

NOTE: Effective April 1, 2003, the Yukon government assumed responsibility for minerals administration and management from the federal government. This publication was produced by the federal government prior to the transfer, and as a result, does not reflect up-to-date contact information and references to mirror legislation.



Indian and Northern
Affairs Canada

Affaires Indiennes
et du Nord Canada



Fuel Storage and Handling Guidebook

Mineral Resources
DIAND, Yukon Region



Canada

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1.0 Introduction and Background

Fuel handling and storage in mining applications have to be conducted properly to prevent environmental damage and protect public and worker safety. This requires an understanding of the basic standards. Although the rules that govern fuel storage and handling in the Yukon are numerous and complex, the intent and safeguards created by the laws are similar for mining as for any other activity off claims.

This guidebook is a reference guide only and not a legal document. It is designed to assist mining operators in their required compliance with the rules and regulations relating to fuel storage and handling. This publication does not purport to address all requirements, rules and regulations governing the use of fuel, its transportation and storage, rather, we have attempted to provide examples of responsible environmental practice in dealing with fuel storage and handling. Recommended environmental and safety practices typical of mining operations are illustrated.

The ultimate responsibility for compliance with legal requirements remains with the mining operator. For any specific fact situation or particular mining site it is recommended that the operator refer to all relevant regulatory agencies. The Department of Indian Affairs and Northern Development (DIAND) and the Government of Canada assume no responsibility for the accuracy of any legal requirements as may be referenced in this guidebook. Mining operators are encouraged to contact government departments and agencies referenced in this guidebook for copies of current legislation and regulations and are reminded that applicable laws are amended from time to time.

Relevant Acts and regulations can be accessed on the Justice Canada website at law.justice.gc.ca/en/subject/index.html or on the Government of Yukon website at www.gov.yk.ca.

2.0 Overview of Applicable Legislation and Guidelines

The placer and quartz mining industries are regulated by various legislation and policies. Primarily, a Water Licence and an approved Mining Land Use Approval are the permits required to explore and mine in the Yukon. These permits include provisions for fuel handling and storage. In the 1990s, regulations were adopted into law under both the *Yukon Placer Mining Act* and the *Yukon Quartz Mining Act* which established a mining land use regulatory regime. These regulations set out the requirements for mining operating plans which include Operating Conditions. Included in the Operating Conditions are rules relating to fuel and chemical storage and handling. For example, Operating Condition F(10) of the Yukon Placer Mining Land Use Regulations (YPMLUR) and the Yukon Quartz Mining Land Use Regulations (YQMLUR) state that “Fuel and other petroleum products and chemicals shall be stored and transferred in such a manner as to prevent spillage into a body of water or onto the surrounding land.”

In addition, under the *Yukon Waters Act* the Yukon Territory Water Board (YTWB) issues water licences often with conditions related to fuel handling, storage of fuel and handling of waste petroleum products and chemicals.

The transportation, storage, and handling of fuel and other hydrocarbon products such as motor oil and lubricants, and hazardous chemicals in the Yukon are governed by a number of territorial and federal Acts, regulations, and guidelines. These include the National Fire Code of Canada, CCME Code of Practice for Above Ground Storage Tank Systems, *Yukon Environment Act*, *Transportation of Dangerous Goods Act*, and Occupational Health and Safety Regulations, to name a few.

The general intent of legislation and regulations governing fuel handling and storage in the Yukon is **to protect human health and property, ensure public safety, protect wildlife and the ecosystem and avoid environmental damage by reducing the risk and impact of fuel spills.**

The following list summarizes relevant federal and territorial legislation, policy and guidelines which currently impact the storage and handling of fuel in the Yukon. Key provisions are highlighted opposite each item. This list is not intended in any way to be an exhaustive review of the current law related to this topic. Instead it is intended to provide examples of statutory requirements which must be considered and, where applicable, complied with by mine operators. In order to ensure compliance with legal requirements for any particular claim or fact situations the mine operator is encouraged to consult with the responsible regulatory authority.

