). The ice must be strong enough to support the necessary personnel and equipment. Vertical barriers are put in place by cutting trenches in the ice at an angle to current flow, inserting the plywood barriers, and allowing them to freeze in place. The location of the spilled product may be monitored by drilling observation holes with an ice-auger.

**Figure E-9: Vertical Barriers**



### **Containment of Spills on Snow**

Snow is a natural sorbent, thus as with spills on soil, spilled fuel can be more easily recovered. Generally, small spills on snow can be easily cleaned up by raking and shovelling the contaminated snow into plastic bags or empty barrels, and storing these at an approved location.

### **Dykes**

Dykes can be used to contain fuel spills on snow. By compacting snow down slope from the spill, and mounding it to form a dyke, a barrier or berm is created thus helping to contain the spill. If the quantity of the spill is fairly large, a plastic tarp can be placed over the dyke such that the spill pools at the base of the dyke. The collected fuel/snow mixture can then be shovelled into barrels or bags, or collected with sorbent materials.

## **APPENDIX E**

### **SPILL KITS**

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## 6.2 SPILL KITS AND EQUIPMENT

NTPC employs two types of sorbent for spill response.

- **Universal Sorbents:** These sorbents pick up most liquids including fuel, oil, glycol, and water. They are used for general spill cleanup on dry land and will sink if placed on water, as they adsorb the water (hydrophilic). For this reason universal sorbents are not to be used on hydrocarbon spills into water.
- **Oil Only Sorbents:** These sorbents only pick up hydrocarbons, such as fuel or lube oil. These sorbents float, as they do not pick up water (hydrophobic), and are to be used for any hydrocarbon spill into water.

Higher quality sorbents will wick up, contain, and retain spilled product much faster and more effectively than low quality sorbent, due to a finer weave of material. Low quality sorbent pads are used around the Facility to clean up drips while higher quality sorbents, found in the spill kits, are used for larger spills.

All plants are equipped with universal sorbent pads for day to day use and the cleanup of spills. For any large or significant spills, spill kits are available for containment and cleanup. Spill kits can be stored both indoors and outdoors and are generally contained in one of the following (see Figure F-1):

- **Overpack Drum:** A yellow plastic drum designed to contain a leaking drum or used/unused spill material.
- **Steel Salvage Drum:** A 205 L steel drum with removable top used to contain used/unused spill material, impacted soil or snow, etc.
- **Spill Kit Locker:** A plastic bin used for spill kit material storage.

**Figure F-1: Typical Spill Kits**



Spill kits generally contain the following spill response materials:

**Sorbent Booms:** When a spill occurs into water, floating booms are placed around the spill perimeter to provide containment. Typically a 5 or 8 inch diameter plastic net tube filled with sorbent material, booms prevent the spill from spreading and/or moving downstream to contaminate other areas (see Figure F-2).

**Figure F-2: Sorbent Booms**



Booms can be clipped together for extra length. The ends should be clipped together so that they overlap, leaving no space at the joint. This ensures that no spilled product leaks out past the boom, and the boom effectively contains and adsorbs the spilled product (see Figure F-3).

- **Sorbent Socks:** Socks are identical to booms in construction; however, they do not clip together. They are generally used for small scale, localized spills.
- **Sorbent Pads:** Individual pads used on drips or leaks.

- **Sorbent Rolls:** A continuous roll of sorbent pads.
- **Printed Disposal Bags:** Soiled absorbent material is put into printed disposal bags which are then tied off for disposal.
- **Instruction Book:** The spill kit instruction book provides information regarding spill kit equipment.
- **Personal Protective Equipment:** Used to augment Facility equipment and supplies. Includes rubber gloves, safety goggles, and protective coveralls.

