NUNA
M & T SERVICES LTD.

Environmental Procedures Manual
Tehek Road Project 2006-2007

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ENVIRONMENTAL POLICY

Nuna Logistics Limited is committed to achieving and maintaining a high standard of environmental stewardship in our operations while conducting business as a resource development and industrial company**.**

Nuna Logistics Limited will seek continuous improvement, in all matters that affect the environment, by engaging employee, community, government and industry.

Nuna Logistics Limited will specifically:

- Communicate openly with all clients, government, community leaders and employees regarding environmental issues.
- Comply with all applicable regulations, laws and industry standards. Where regulations do not provide adequate environmental protection Nuna Logistics Limited will apply standards that will minimize environmental impact.
- Implement a risk management system that identifies, controls and monitors potential environmental risks arising from Nuna Logistics Limited operations.
- Ensure that employees are aware of this policy, and their environmental responsibilities.
- Provide site-specific training for all employees and contractors to prevent damage to the environment before it happens by reporting problems, concerns to their supervisors.
- Ensure that suppliers of goods and services comply with this policy and are aware of their responsibilities in relation to Nuna Logistics Limited.
- Implement sustainable business practices such as efficient use of materials and energy and minimal use and production of hazardous substances.

John Zigarlick
Chairman

Mervyn Hempenstall
President &
Chief Executive Officer

Robert Gilroy
Vice President -
Operations

Pat McHale
Operations Manager

NOTE: Original controlled document signed and available in Nuna IHSEMS

Introduction

Nuna Projects

The Nuna group of companies are involved in resource and industrial development primarily in the northern mining industry.

The company is also involved in the construction and maintenance of the winter ice roads servicing the northern diamond and gold mines in addition to exploration projects.

Environmental considerations are very important to all stakeholders.

Procedure

The scope and the purpose for the spill prevention and response plan outlines the procedures for the appropriate response, notification, duties and responsibilities of employees and key personnel in the event of a spill of hazardous materials at project locations or on the winter ice road.

A suitable response to a hazardous spill is necessary to minimize the potential adverse health effects on humans, the environmental damage and cleanup costs that may result if proper procedures are not established and followed.

The spill response plan will list site-specific contact locations and telephone numbers for response personnel, contractors, governmental agencies, neighboring operations and private response organizations.

Objectives

Identify the potential health and environmental hazards that may exist in the event of a spill.

The procedures for the stoppage, containment and cleanup of spilled hazardous materials are in place.

All spills of hazardous materials are reported to management, supervisors and environmental agencies.

Identify various internal management positions and assign specific responsibilities to site personnel.

Provide an inventory of equipment and materials that are available to clean up a hazardous spill.

Spill response teams are trained and equipped for the tasks at hand.

Provide an updated list of hazardous materials that will be in use.

Provide training and make available Material Safety Data Sheets to all site personnel.

Communications
All vehicles traveling to and from the sites serviced are equipped with two-way communications (radios). When an incident occurs personnel can respond to the incident site with the appropriate personnel and support equipment.

Training.
All Nuna employees participate in a site-specific orientation program that includes WHMIS, Transportation of Dangerous Goods and spill prevention information and safe procedures for the handling of spills.

Employee Safety.
When responding to any spill, the safety of all employees are paramount, therefore the following steps are part of the procedures:

1. Identify the spilled material and follow the appropriate procedure.

2. Monitor the area for Explosive gases and Oxygen (O_2) to ensure a safe atmosphere.

3. Determine the potential for fire, and eliminate any hazards.

4. Ensure that all personnel are equipped with the appropriate Personal Protective Equipment.

Chemical Spills
Consult the Material Safety Data Sheets (MSDS) for the spilled material to determine the health effects and the requirement for PPE.
Refer to the Nuna Spill Reporting Procedures.

Medical Facilities
A medical facility is established at every Nuna project as specified in the Mine Health and Safety Act and Regulations.

Medivac procedures may vary from one jurisdiction to the next. The site manager must ensure that the Medivac procedure is in place prior to the start of the project.

Containment.
All bulk fuel storage areas at Nuna facilities will include double walled storage tanks or have lined secondary containment dikes surrounding them. These dikes are constructed of either concrete or compacted earth with liners and have at least 110% containment capacity of the largest tank contained within them.

Inspections.
A weekly inspection program is established at each site to inspect all bulk storage tanks and containment dikes.

Responsibilities.
The site manager has the responsibility for the initiation of the spill response in the event of a hazardous material spill, and is responsible to manage and direct the containment and cleanup activities.

Note: The site manager has the authority to purchase or procure any labor, contract services, materials, and/or support services required to meet the situation.

Weather Conditions.
Weather conditions have a significant impact when determining which environmental controls are required when developing an emergency spill response strategy.

Sub-zero temperatures and a constantly blowing wind make it difficult for employees to control and cleanup a hazardous spill especially on the ice surface.

WHMIS.
All employees are trained in the Workplace Hazardous Material Information System (WHMIS) and understand the hazards associated with the products used in the workplace or transported over the winter ice road.

Hazard Reactions.
There are several chemicals, which require special safety precautions are in handling and in response to a spill cleanup, due to their highly reactive and corrosive nature.

These chemicals include hydrofluoric and nitric acid and caustic soda.

These compounds in contact with water result in violent exothermic reactions, which may generate sufficient heat to ignite combustible materials.

Hydrofluoric acid reacts with most metals to produce hydrogen gas, which can form an explosive mixture with air.

These chemicals must be stored in cool, dry and well-ventilated areas, away from incompatible substances such as combustible, organic or readily oxidized materials.

Solubility.
Antifreeze, nitric and acetic acids are completely soluble in water. Sodium nitrite, ammonium nitrate and Percol flocculants are solids that are also water-soluble.

These materials are packaged, stored and handled so that releases into water are prevented.

The difficulty of cleaning up releases of these substances is well recognized.

Toxicity.
The hazardous nature of certain materials handled by personnel, are addressed in this plan. Information has been compiled as MSDS sheets and as product guides and action guides in the main body of this emergency spill response plan. Some chemicals can produce toxic materials in fires e.g., sodium nitrite, sodium thiocyanate, as well as hydrocarbons.

Toxicity concerns relate to both personnel and environmental impacts.

Training focuses on these aspects in terms of immediate danger to personnel as well as in terms of long-term and short-term impacts to the environment.

Fuel Spills.
The possibility of a fuel spill on Nuna projects will vary depending on a number of factors: human error, mechanical failure, road conditions, weather conditions, etc.

Risk Assessment & Preventative Measures

POTENTIAL PROBLEM	IMPACT	PROBABILITY	PREVENTATIVE MEASURES
Diesel or Oil Major leak from storage tanks	High	Low	Daily inspections and monitoring will take place during the winter re-supply by the winter road personnel. All tanks to have 110% capacity berms and will be inspected semi-annually. Remote emergency shutoffs. Maintain additional fuel storage for emergencies.
A spill from a valve left open or a break in a pipe at the transfer	High	Moderate	Ensure all major valves are locked when not in use. Fuel transfer hoses will have a double locking mechanism.

facilities or at a pumping station			Concrete catchments basin at each station. Installation of bollards and location. Markers around all above ground fuel transfer pipelines.
A hydraulic hose breaking on a piece of heavy equipment	Low	High	Mechanics check all hoses and a nozzle for wear and leaks. Operators are required to complete daily equipment checklists for the mechanics; mechanics to service immediately or schedule downtime.
Pump Failure	Low	Low	Pumps are to be inspected weekly and -serviced monthly.
Power Outages	Low	Low	In case of long-term power outages, an emergency power supply is available to ensure that sewage is treated.
Broken Or Blockage Of Pipeline	Low	Moderate	Pipeline is to be inspected weekly.

Risk Assessment & Preventative Measures

POTENTIAL PROBLEM	IMPACT	PROBABILITY	PREVENTATIVE MEASURES
Chemical Spills	Low –	Low	Chemicals will be stored in

	High		drums, bottles, canisters or packages. Chemicals will be stored in such a way as to protect from the weather Training in the handling of chemicals will take place to ensure safe handling. Regular inspections will take place of stored chemicals. Inventory controls in place. All chemicals used in explosive formulations are stored in designated areas.
Flammables (paints, thinners, acetones, etc.)			Stored in fireproof storage facilities. All containers to be labeled.
Ammonium Nitrate			Stored in designated site areas.
Glycol Antifreeze			Used glycol storage tank bermed. Weekly inspection of mixing and used storage tank.
Flocculants			Stored in designated areas. .
Gases (oxygen, acetylene, propane, argon, carbon dioxide)			Stored in designated areas until required.

Product Categories.

The materials in this Emergency Spill Response are generally divided into five categories:

Flammable Immiscible Liquids
Soluble Solids/Oxidizers
Flammable Compressed Gases
Soluble Liquids
Toxic Solids

Flammable Immiscible Liquids
These substances are all hydrocarbon-based and will ignite under certain conditions.

Gasoline and aviation fuels pose the greatest fire and safety hazard and are not recoverable when spilled on water.

Action Plan Steps
Confirm that a spill has occurred. It may not be obvious if a spill has occurred - look for:

pooled liquid.
damage to equipment/tanks.
smell of fuel or chemicals and
leaks from hatches, valves or other fixtures

Assess The Situation. Before initiating response actions, take the time to determine the nature of a spill and to collect some or all of following facts:

potential risk of fire, explosion and environmental damage.
extent of injuries to co-workers or the public.
source and approximate size of the spill.
possible methods to stop the flow of product; and
proximity to water.

Take Action.

Eliminate ignition source(s) if safe to do so.
Shut off spill source if safe to do so.
Attend to any injured persons.
Restrict personnel to the spill site using road barriers or marker tape.
Warn others in the area of the spill.
Use an explosion meter to monitor atmospheric gas concentrations.
Report spill to Nuna management.
Transport spill response kit to the spill site.
Control spreading and minimize impacts.