REFERENCE

- Yukon Waters Act*
- Water licences often incorporate conditions for fuel storage and handling.
 - Prohibits deposit of waste into water.
- Yukon Quartz Mining Act and Regulations and Yukon Placer Mining Act and Regulations*
- Governs the storage and handling of petroleum products and chemicals.
 - Requires secondary 110 percent containment for fuel in storage over 4,000 litres.
 - Requires Fuel Spill Contingency Plan.
 - Requires that fuel spills must be contained, cleaned up and reported.
 - Requires that waste petroleum products be handled and disposed as per *Yukon Environment Act* Special Waste Regulations.
- Transportation of Dangerous Goods Act*
- Designates thousands of products as dangerous goods. Fuel is included.
 - Used or waste products are waste dangerous goods and require special handling.
 - Sets out transportation and handling rules to be followed by shippers and secondary shippers to increase public safety, such as marking of containers and labelling.
- Fisheries Act*
- Enables Environment Canada's Environmental Protection Branch to enforce certain environmental protection provisions that prohibit deposits of deleterious substances into waters frequented by fish. Under the Yukon Placer Authorization (YPA) a system exists which transfers authority to DIAND Mineral Resources to act as the inspectorate. Terms and conditions of the YPA are incorporated into individual water licenses. Failure to comply may result in prosecutions under the *Fisheries Act*.
- Canadian Environmental Protection Act (CEPA)*
- Memorandum of Understanding in place with DIAND, so that inspectors register fuel tanks as required by *CEPA* and report to Environment Canada. Provides for regulations governing pollution prevention.
- Code of Practise for Above Ground Storage Tank Systems Containing Petroleum Products (CCME Code)*
- Comprehensive specifications for tanks, piping, and containment. CCME Code is referenced in other law such as the *Yukon Environment Act* Storage Tank Regulations.
 - Tanks having a capacity in excess of 4,000 litres require registration.

*Yukon Environment Act
and Regulations*

- Storage Tank regulations reference the CCME Code.
- Spills Regulations require that fuel spills over 200 litres must be reported, all reasonable measures taken to remedy the effects.
- Special Waste Regulations do not apply directly because of a Federal Disposition, Section 2.(2): “A person who holds a permit, lease, licence or other disposition or approval pursuant to the *Yukon Placer Mining Act*, the *Yukon Quartz Mining Act*, the *Territorial Lands Act* and the *Yukon Waters Act* is not subject to the regulations where the person’s activities are carried out exclusively on the lands expressly referred to in the permit, lease, licence, or other disposition or approval.”
- Certain handling and disposal actions such as waste oil storage, handling, and disposal methods, are derived from this legislation.

*Occupational Health and
Safety Act and
Occupational Health
Regulations*

- Require storage, handling, and use of flammable liquids to be done as per the *National Fire Prevention Act*.
- Designates that fuel must be stored away from water, specifies spill response actions.

*Workplace Hazardous
Materials Information
System (WHMIS)*

- Specifies that all controlled substances (over 2,000 on the list) must have safety warning labels.
- *Hazardous Products Act* and Controlled Products Regulations specify that all WHMIS provisions be applied to employers and the workplace.

*National Fire Code of
Canada 1995*

- Rules relate to storage, handling, use and processing of flammable and combustible liquids related to Storage Tank Regulations under the *Environment Act* (Yukon).

*Fire Prevention Act
(Yukon)*

- Regulates premises where inflammable substances are stored.

*Gasoline Handling Act
(Yukon)*

- Regulates transportation, storage and handling of gasoline.
- Applies to storage tank systems.

The following sections describe some practical examples of how the fuel handling and storage regulations might be put into practice on a mining claim.

3.0 Containment, Storage and Handling of Petroleum Products and Chemicals

It is apparent from the previous section that there is a wide range of legislation that may apply to fuel handling and storage. The following is a concise list of good environmental practices that should be used in mining applications. Storage and handling practices are presented for the most common petroleum products used in mining: diesel fuel, gasoline, aviation fuel, lubricating oil, solvents, and grease.

“Chemicals” is obviously a very broad term that can mean anything from household bleach to sodium cyanide. The *Transportation of Dangerous Goods Act Regulations* (TDG) lists over 2,000 chemical formulations used in Canada today as commercially available, controlled products. Only a selected list of chemicals that may be used on claims in the context of exploration and mining are dealt with here.