**Figure F-3: Boom Deployment**





## **APPENDIX F**

### **ACRONYMS**

## ACRONYMS

AST	Aboveground Storage Tank
CE	Chief Engineer
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CIO	Chief Information Officer
CPR	Cardiopulmonary Resuscitation
DFO	Department of Fisheries and Oceans
DNAPL	Dense Non-Aqueous Phase Liquid
EC	Environment Canada
EMO	Emergency Measures Organization
ENR	GNWT Dept. of Environment and Natural Resources
ERT	Emergency Response Team
GNWT	Government of the Northwest Territories
HDPE	High Density Polyethylene
INAC	Indian and Northern Affairs Canada
IT	Information Technology
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheets
NAPL	Non-aqueous Phase Liquid
NTCL	Northern Transportation Company Ltd.
NTPC	Northwest Territories Power Corporation
NWT	Northwest Territories
PCB	Polychlorinated Biphenyls
PHC	Petroleum Hydrocarbons
PPD	GNWT Petroleum Products Division
PPE	Personal Protective Equipment
RCMP	Royal Canadian Mounted Police
SCP	Spill Contingency Plan
UST	Underground Storage Tank
WHMIS	Workplace Hazardous Materials Information System

## **APPENDIX G**

### **BIORECLAIM MSDS**

## Material Safety Data Sheet - SUMP-SAFE BIO-RECLAIM

### Product Identification

EDP Number: 71701, 71705

Product Name: SUMP SAFE BIO-RECLAIM

TDG Hazard: NONE

TDG Ship Name: NOI LIQUID

### Physical Data

Boil Point	Freeze Point	Gravity	Vapor Pressure	Vapor Density	Evap Rate	% Volatile	Solubility
N/A	N/A	N/A	N/A	N/A	N/A	N/A	100%

Odor and Appearance: BLUE & ODORLESS

### Ingredients

Material Name	Percentage	TLV	Hazard	CAS Number
NO HAZARDOUS COMPONENTS	N/A	N/A	N/A	PROPRIETARY

### Fire and Explosion Hazard Data

Flash Point	LEL	UEL
N/A	N/A	N/A

Extinguishing Media: NONE

Unusual Fire & Explosion Hazards: NONE

### Health Hazard Data

Acute Effects: SEE BELOW

Swallowing: MAY CAUSE NAUSEA, DIARRHEA OR OTHER GASTROINTESTINAL EFFECTS

Inhalation: N/A

Skin Contact: MAY CAUSE IRRITATION OR REDNESS

Eye Contact: MAY CAUSE IRRITATION OR REDNESS, TEARING OR BLURRED VISION

Chronic Effects: N/A

Other Hazards: N/A

### Emergency First Aid Procedures

Swallowing: GIVE LARGE AMOUNTS OF WATER, DO NOT INDUCE VOMITING

Inhalation: N/A

Skin Contact: RINSE WITH WATER

Eye Contact: FLUSH WITH LARGER AMOUNTS OF WATER FOR MINIMUM OF 10 MINUTES, IF IRRITATION PERSISTS, CONTACT PHYSICIAN IMMEDIATELY

Primary: SKIN/EYE CONTACT

Note to Physician: PH = 7.0

**Emergency Response Information: CANUTEC (Canada) 613-996-6666**

## **Reactivity Data**

**Stability:** STABLE

**Conditions to Avoid:** N/A

**Materials to Avoid:** N/A

**Hazardous Decom Prod:** N/A

**Hazardous Polymerization:** WILL NOT OCCUR

**Additional Cond to Avoid:** N/A

## **Spill or Leak Procedures**

**Steps if spilled:** CONTAIN SPILL, DIKE WITH ABSORBENT MATERIAL, SUCH AS EARTH OR SAND. SALVAGE VESSEL. SWEEP UP REMAINING ABSORBENT. DO NOT FLUSH AREA WITH WATER. (SEE SECTION IX).

**Waste Disposal Method:** DISPOSE OF IN ACCORDANCE WITH LOCAL, PROVINCIAL AND FEDERAL REGULATIONS.

## **Special Protection Information**

**Respiratory Protection:** NONE

**Ventilation:** LOCAL EXHAUST

**Impervious Gloves:** RECOMMEND LATEX GLOVES IF USAGE IN FOR LONG PERIODS AT A TIME

**Other:** PPE SAFETY GLASSES OPTIONAL

## **Special Precautions**

**Storage & Handling Precautions:** NONE

**Other Precautions:** N/A

## **HMIS Ratings**

Health	1
Flammability	0
Reactivity	0
Personal Protective Equipment	D

**Last Updated:** Jan. 2013

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