Spill Containment and Recovery.
Special care should be taken to ensure that spilled material does not reach water bodies where recovery is more difficult. Ice augers can be effective in terms of locating and exposing oil for burning or pumping off.

Waste Disposal.
All combustibles are incinerated on a daily basis. This includes food scraps, office garbage etc.

Non-hazardous solid “inert” waste generated (i.e. Scrap metal, pipe, wood, plastics, liners, Styrofoam) will be disposed of at approved landfills.

All hazardous wastes and waste items that cannot be incinerated are securely packaged, flown out on aircraft backhauls, and disposed of in designated locations off-site.

Prior to disposal, the hazardous waste will be properly packaged, labeled, and stored and manifested in a Transportation of Dangerous Goods (TDG) approved shipping container.

The container will have the appropriate hazardous waste labels.

All Federal, Provincial and Territorial regulations will be adhered to.

Used Container Disposal
To ensure the proper disposal of used containers that have contacted, collected or contained a hazardous or regulated substance (e.g., paint cans, oil cans acid containers aerosol cans).

Containers having contacted, collected or contained an acute hazardous material, corrosive or reactive substance must be triple washed with water prior to disposal.

Metal containers can be disposed as scrape metal in the approved landfill after being triple washed and crushed.

Any free liquid in the container must be disposed of properly, and the residual material allowed to dry or solidify.

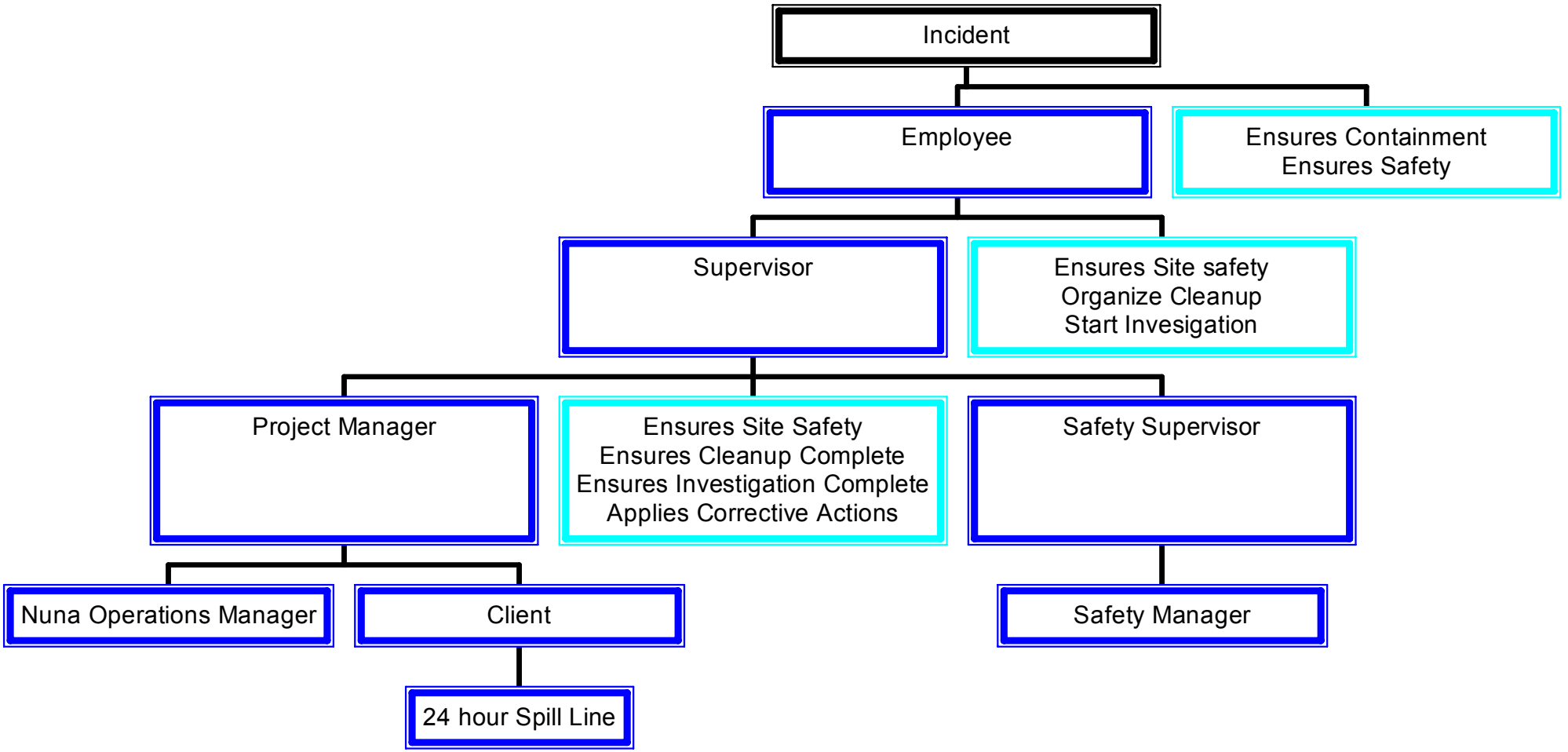
Used Drum Disposal
The majority of used fuel drums for Jet-B fuel and unleaded gasoline (205 litre or 45 gallon drums) can be returned to the supplier for refund. However, during operations drums will be used for storage of other “used” products (i.e. used glycol, used oil, cleaning of spills etc). These drums will have to be properly labeled and stored prior to acceptable removal and disposal usually off-site at an approved facility.

Used Tire Recycle and Disposal
Used tires generated must be recycled or disposed of on-site if recycling is not possible. In general, all tires smaller than 24.5 inches (wheel rim size) must be recycled with an approved tire recycler.

No commercial recycling options exist for tires larger than 24.5 inches in diameter, so these tires may be disposed of in the approved landfill and or designated area within the country rock pile (if mining has commenced). Larger tires can also be cut in half and used as barriers alongside certain roads, and can be used as platforms to store materials above the snow. If a viable recycling

option is identified in the future for larger diameter tires, these tires should also be recycled.

INCIDENT NOTIFICATION & RESPONSIBILITIES CHART



NOTE: EMERGENCY CONTACTS LISTED IN APPENDICES (PAGE 49)

Response Organization

In some cases additional company and outside resources may need to be brought in to support the spill cleanup.

For a major incident, the Project Manager would mobilize company, contractor and outside expertise for the response

General Responsibilities

The following provide a general guide to the Spill Response Organization. In some cases certain company personnel may fill dual roles, depending upon the circumstances of the incident.

In most incidents the Operations Supervisor working with the local Spill Response Team will handle the initial response, containment and cleanup. In larger incidents Nuna Management will play a more active role. In all cases, Nuna Management will be made immediately aware of a spill and will be responsible to notify the appropriate Spill Line.

Other contractors and specialists may be brought in to assist in response to a major incident.

Individual Discovering Incident

- Assess the initial severity of the spill and safety concerns.
- Identify the source of the spill
- Report all spills to Nuna Supervisor.
- Determine the size of the spill and stop or contain it, if possible.

First Responders

- Assess and verify the initial severity of the spill and safety concerns.
- Gather, collect and confirm information on the spill-source, type, size, cause, etc.
- Notify the Nuna Supervisor.
- Conduct the initial containment and cleanup operations.

Spill Response Team

- Conduct the cleanup of spills under the direction of the Supervisor.
- Deploy booms, absorbent and other equipment and materials as required.
- Take appropriate response measures.
- Continue the cleanup as directed by the Supervisor or until relieved.

Supervisor

- Assist in initial and ongoing response efforts.
- Supervise the spill response team.
- With work crew, take initial action to seal off the source and contain spill.
- Decide with Nuna Management if mobilization of additional equipment is required.
- Assess whether burning is a viable cleanup measure. Consult with Regulatory Agency.
- Ensure co-ordination of equipment and manpower as needed (company and contractors)
- Ensure expeditious response and clean up of spill site and impacted area.

Additional Resources – Support Team

- Provides assistance to Supervisor as required.
- Responsible for mobilizing additional local company support staff, security, and other contractors as required.

Nuna Management

- Records the time of the report, source of information and details on location, size, type of spill and any other information available on the spill report form.
- Ensures that the spill is reported to the NWT 24-Hour Spill Report Line.

◙ Oversees the cleanup operations until it is satisfactorily completed.

◙ Together with the Supervisor decides if additional equipment is required to contain and cleanup spills.

◙ Maintain contact with Supervisor to ensure final inspection and sign-off on spill site.

◙ Notifies internal company departments.

◙ Initiates Mutual Aid Agreements if so required.

◙ Oversees completion and distribution of Spill Report.

◙ Ensures investigation identifies measures to prevent similar spills.

◙ Provides cleanup advice to the Supervisor.

◙ Assists with preparation of press releases.

◙ Provides advice on storage and disposal options.

◙ Ensures that there are follow up reports prepared on the spill event, clean up and environmental impacts.

◙ Ensures that Post-Spill reports are completed and takes action, as necessary, to prevent a recurrence.

◙ Liaise with government agencies (as required)

Response Resources

A wide variety of spill control/recovery equipment and material exists for dealing with spills of petroleum products and chemical reagents. Heavy construction equipment is also available for use on demand.

Response Equipment.

All equipment is stored in such a manner as to be readily available on short notice.

The Supervisor would immediately respond to a reported spill site by notifying his on duty equipment operators to move equipment and material necessary to provide control and clean-up measures to the reported spill site.

Emergency spill containment and recovery materials and supplies are available for immediate mobilization at any time.

Spill Response Actions

Diesel

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE: Clear, Yellow or Red FLASH POINT: 40°C (Minimum) ODOR: Petroleum POUR POINT: -50° to -6°C SOLUBILITY: Insoluble VISCOSITY: Not Viscous VAPOR DENSITY: Will Sink to Ground Levels SPECIFIC GRAVITY: Floats on Water (0.8 – 0.9)	
SAFETY MEASURES	
WARNING	Vapours are heavier than air and form easily at high temperatures. Empty containers can contain explosive vapours. Toxic gases form upon combustion. Eye contact causes irritation. Material can accumulate static charges. Inhalation of vapours can cause irritation of the respiratory tract, headache, vomiting, and unconsciousness.
PERSONAL PROTECTION	Always wear impervious, chemica1-resistant clothing, gloves, footwear, and goggles; ni-trile and PVC are suitable materials (DO NOT USE NATURAL RUBBER or NEOPRENE.) Wear full-face organic vapor cartridge respirator where oxygen is adequate, otherwise wear positive pressure SCBA.
PRECAUTIONS	Monitor for explosive atmosphere. Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, and peroxides. Eliminate ignition sources. Restrict access and work upwind of spill.

RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	Wear SCBA in confined areas. Shut off fuel supply. Extinguish fire with CO_2, dry chemical, and alcohol foam or water fog. Use water to cool containers, exposed to fire. Eliminate the ignition source – Stop the source if safe to do so .
ON LAND	Prevent additional discharge of fuel. Do not flush into ditch/drainage systems. Block entry into waterways. Contain spill by diking with earth, snow or other barrier. Remove minor spills with absorbent and/or peat moss. Remove large spills with pumps or vacuum equipment. Spill can also be mechanically removed if oil is too viscous to be pumped.
ON WATER	Use booms to contain and concentrate spill. Remove spill using absorbent, skimmer or vacuum truck. Protection booming can be considered for water intakes.
STORAGE & TRANSFER	Store closed, labeled containers in cool, and ventilated areas away from incompatible materials.
DISPOSAL	Segregate waste types. Place contaminated materials into marked containers. Consult with environmental authorities during fina1 disposal.
FIRST AID	
EYES	Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses, if exposed to vapours or liquid. Get prompt medical attention.
SKIN	Remove and launder contaminated clothing. Wash skin thoroughly with soap and water. Get medical attention. Discard saturated leather articles.
INHALATION	Move victim to fresh air. Perform CPR if victim not breathing. Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.

Hydraulic Oil

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE: Straw-Yellow Liquid FLASH POINT: 215°C (Minimum) ODOUR: Petroleum POUR POINT: -25°C SOLUBILITY: Generally Insoluble VISCOSITY: Medium (265 x ST, 15°C) VAPOUR DENSITY: Few Vapours Emitted SPECIFIC GRAVITY: Floats on Water (0.9)	
SAFETY MEASURES	
WARNING	Vapours are heavier than air but are unlikely to form. Toxic gas can form in fire and at high temperatures. CO, CO_2, and dense smoke are produced upon combustion. Oil mist or vapour from hot oil can cause irritation of the eyes, nose, throat and lungs.
PERSONAL PROTECTION	Always wear impervious, chemical -resistant clothing, gloves, footwear, and goggles; PVC, Nitrile, and Viton are suitable materials (DO NOT USE NATURAL RUBBER). Use of organic vapour cartridge respirator is highly unlikely.
PRECAUTIONS	Avoid excessive heat, which can cause formation of vapours. Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, and peroxides. Eliminate ignition sources. Restrict access and work upwind of spill.
RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	Wear SCBA in confined areas. Shut off fuel supply. Extinguish fire with CO_2, dry chemical, alcohol, foam or water fog. NOTE: water or foam may cause frothing. Use water to cool containers, exposed to fire.
ON LAND	Prevent additional discharge of oil. Do not flush into ditch/drainage systems. Block entry into waterways. Contain spill by diking with earth, snow or other barrier. Remove minor spills with absorbent and/or peat moss.

	Remove large spills with pumps or vacuum equipment. Spill can also be mechanically removed if oil is too viscous to be pumped.
ON WATER	Use booms to contain and concentrate spill. Remove spill using absorbent, skimmer or vacuum truck. Protection booming can be considered for water intakes.
STORAGE & TRANSFER	Store closed, labeled containers in cool, and ventilated areas away from incompatible materials.
DISPOSAL	Segregate waste types. Place contaminated materials into marked containers. Consult with environmental authorities during fina1 disposal.
FIRST AID	
EYES	Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses, if exposed to vapours or liquid. Get prompt medical attention.
SKIN	Remove and launder contaminated clothing. Wash skin thoroughly with soap and water. Get medical attention. Discard saturated leather articles.
INHALATION	Move victim to fresh air. Perform CPR if victim not breathing. Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.
INGESTION	DO NOT INDUCE VOMITING; if victim is conscious; give milk or water to drink. If vomiting begins, keep victim's head below hips to prevent aspiration. Get prompt medical attention.

SPILL RESPONSE ACTIONS

Lube Oil

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

APPEARANCE: Amber Liquid FLASH POINT: 190° to 2220°C ODOUR: Petroleum POUR POINT: -35° to -40°C SOLUBILITY: Generally Insoluble VISCOSITY: Medium (255 xST, 15°C) VAPOUR DENSITY: Few Vapours Emitted SPECIFIC GRAVITY: Floats on Water (0.9)	
SAFETY MEASURES	
WARNING	Vapours are heavier than air but are unlikely to form. Toxic gas can form in fire and at high temperatures. CO, CO_2, and dense smoke are produced upon combustion. Oil mist or vapour from hot oil can cause irritation of the eyes, nose, throat and lungs.
PERSONAL PROTECTION	Always wear impervious, chemical-resistant clothing, gloves, footwear, and goggles; PVC, Nitrile, and Viton are suitable materials (DO NOT USE NATURAL RUBBER). Use of organic vapour cartridge respirator is highly unlikely.
PRECAUTIONS	Avoid excessive heat, which can cause formation of vapours. Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, and peroxides. Eliminate ignition sources. Restrict access and work upwind of spill.
RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	Wear SCBA and eye protection when responding to lube oil fires. Shut off fuel supply. Extinguish fire with CO_2, dry chemical, alcohol foam or water fog. NOTE: water or foam may cause frothing. Use water to cool containers, exposed to fire.

Lube Oil

CONSIDER ACTION ONLY IF SAFETY PERMITS!

Eliminate Ignition Sources - Stop Source if Safe to Do So

ON LAND	Prevent additional discharge of oil. Do not flush into ditch/drainage systems. Block entry into waterways. Contain spill by diking with earth, snow or other barrier. Remove minor spills with absorbent and/or peat moss. Remove large spills with pumps or vacuum equipment. Spill can also be mechanically removed if oil is too viscous to be pumped.
ON WATER	Use booms to contain and concentrate spill. Remove spill using absorbent, skimmer or vacuum truck. Protection booming can be considered for water intakes.
STORAGE & TRANSFER	Store closed, labeled containers in cool, and ventilated areas away from incompatible materials.
DISPOSAL	Segregate waste types. Place contaminated materials into marked containers. Consult with environmental authorities during fina1 disposal.
FIRST AID	
EYES	Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses, if exposed to vapours or liquid. Get prompt medical attention.
SKIN	Remove and launder contaminated clothing. Wash skin thoroughly with soap and water. Get medical attention. Discard saturated leather articles.
INHALATION	Move victim to fresh air. Perform CPR if victim not breathing. Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.
INGESTION	DO NOT INDUCE VOMITING; if victim is conscious; give milk or water to drink. If vomiting begins, keep victim's head below hips to prevent aspiration. Get prompt medical attention.

Waste Oil

CONSIDER ACTION ONLY IF SAFETY PERMITS!

Eliminate Ignition Sources - Stop Source if Safe to Do So

ON LAND	Prevent additional discharge of oil. Do not flush into ditch/drainage systems. Block entry into waterways. Contain spill by diking with earth, snow or other barrier. Remove minor spills with absorbent pads and/or peat moss. Remove large spills with pumps or vacuum equipment. Spill can also be mechanically removed if oil is too viscous to be pumped.
ON WATER	Use booms to contain and concentrate spill. Remove spill using absorbent, skimmer or vacuum truck. Protection booming can be considered for water intakes.
STORAGE & TRANSFER	Store closed, labeled containers in cool, ventilated areas away from incompatible materials.
DISPOSAL	Segregate waste types. Place contaminated materials into marked containers. Consult with environmental authorities during fina1 disposal.
FIRST AID	
EYES	Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses, if exposed to vapours or liquid. Get prompt medical attention.
SKIN	Remove and launder contaminated clothing. Wash skin thoroughly with soap and water. Get medical attention. Discard saturated leather articles.
INHALATION	Move victim to fresh air. Perform CPR if victim not breathing. Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.
INGESTION	DO NOT INDUCE VOMITING; if victim is conscious; give milk or water to drink. If vomiting begins, keep victim's head below hips to prevent aspiration. Get prompt medical attention.

Gasoline

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE: Colorless Liquid (Can Be Dyed) FLASH POINT: -50°C ODOUR: Gasoline/Petroleum POUR POINT: -60°C SOLUBILITY: Insoluble VISCOSITY: Not Viscous (<1 cSt) VAPOUR DENSITY: Will Sink to Ground Level SPECIFIC GRAVITY: Floats on Water (0.7 - 0.8)	
SAFETY MEASURES	
WARNING	Vapours form instantaneously, and are heavier than air. Empty containers can contain explosive vapours. Vapours can travel to distant sources of ignition and flash back. Eye contact causes irritation. Material can accumulate static charges. Inhalation of vapours can cause irritation of the respiratory tract, headache, vomiting, and unconsciousness.
PERSONAL PROTECTION	Always wear impervious, chemical-resistant clothing, gloves, footwear, and goggles; PVC, Nitrile, and Viton and PVC are suitable materials (DO NOT USE NATURAL RUBBER or NEOPRENE). Wear full-face organic vapour cartridge respirator where oxygen is adequate; otherwise wear positive pressure SCBA, if circumstances warrant.
PRECAUTIONS	Monitor for explosive atmosphere. Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, peroxides. Eliminate ignition sources. Restrict access and work upwind of spill.
RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	Wear SCBA in confined areas. Shut off fuel supply. Extinguish fire with CO_2, dry chemical, alcohol foam or water fog. Use water to cool containers, exposed to fire.

SPILL RESPONSE ACTIONS

Gasoline

CONSIDER ACTION ONLY IF SAFETY PERMITS!

Eliminate Ignition Sources - Stop Source if Safe to Do So

ON LAND	ELIMINATE IGNITION SOURCES. Do not flush into ditch/drainage systems. Block entry into waterways. Contain spill by diking with earth, snow or other barrier. Remove minor spills with peat moss and/or absorbent pads. Cover pools with foam to prevent vapour evolution if gasoline presents a fire hazard; otherwise allow vapours to dissipate.
ON WATER	ELIMINATE IGNITION SOURCES. DO NOT ATTEMPT TO CONTAIN OR REMOVE SPILLS. Protection booming can be considered for water intakes.
STORAGE & TRANSFER	Store closed, labeled container in cool, ventilated areas away from incompatible materials. Electrically ground containers and vehicles during transfer.
DISPOSAL	Place contaminated materials into segregated marked containers. Consult with environmental authorities during final disposal.
FIRST AID	
EYES	Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses, if exposed to vapours or liquid. Get prompt medical attention.
SKIN	Remove and launder contaminated clothing. Wash skin thoroughly with soap and water. Get medical attention. Discard saturated leather articles.
INHALATION	Move victim to fresh air. Perform CPR if victim not breathing. Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.
INGESTION	DO NOT INDUCE VOMITING; if victim is conscious; give milk or water to drink. If vomiting begins, keep victim's head below hips to prevent aspiration. Get prompt medical attention.

Jet-B (JP-4)

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE: White or Pale Yellow Liquid ODOUR: Gasoline/Petroleum SOLUBILITY: Negligible VAPOUR DENSITY: Will Sink to Ground Level	FLASH POINT: -20°C to -25°C POUR POINT: -50°C VISCOSITY: Not Viscous (<7 cSt) SPECIFIC GRAVITY: Floats on Water (0.75 - 0.8)
SAFETY MEASURES	
WARNING	Vapours instantaneously form, and are heavier than air. Low-lying areas can trap explosive vapours. Vapours can travel to distant sources of ignition and flash back. Eye contact causes irritation. Material can accumulate static charges. Inhalation of vapours can cause irritation of the respiratory tract, headache, vomiting, and unconsciousness.
PERSONAL PROTECTION	Always wear impervious, chemical-resistant clothing, gloves, footwear, and goggles; PVC, Nitrile, and Viton and PVC are suitable materials (DO NOT USE NATURAL RUBBER or NEOPRENE). Wear full-face organic vapour cartridge respirator where oxygen is adequate; otherwise wear positive pressure SCBA, if circumstances warrant.
PRECAUTIONS	Monitor for explosive atmosphere. Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, peroxides. Eliminate ignition sources. Restrict access and work upwind of spill.
RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	Wear SCBA in confined areas. Shut off fuel supply. Extinguish fire with CO_2, dry chemical, alcohol foam or water fog. Use water to cool containers, exposed to fire.

SPILL RESPONSE ACTIONS
Jet-B (JP-4)
CONSIDER ACTION ONLY IF SAFETY PERMITS!

Eliminate Ignition Sources - Stop Source if Safe to Do So

ON LAND	ELIMINATE IGNITION SOURCES. Do not flush into ditch/drainage systems. Block entry into waterways. Contain spill by diking with earth, snow or other barrier. Remove minor spills with peat moss and/or absorbent pads. Cover pools with foam to prevent vapour evolution if gasoline presents a fire hazard; otherwise allow vapours to dissipate.
ON WATER	ELIMINATE IGNITION SOURCES. DO NOT ATTEMPT TO CONTAIN OR REMOVE SPILLS. Protection booming can be considered for water intakes.
STORAGE & TRANSFER	Store closed, labeled containers in cool, ventilated areas away from incompatible materials. Electrically ground containers and vehicles during transfer.
DISPOSAL	Place contaminated materials into segregated marked containers. Consult with environmental authorities during final disposal.
FIRST AID	
EYES	Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses, if exposed to vapours or liquid. Get prompt medical attention.
SKIN	Remove and launder contaminated clothing. Wash skin thoroughly with soap and water. Get medical attention. Discard saturated leather articles.
INHALATION	Move victim to fresh air. Perform CPR if victim not breathing. Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.
INGESTION	DO NOT INDUCE VOMITING; if victim is conscious; give milk or water to drink. If vomiting begins, keep victim's head below hips to prevent aspiration. Get prompt medical attention.

Fuel Dye

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE: Dark Red Liquid FLASH POINT: -28°C ODOUR: Aromatic Hydrocarbon POUR POINT: -45°C SOLUBILITY: Negligible VISCOSITY: Not Viscous VAPOUR DENSITY: Will Sink to Ground Level SPECIFIC GRAVITY: Floats on Water	
SAFETY MEASURES	
WARNING	Vapours instantaneously form, and are heavier than air. Low-lying areas can trap explosive vapours. Vapours can travel to distant sources of ignition and flash back. Eye contact causes irritation. Material contains xylene, benzene and ethyl benzene. Inhalation of vapours can cause nausea, headache and dizziness.
PERSONAL PROTECTION	Always wear impervious, chemical-resistant clothing, gloves, footwear, and goggles; PVC, Nitrile, and Viton are suitable materials (DO NOT USE NATURAL RUBBER or NEOPRENE OR PVC). Wear full-face organic vapour cartridge respirator where oxygen is adequate; otherwise wear positive pressure SCBA, if circumstances warrant.
PRECAUTIONS	Avoid breathing vapours or mist. Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, peroxides. Eliminate ignition sources. Restrict access and work upwind of spill.
RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	Wear SCBA in confined areas. Shut off fuel supply. Extinguish fire with CO_2, dry chemical, AFFF foam or water fog. Use water to cool containers, exposed to fire.

Propane

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE: Colorless Gas FLASH POINT: -104°C ODOUR: Natural Gas Odour POUR POINT: -190°C SOLUBILITY: Insoluble VISCOSITY: N/A VAPOUR DENSITY: Will Sink to Ground Level SPECIFIC GRAVITY: Liquid Floats on Water	
SAFETY MEASURES	
WARNING	Vapours form instantaneously, and are heavier than air. Vapours can travel to distant sources of ignition and flash back. Eye contact causes irritation. Material can accumulate static charges. Inhalation of vapours can cause irritation of the respiratory tract, headache, vomiting, and unconsciousness.
PERSONAL PROTECTION	Always wear impervious, chemical-resistant clothing, gloves, footwear, and goggles; Nitrile: and Viton are suitable protective materials (DO NOT USE NATURAL RUBBER, NEOPRENE, OR PVC). Avoid frostbite bum to skin and eyes from contact with propane. Wear full-face organic vapour cartridge respirator where oxygen is adequate, otherwise wear positive pressure SCBA.
PRECAUTIONS	Monitor for explosive atmosphere. Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, peroxides. Eliminate ignition sources. Restrict access and work upwind of spill.
RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	Wear SCBA in confined areas. Shut off fuel supply. Extinguish fire with CO_2, dry chemical, alcohol foam or water

	fog. Use water to cool containers, exposed to fire.

SPILL RESPONSE ACTIONS
Propane
CONSIDER ACTION ONLY IF SAFETY PERMITS!

Response to Gas Releases

ON LAND	ELIMINATE IGNITION SOURCES. DO NOT ATTEMPT TO CONTAIN OR REMOVE SPILLS.
ON WATER	ELIMINATE IGNITION SOURCES. DO NOT ATTEMPT TO CONTAIN OR REMOVE SPILLS.
STORAGE & TRANSFER	It is not possible to collect released material.
DISPOSAL	Consult with environmental authorities if the disposal of any contaminated materials is required.
FIRST AID	
EYES	Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses, if exposed to vapours or liquid. Get prompt medical attention.
SKIN	Remove and launder contaminated clothing. Wash skin thoroughly with soap and water. Get medical attention. Discard saturated leather articles.
INHALATION	Move victim to fresh air. Perform CPR if victim not breathing. Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.
INGESTION	DO NOT INDUCE VOMITING; if victim is conscious; give milk or water to drink. If vomiting begins, keep victim's head below hips to prevent aspiration. Get prompt medical attention.

Acetylene

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE: Colorless Gas FLASH POINT: -18°C ODOUR: Garlic-Like POUR POINT: -82°C SOLUBILITY: Slightly Soluble VISCOSITY: N/A VAPOUR DENSITY: Will Sink to Ground Level SPECIFIC GRAVITY: Liquid Floats on Water (0.06)	
SAFETY MEASURES	
WARNING	Vapours form instantaneously, and are heavier than air. Empty containers can contain explosive vapours. Vapours can travel to distant sources of ignition and flash back. Eye contact causes irritation. Material can accumulate static charges. Inhalation of vapours can cause irritation of the respiratory tract, headache, vomiting, and unconsciousness.
PERSONAL PROTECTION	Always wear impervious, chemical-resistant clothing, gloves, footwear, and goggles; use suitable protective materials (DO NOT USE NATURAL RUBBER, NEOPRENE, OR PVC). Wear full-face organic vapour cartridge respirator where oxygen is adequate, otherwise wear positive pressure SCBA.
PRECAUTIONS	Monitor for explosive atmosphere. Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, and peroxides. Eliminate ignition sources. Restrict access and work upwind of spill.
RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	Wear SCBA in confined areas. Shut off fuel supply. Extinguish fire with CO_2, dry chemical, alcohol, foam, or water fog. Use water to cool containers, exposed to fire.

Hydrofluoric Acid

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE: Colorless, Fuming Liquid FLASH POINT: None ODOUR: Pungent, Irritating POUR POINT: -36°C (48% Solution) SOLUBILITY: Infinitely VISCOSITY: Not Viscous VAPOUR DENSITY: 1.26 Sinks to Ground Level SPECIFIC GRAVITY: 1.19	
SAFETY MEASURES	
WARNING	Extremely hazardous liquid and vapour. Causes severe burns, which may not be immediately painful or visible. May be fatal if swallowed or inhaled. Reacts with certain metals generating explosive hydrogen gas. Addition of water releases heat resulting in boiling and splattering. Attacks glass and concrete.
PERSONAL PROTECTION	Always wear protective clothing, including boots or safety shoes with PVC or neoprene. Use chemical safety goggles and/or full-face shield.
PRECAUTIONS	Monitor for explosive atmosphere. Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, and peroxides. Eliminate ignition sources. Restrict access and work upwind of spill.
RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	Wear full protective clothing and NIOSH approved self-contained breathing apparatus with full-face piece. Eliminate all ignition sources. Use water spray or CO_2, foam on fires involving the acid. Use water spray to cool containers exposed to fire.

Hydrofluoric Acid

CONSIDER ACTION ONLY IF SAFETY PERMITS!

Response to Gas Releases

ON LAND	ELIMINATE IGNITION SOURCES. Block entry into waterways; do not flush into ditch/drain systems. Contain spill by diking with earth or other non-combustible absorbent material, preferably with vermiculite, which does not react with HF. Small spills can be neutralized by carefully covering with soda ash or lime. Remove small spills with vermiculite or earth absorbents and place in polyethylene containers.
ON WATER	FM sinks and readily mixes with water producing a vigorous exothermic reaction. Isolate/confine spill by damming or diversion. Water flushing can be tried to disperse acid if conditions warrant. Neutralization with lime or soda ash can also be tried.
STORAGE & TRANSFER	Store closed, labeled containers in cool, and ventilated areas away from incompatible materials. Avoid contact with glass, concrete, metals, other acids, oxidizers, reducers, alkalis, combustibles, organics and ceramics.
DISPOSAL	Place contaminated materials in segregated, marked polyethylene or PVC containers. Consult with environmental authorities during final disposal.
FIRST AID	
EYES	Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses, if exposed to vapours or liquid. Get prompt medical attention.
SKIN	Remove and destroy contaminated clothing and footwear. Wash skin thoroughly with cold 0.13% zephiran chloride solution. Get medical attention.
INHALATION	Move victim to fresh air. Perform CPR if victim not breathing. Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.
INGESTION	Get prompt medical attention.

Antifreeze (Ethylene Glycol)

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE: Colorless Liquid FLASH POINT: 111°C ODOUR: Slight; Undetectable <25 ppm POUR POINT: -13°C (48% Solution) SOLUBILITY: Soluble in All Proportions VISCOSITY: Not Viscous (=22 cSt) VAPOUR DENSITY: Will Sinks to Ground Level SPECIFIC GRAVITY: Same as Water (1.0)	
SAFETY MEASURES	
WARNING	Vapours are heavier than air. Ingestion of significant quantities can be lethal. Eye contact causes irritation. Skin contact can cause intoxication due to absorption. Inhalation of vapours can cause intoxication, headache, vomiting, unconsciousness with convu1sions, and even death Avoid inhaling vapours, particularly in enclosed places.
PERSONAL PROTECTION	Always wear impervious, chemical-resistant clothing, gloves, footwear, and goggles; neoprenes, nitrile, PVC are suitable protective materials.
PRECAUTIONS	Monitor empty containers for explosive atmosphere. Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, peroxides. Eliminate ignition sources. Restrict access and work upwind of spill.
RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	Wear SCBA in confined areas. Shut off fuel supply. Extinguish fire with CO_2, dry chemical, alcohol foam or water fog. (Note: Water or foam may cause frothing). Use water spray to cool containers exposed to fire.

Antifreeze (Ethylene Glycol)
CONSIDER ACTION ONLY IF SAFETY PERMITS!

Response to Gas Releases

ON LAND	Block entry into waterways. Do not flush into ditch/drainage systems. Contain spill by diking with earth, snow or other barrier. Remove minor spills with universal type absorbent. Remove large spills with pumps or vacuum equipment.
ON WATER	Ethylene glycol sinks and mixes with water; contain spill by isolating contaminated water through damming or diversion.
STORAGE & TRANSFER	Store closed, labeled containers in cool, ventilated areas away from incompatible materials
DISPOSAL	Segregate waste types. Place contaminated materials into marked containers. Consult with environmental authorities during final disposal.
FIRST AID	
EYES	Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses, if exposed to vapours or liquid. Get prompt medical attention.
SKIN	Remove contaminated clothing. Wash skin thoroughly soap and water. Get medical attention.
INHALATION	Move victim to fresh air. Perform CPR if victim not breathing Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.
INGESTION	INDUCE VOMITING IMMEDIATELY if victim is conscious; Get prompt medical attention.

Ammonium Nitrate

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE: White Pellets or Granules Also Colorless Liquid FLASH POINT: N/A ODOUR: Slight POUR POINT: N/A SOLUBILITY: Completely Soluble VISCOSITY: N/A VAPOUR DENSITY: N/A SPECIFIC GRAVITY: Sinks in Water (1.35)	
SAFETY MEASURES	
WARNING	Inhalation may cause dizziness, nausea, intestinal upset. Ingestion of large amounts can be harmful. Eye contact causes irritation, redness and tearing. Prolonged and repeated skin contact can cause irritation.
PERSONAL PROTECTION	Always wear impervious, chemical-resistant clothing, gloves, footwear, and goggles. PVC is suitable protective material.
PRECAUTIONS	Prevent from contacting water. Dry material can decompose explosively when confined and exposed to high temperatures. Keep away from organic materials since these can lower decomposition temperature.
RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	Wear SCBA in confined areas. Shut off fuel supply. Extinguish fire with CO_2, dry chemical, alcohol foam or water fog. (Note: Water or foam may cause frothing). Use water to cool containers exposed to fire.

SPILL RESPONSE ACTIONS
Ammonium Nitrate
CONSIDER ACTION ONLY IF SAFETY PERMITS!
Response to Gas Releases

ON LAND	Block entry into waterways. Do not flush into sewer/drainage systems. Contain spill by diking with earth, snow or other barrier. If liquid, remove minor spills with absorbent, large spills with pumps or vacuum equipment. Prills/granules can be shoveled or removed mechanically.
ON WATER	Ammonium nitrate sinks and mixes with water; contain spill by isolating contaminated water through damming or diversion. Flushing with water can be tried, if spill area cannot be isolated.
STORAGE & TRANSFER	Store closed, labeled containers in cool, ventilated areas away from incompatible materials
DISPOSAL	Segregate waste types. Place contaminated materials into marked containers. Consult with environmental authorities during final disposal.
FIRST AID	
EYES	Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses, if exposed to vapours or liquid. Get prompt medical attention.
SKIN	Remove contaminated clothing. Wash skin thoroughly soap and water. Get medical attention.
INHALATION	Move victim to fresh air. Perform CPR if victim not breathing Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.
INGESTION	INDUCE VOMITING IMMEDIATELY if victim is conscious; Get prompt medical attention.

Caustic Soda (Sodium Hydroxide)

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE: White Solid FLASH POINT: Non-Flammable ODOUR: Odourless POUR POINT: 318ºC SOLUBILITY: Highly Soluble VISCOSITY: N/A VAPOUR DENSITY: N/A SPECIFIC GRAVITY: 2.1	
SAFETY MEASURES	
WARNING	Caustic soda is a corrosive solid or liquid. Contact can cause severe skin burns. Contact with water may generate sufficient heat to ignite combustible materials. Eye contact causes irritation. Reacts violently with acids.
PERSONAL PROTECTION	Always wear impervious, chemica1-resistant clothing, gloves footwear, and goggles specifically recommended by the manufacturer. Wear full-face organic vapour cartridge respirator where oxygen is adequate; otherwise wear SCBA, if circumstances warrant.
PRECAUTIONS	May react with aluminum, zinc and tin metals to generate flammable and potentially explosive hydrogen gas. Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, and peroxides. When mixing with water, add small amounts of the caustic soda slowly. Restrict access and work upwind of spill.
RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	Wear SCBA in confined areas. Eliminate all ignition sources. Extinguish fire with CO_2, dry chemical, AFFF foam or water fog. Use water to cool containers exposed to fire.

SPILL RESPONSE ACTIONS
Caustic Soda
CONSIDER ACTION ONLY IF SAFETY PERMITS!
Response to Gas Releases

ON LAND	Block entry into waterways; do not flush into ditch/drain systems. Contain spill by diking with earth, sand or other barrier. Remove minor spills with earth, sand or vermiculite absorbent; large spills in solution with pumps or vacuum equipment. Neutralization with dilute hydrochloric acid can be tried.
ON WATER	Caustic soda sinks and mixes with water generating heat. Isolate/confine spill by damming or diversion if feasible. Water flushing can be tried to disperse the caustic sodas. Neutralization with dilute hydrochloric acid can also be tried.
STORAGE & TRANSFER	Store closed, labeled containers in cool, and ventilated areas away from incompatible materials. Protect from contact with water.
DISPOSAL	Place contaminated materials in segregated, marked containers. Consult with environmental authorities final disposal.
FIRST AID	
EYES	Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses, if exposed to vapours or liquid. Get prompt medical attention.
SKIN	Remove and launder contaminated clothing. Wash skin thoroughly soap and water. Get medical attention. Discard saturated leather articles.
INHALATION	Move victim to fresh air. Perform CPR if victim not breathing. Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.
INGESTION	DO NOT INDUCE VOMITING IMMEDIATELY if victim is conscious; give milk or water. If vomiting begins, keep victim's head below hips to prevent aspiration.

	Get prompt medical attention.

SPILL RESPONSE ACTIONS

Sodium Bicarbonate

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE: White Granular Solid ODOUR: Odourless SOLUBILITY: 9.6 g/100g @ 20ºC VAPOUR DENSITY: N/A	FLASH POINT: Non-Combustible POUR POINT: N/A VISCOSITY: N/A SPECIFIC GRAVITY: 2.2
SAFETY MEASURES	
WARNING	Reacts with acids to release carbon dioxide and heat. Ingestion may cause nausea, vomiting and abdominal pains. Inhalation may cause cough and mild respiratory irritation. Eye contact causes mild irritation. Prolonged skin contact may cause mild skin irritation and possibly dermatitis.
PERSONAL PROTECTION	Use respirator for dusts, chemical resistant gloves and boots when handling spills. Do not wear contact lenses under dusty conditions.
PRECAUTIONS	Contact with acids will release CO_2.
RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	Wear SCBA in confined areas. Carbon dioxide can be produced Shut off fuel supply Extinguish fire with media appropriate to surrounding fire. Use water to cool containers exposed to fire.

Sodium Bicarbonate
CONSIDER ACTION ONLY IF SAFETY PERMITS!
Response to Gas Releases

ON LAND	Block entry into waterways; do not flush into ditch/drain systems. Contain spill by diking with earth, snow or other barrier. Material can be shoveled or removed mechanically. Remove spills of dissolved materials with universal absorbent, pumps or vacuum equipment.
ON WATER	Sodium bicarbonate (baking soda) mixes with water; contain spill by isolating contaminated water through damming or diversion. Flushing with water can be tried, if spill area cannot be contained or isolated.
STORAGE & TRANSFER	Store closed, labeled containers in cool, ventilated areas away from incompatible materials.
DISPOSAL	Place contaminated materials in segregated, marked containers. Consult with environmental authorities during final disposal.
FIRST AID	
EYES	Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses, if exposed to vapours or liquid. Get prompt medical attention.
SKIN	Remove contaminated clothing. Wash skin thoroughly soap and water. Get medical attention if irritation persists.
INHALATION	Move victim to fresh air. Perform CPR if victim not breathing. Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.
INGESTION	DO NOT INDUCE VOMITING IMMEDIATELY if victim is conscious; give milk or water. If vomiting begins, keep victim's head below hips to prevent aspiration. Get prompt medical attention.

SPILL RESPONSE ACTIONS

N-7 Emulsifier (Sorbitan Mono-oleate)

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES			
APPEARANCE:	Amber Viscous Liquid	FLASH POINT:	>150ºC
ODOUR:	Fatty Acid	POUR POINT:	Not Known
SOLUBILITY:	Insoluble	VISCOSITY:	Viscous
VAPOUR DENSITY:	>1.0	SPECIFIC GRAVITY:	1.0

SAFETY MEASURES	
WARNING	Not considered a hazardous or toxic substance. May release carbon monoxide and/or dioxides on combustion.
PERSONAL PROTECTION	Wear protective clothing in handling this material.
PRECAUTIONS	Although N- 7 is a stable material, avoid contact with oxidizing compounds, which may cause a reaction.

RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	Wear SCBA and eye protection when responding to fires. Shut off fuel supply. Extinguish fire with CO_2 dry chemical, alcohol foam or water fog. Use water to cool containers exposed to fire.

N-7 Emulsifier (Sorbitan Mono-oleate)
CONSIDER ACTION ONLY IF SAFETY PERMITS!
Response to Gas Releases

ON LAND	Block entry into waterways. Do not flush into sewer/drainage system. Contain spill by diking with earth, snow or other barrier. Remove minor spills with absorbent. Remove large spills with pumps or vacuum equipment.
ON WATER	Contain spill as close to release point as possible. Try containment boom to concentrate spill for pumping. On small spills, pump to storage or flush with large amounts of water. For larger spills, pumping and dispersal might have to be tried.
STORAGE & TRANSFER	Store close labeled containers in cool, ventilated areas away from incompatible materials.
DISPOSAL	Segregate waste types. Place contaminated materials into marked containers. Consult with environmental authorities during final disposal.
FIRST AID	
EYES	Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses. Get prompt medical attention.
SKIN	Remove and launder contaminated clothing. Wash skin thoroughly soap and water. If irritation develops seek medical attention.
INHALATION	No adverse effects are known. If discomfort develops, remove patient to fresh air. Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.
INGESTION	No adverse effects are known. If discomfort develops seek medical attention.

N-23 Emulsifier

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES	
APPEARANCE: Dark Brown Liquid FLASH POINT: >100ºC ODOUR: Slightly Hydrocarbon Smell POUR POINT: >150ºC SOLUBILITY: Insoluble VISCOSITY: Medium 200 Cst VAPOUR DENSITY: >1.0 SPECIFIC GRAVITY: 0.9	
SAFETY MEASURES	
WARNING	Inhalation may cause irritation. Contact with skin or eyes will cause irritation. On combustion can generate carbon monoxide and/or dioxide and nitrogen oxides. Prolonged and repeated contact can cause irritation.
PERSONAL PROTECTION	Always wear impervious, chemica1-resistant clothing, gloves, footwear, and goggles.
PRECAUTIONS	Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, peroxides.
RESPONSE TO FIRES	
CONSIDER ACTION ONLY IF SAFETY PERMITS!	Wear eye protection when responding to fires. Shut off fuel supply. Extinguish fire with media appropriate for surrounding fire. Use carbon dioxide or dry chemicals on small fires. For large fires foam and water spray can be used. Use water to cool containers exposed to fire.

Percol Flocculent

TYPICAL PHYSICAL AND CHEMICAL PROPERTIES

THE KIMBERLITE PROCESSINGPLANT USES THREE POLYMER FLOCCULENTS:
PERCOL 368, PERCOL E-10 AND PERCOL 156
WHICH ALL HAVE SIMILAR PHYSICAL AND CHEMCIAL PROPERTIES.

APPEARANCE: White or Off-White Powders FLASH POINT: None Exhibited
ODOUR: Not Significant POWER POINT: Not Available
SOLUBILITY: Soluble VISCOSITY: Low
In Concentration <1%
VAPOUR DENSITY: 6.0 – 7.0 SPECIFIC GRAVITY: 0.75 – 1.0

SAFETY MEASURES

WARNING	Dust can gather, mix with air and become explosive. Inhalation of dust may be irritating to respiratory system. Avoid contact with strong oxidants. Eye contact may cause irritation, redness. Prolonged and repeated contact can cause mild irritation.
PERSONAL PROTECTION	Use dust mask, chemical-resistant clothing, gloves, footwear, and goggles.
PRECAUTIONS	Minimize breathing dust. Spilled solutions can create a hazard because of their slippery nature. Avoid contact with strong oxidizers, such as nitric acid, sulphuric acid, chlorine, ozone, peroxides.

RESPONSE TO FIRES

	Keep away from sources of ignition. Products are stable and will not react violently with water. Extinguish fire with CO_2, dry chemical, alcohol foam in preference to a water spray.

Spill Response Actions

Percol Flocculants
CONSIDER ACTION ONLY IF SAFETY PERMITS!
Response to Gas Releases

ON LAND	Block entry into waterways. Do not flush into sewer/drainage system. Contain spill by diking with earth, snow or other barrier. Powder can be shoveled or removed mechanically.
ON WATER	Percol flocculants are soluble in water. Isolate/confine spill by damming or diversion. Flushing with water can be tried, if spill area cannot be contained or isolated.
STORAGE & TRANSFER	Store closed, labeled containers in cool, ventilated areas away from incompatible materials.
DISPOSAL	Segregate waste types. Place contaminated materials into marked containers. Consult with environmental authorities during final disposal.
FIRST AID	
EYES	Flush eyes immediately with fresh, warm water (NOT HOT WATER) for 20 minutes, while holding the eyelids open. Remove contact lenses, if exposed liquid solutions. Get prompt medical attention.
SKIN	Remove contaminated clothing. Wash skin thoroughly soap and water. Get medical attention.
INHALATION	Move victim to fresh air. Perform CPR if victim not breathing Provide oxygen if victim is having difficulty breathing. Get prompt medical attention.
INGESTION	If ingested do not induce vomiting; remove product from mouth and seek medical attention.

Appendices

Emergency Contact Numbers

Name	Company	Title	Phone	Cell	Fax
Pat McHale	Nuna	Operations Manager	780-434-9114	780-504-7044	780-434-7758
Neil Thompson	Nuna	Corp. Safety Manager	780-408-5347	780-238-5347	780-434-7758
24 hour Spill Report Line	GNWT		867-920-8130		867-873-6924
Len McHale	Nuna	Project Manager	780-434-9114	780-238-5351	780-434-7758

Planning & Logistics

The feasibility of containing and recovering a spill will largely be determined by its location and the rate of release, spreading, transport and evaporation. These rates should be compared with the total time needed to deploy response equipment in order to evaluate whether or not containment, and/or absorbent and skimming operations can be effectively implemented. The pre-assembly of spill cleanup kits will expedite response and reduce the total deployment time needed, including:

Equipment and support material mobilization time.
Personnel Mobilization, transit and assembly at spill site time.
Actual equipment set-up and deployment time.

a. Determine Whether or not a spill has entered a waterway and whether or not access by land or water to control points is possible so that booms, absorbents and skimmers and vacuum trucks can be deployed. Check maps and consult with personnel familiar with the spill area.
b. Establish priorities to optimize utilization of personnel and gear needed for all cleanup phases (containment, removal, storage, transfer and disposal) at selected sites.
c. Allow additional time for adverse weather, flying or driving conditions.

Monitoring Spills

Monitor spills throughout the response to ensure safety and to direct cleanup efforts:

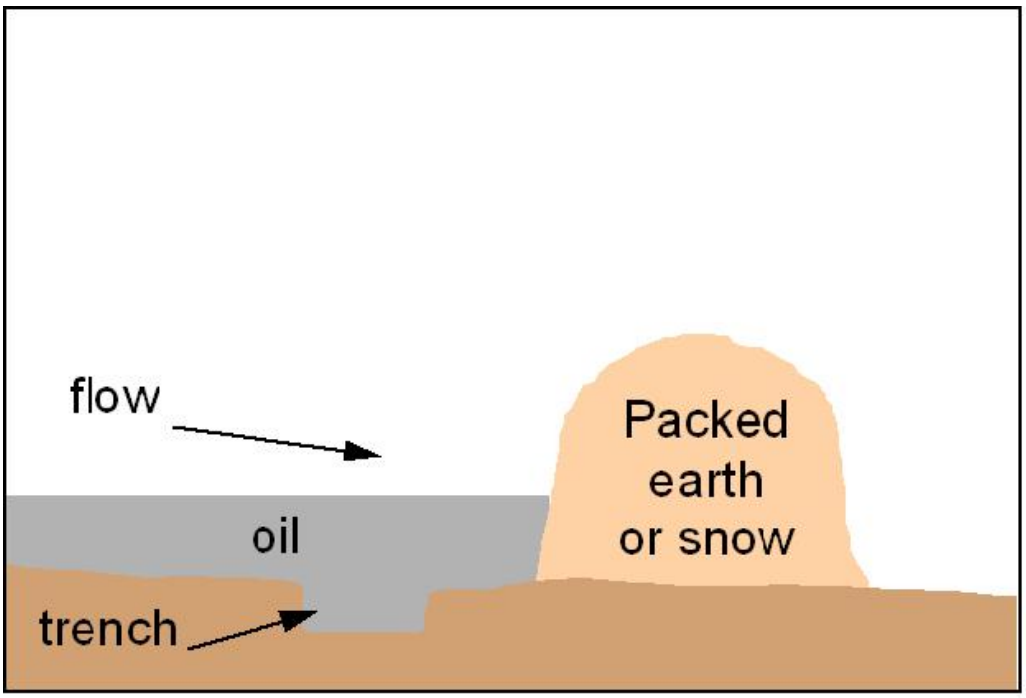
Explosive gas concentrations in the atmosphere using an explosion meter.
Spill movement and behavior, in order to properly direct response efforts.
All threats to the safety of people, property and the environment.

Spills On Land

Spills on land should be contained as close to the source as possible, if safety allows.

Every effort should be made to ensure that a spill does not reach water, where its containment and recovery are much more difficult and the potential environmental impacts are much greater. Containment can be achieved using:

A berm or dyke around the spill source.
A trench or ditch down slope of the spill source.



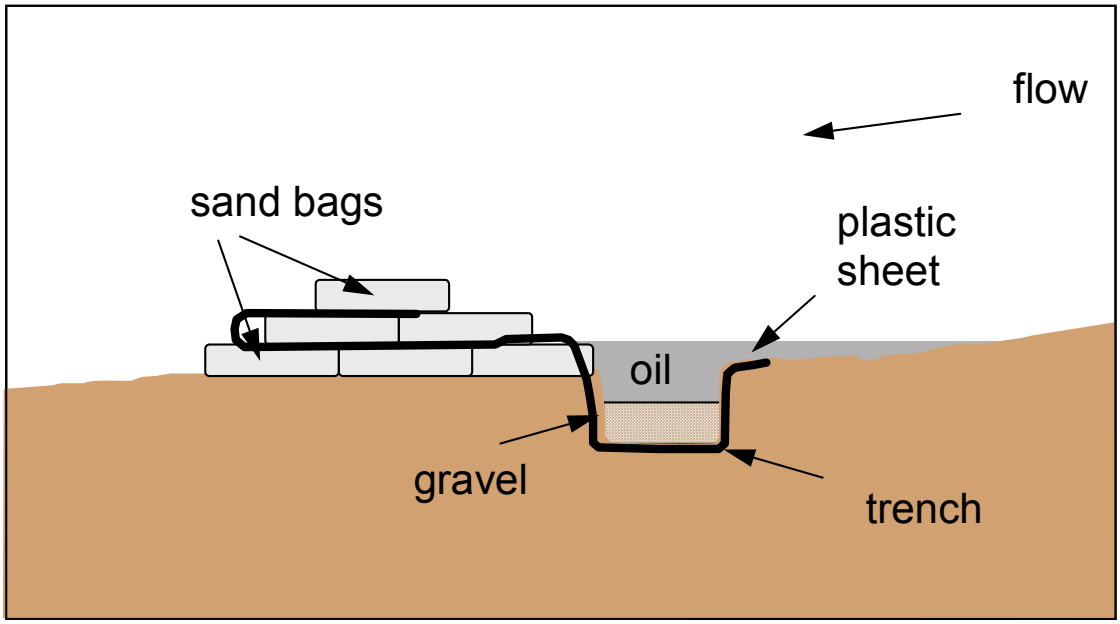
Earth Berm /Trench

If possible, locate the berm/trench sufficiently down slope of the release point to complete its construction before the spill arrives. Dig the trench along a natural drainage contour.

It should be approximately 0.5 m deep with a relatively flat bottom. The excavated material can then be combined with other available material to build the berm.

Sand Bag Berm/Trench

Sand bags can be used where available and if the earth is too hard or frozen and cannot be excavated or compacted. A plastic liner can be used to seal the trench and bags should be anchored with gravel or rocks and be woven between layers of bags.



Spills on Muskeg

Muskeg is generally poorly drained, wet and spongy. Internal drainage is usually slow and the depth of peat over mineral soil varies greatly. Muskeg is also highly acidic and low in nutrients, making biodegradation very slow, even during the summer months.

It is recommended that small oil spills in muskeg be mixed with peat moss and allowed to degrade during the summer months since more damage can be done by attempting cleanup using mechanical removal methods.

In the event of a small spill, it is important to weigh the advantages or cleanup versus the potential negative impacts on the terrain. Both personnel and equipment on wet or sensitive areas can cause considerable damage. In many cases, the best solution may be to add nutrients to the contaminated area and monitor the site to ensure that the spill does not migrate to an adjacent sensitive area. In all cases appropriate environmental advisors and Regulatory Authorities should be consulted.

Spills in Water

Containing spills in water is often difficult because oil quickly spreads. In turbulent water, oil and chemicals are likely to mix into the water column, making recovery impractical. For these reasons, it is important that if the spill reaches water, that containment be attempted as close to the source as possible, and that the spill be prevented from reaching a flowing stream.

Spills in lakes should be contained, if possible, before reaching outlets where containment and recovery can be difficult and dangerous.

Efforts to contain spills in large streams should be limited to land based operations where the oil might pool in accessible back eddies. The recovery of water-soluble chemicals is not possible.

In flowing streams, oil travels at the same speed as the surface current. On larger rivers or in open lake areas, slicks are also transported at 3.5% of the wind speed. Although a comparatively small effect, it can be an important factor if the wind is at right angles to the water flow and if the water surface is extensive. The wind can force the spill to the sides of the river where flows are slower or the shore of a lake. Long reaches of the river may become contaminated although containment and recovery might also be possible.

In smaller streams, the wind will have less impact and the slick speed can be easily estimated. Placing a small stick in the middle of the stream and determining the length of time required to travel a given distance, typically 10 m. this information can be quickly be converted to speed (36/time (sec) =km/h) to determine the estimated travel time to a confluence or other sensitive area.

Containment Strategies

Determine the best possible strategy for containme3nt will depend on a number of factors:

Speed of slick travel
Location of possible containment sites
Availability of personnel and equipment Location of sensitive areas
Safety of operations

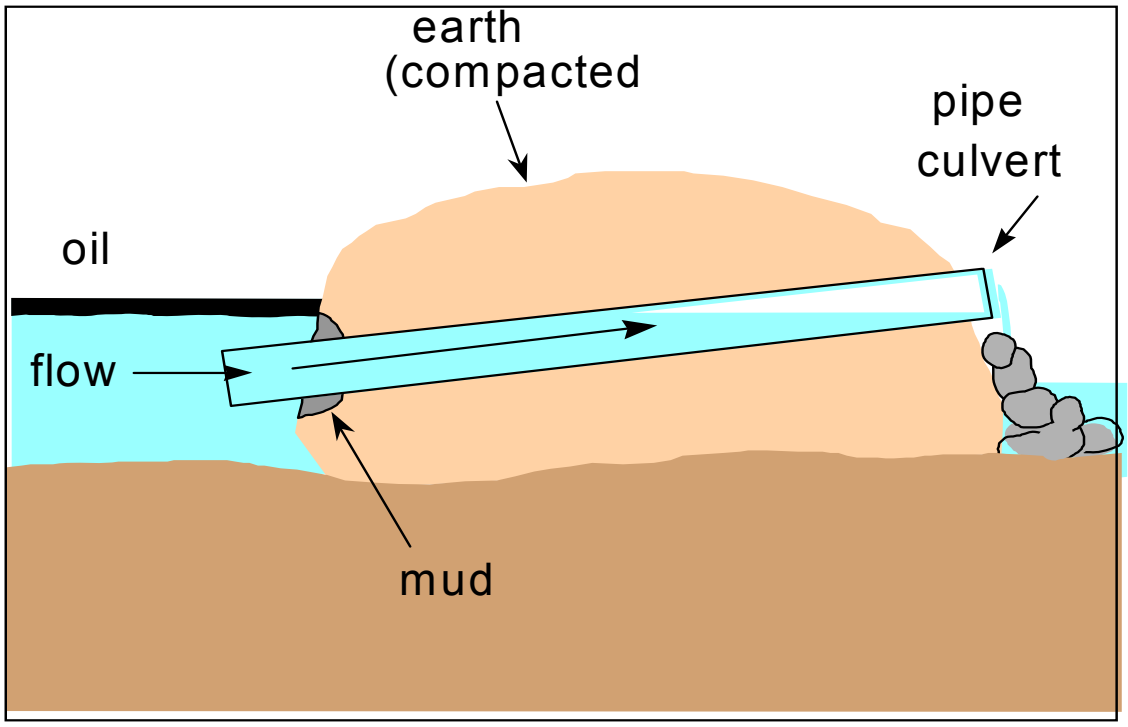
Spills on water can be contained by using floating booms (absorbent or non-absorbent) or by constructing a temporary berm or inverted weir. The objective is to build a barrier against which the (normally floating) oil will pool while allowing the underflow of water.

Inverted Weir

Booms

Booming with either absorbent or non-absorbent booms can also be an effective means of containing spills on slow-moving waters and in lakes. Effective containment using conventional booming techniques will be very difficult in streams or rivers where currents exceed 0.7 knots (.4m/s). At these speeds, oil will become entrained in the water flowing under the boom resulting in significant Losses. Some improvements can be achieved in waters flowing at 1-2 (0.5-1 m/s) if the boom is deployed at an angle of less than 90 degrees to the direction of the flow.

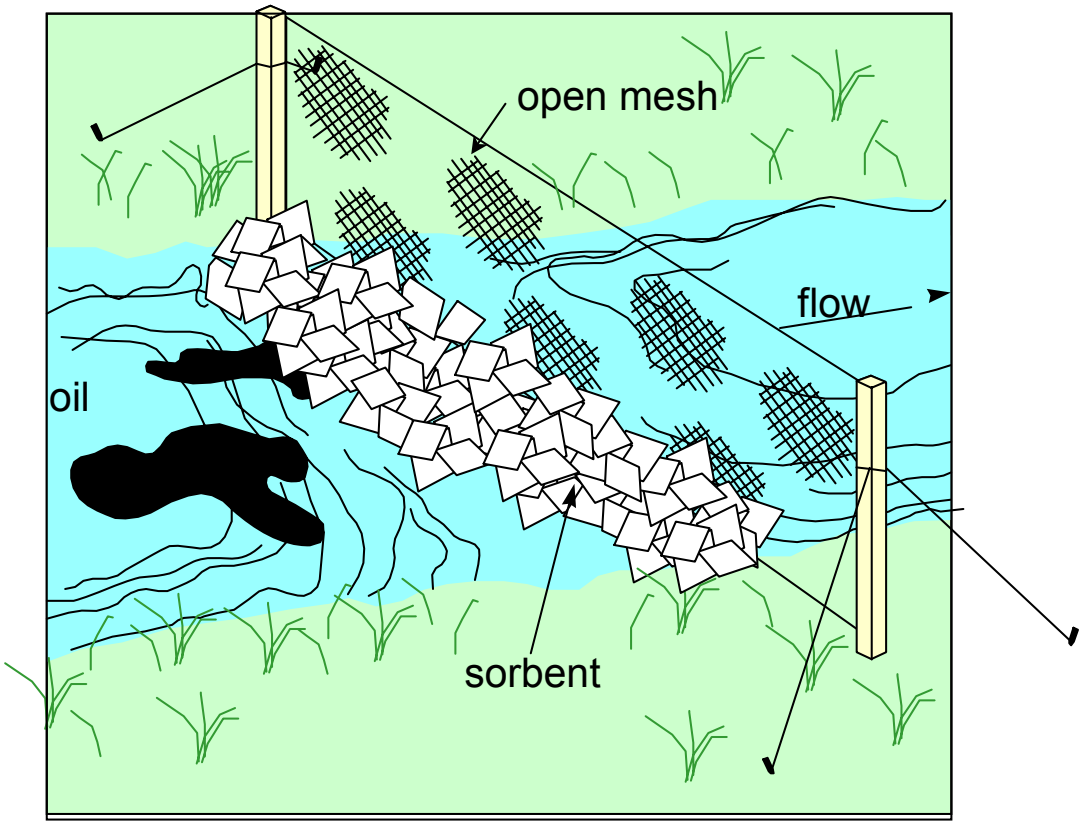
Inverted Weir

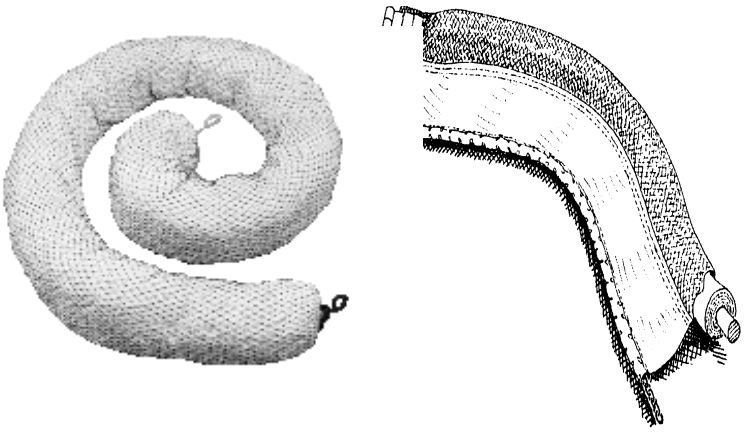


Absorbent booms or socks can also be used to provide a barrier to floating oil. These types of booms should be checked regularly to ensure that they do not

become saturated with either water or oil since they will tend to float very low in the water or even sink and release oil down stream.

Filter Fence





Booms	10 ft (3 m) by 6-10in(15-25 cm) used to contain spills in calm water

Spills in Ice and Snow

Oil can remain relatively fresh, i.e. in an unweathered state, under snow and ice for several months or more after a spill.

Evaporation rates will still be high when oil is ultimately exposed to the atmosphere except in very low temperatures. Oil can also move up and down small hills (several metres high) due to the capillary action of the snow.

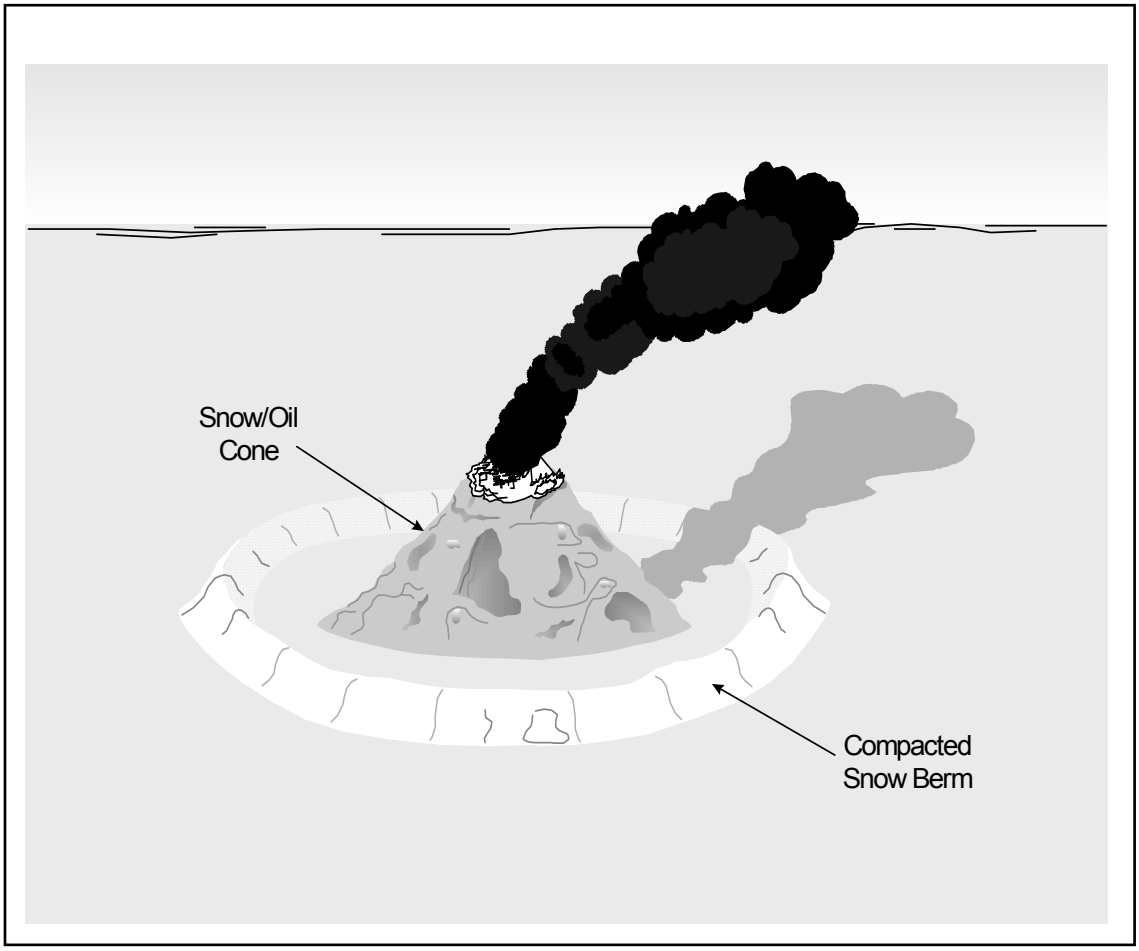
Containment

Snow and ice can be used to create berms to keep spills from spreading. In frozen rivers angled slots about 1 metre wide or holes can be cut in the ice, where safety permits, to allow possible spill recovery. The oil will rise up into the

openings where it will concentrate, and be available for recovery using skimmers or pumps.
Disposal

Oil spills in snow and ice can sometimes be burned if the spill can be isolated from the source. Although there is generally a reduced fire hazard, due attention to safety of operations is still required. If burning is not effective, recovered contaminated material will need to be collected and transported to a designated disposal/treatment facility.

Burning Snow Cone



Recovery

When large volumes of oil have been contained either through natural or mechanical containment, it will be necessary to remove or recover the

accumulated oil. This will generally occur in excavated trenches or adjacent to berms or natural barriers and occasionally in slow running streams or quiet ponds.

Vacuum trucks are ideal at cleanup sites accessible by road and where a large volume of oil has pooled that is generally free of water. The truck must be positioned at a safe distance so that there is no possibility of fire or explosion.

Oleophillic devises, such as disc or drum skimmers, can selectively recover oil in water, and are better suited to applications where the oil has formed a distinct layer on top of quiet water. Accumulations adjacent to an inverted weir are an example. A vacuum truck would be largely ineffective in this instance since it would recover large amounts of water, particularly in a thin layer of oil with water flowing through the pipe or culvert.

When using disc or drum skimmers, ensure that small items of debris are periodically removed from the scrapers to ensure their efficient operation.

Disc Skimmer