A separate section is presented which deals with waste petroleum products – mainly waste oil, since it represents the vast majority of special waste generated by the Yukon mining industry.

The following are specific sections taken from the Operating Conditions found in the Yukon Placer Mining Land Use Regulations and the Yukon Quartz Mining Land Use Regulations that are relevant to fuel and chemical storage and handling:

- Fuel and other petroleum products and chemicals shall be stored and transferred in such a manner as to prevent spillage into a body of water or onto the surrounding land.
- A fuel spill emergency plan must be in place and a copy of it posted on-site.
- When the quantity of fuel in storage exceeds 4,000 litres, a secondary containment facility must be constructed that is of material impervious to petroleum products and that is of sufficient size to accommodate at least 110 percent of the fuel, in the case of a single storage tank. If there is more than one storage tank, the secondary containment facility must be of sufficient size to accommodate 110 percent of the capacity of the largest tank or 10 percent of the total capacity of all the tanks, whichever size is greater.
- Vehicles must be maintained and operated in a manner designed to prevent spills of fuel or oil.
- All waste petroleum products must be safely stored on-site or removed to a waste disposal facility approved under the

Special Waste Regulations of the *Environment Act* of the Yukon, or to a waste disposal facility approved in another jurisdiction of Canada.

- All fuel spills must be immediately contained cleaned up and reported to an inspector.

In addition to the above conditions which relate to fuel and chemical storage and handling, one must also comply with the Operating Conditions for Cleanliness, which would apply to empty fuel drums and other solid waste. For example, Operating Condition E (7) states: “Debris, equipment, fuel barrels, scrap metal and other waste at the work site shall be disposed of safely, so as not to attract wildlife, by removal, burial or incineration, as often as practicable throughout the mining season and completely at the cessation of the operation.”

Operating Conditions are considered minimum environmental standards and were developed to regulate Class 1 programs, which do not require notification to government. However, they do apply to all mining activity, and are enforceable because they are part of the Regulations. Mining Inspectors will enforce the terms and conditions of mining land use permits as well as the applicable legislation and regulations, including the Operating Conditions.

3.1 FUEL PRODUCTS

This section applies to commonly used products in mining and exploration such as diesel fuel, gasoline, and aviation fuel. These are considered Class 3 Flammable Liquids under the *Transportation and Dangerous Goods Act*.

3.1.1 Fuel Storage

The following are some general guidelines concerning all types of fuel storage:

- Ensure that all fuel containers, regardless of size, are situated on stable ground located well above the ordinary high water mark and at least 30 meters horizontal distance away from the high water mark of any watercourse;
- Leave a safe distance between fuel caches and water bodies and drainages;
- Ensure that containers with a capacity greater than 4,000 litres are located at least 30 metres from any watercourse and are provided with secondary containment;
- Store fuel drums in an upright position to prevent the possibility of spills and leaks; and

- Impact barriers should be installed to protect all types of exposed tanks which are vulnerable to impact by equipment. Barriers can be constructed of various materials, depending on the use of the tanks and length of time the tanks will be in one location. Natural materials such as gravel berms, boulders or wooden posts can be used for temporary storage barriers. Barriers for long-term storage should be 100 millimetres minimum steel pipes filled with concrete set into the ground one metre, and extending above the ground 0.75 metre. The posts should be 1.4 metres apart and one metre from the outside of the tank shell.

3.1.2 Secondary Containment

Secondary Containment means a container that prevents leaks or spills from a storage tank or system of storage tanks from reaching outside the containment area.

Secondary containment is a preventative measure designed to minimize environmental damage resulting from a failure of the primary tank storage system itself. This is a required back up system that prevents leaks or spills from the storage tank(s) from escaping the containment area and contaminating soil, surface water or groundwater. It can be a double-walled or contained aboveground tank, a leak-proof barrier such as a lined berm, a commercially custom-built system, or a field-constructed system that meets the intent of the legislation.

The following is an overview of the most common types: contained tanks, double-walled tanks, and dyked containment systems.

3.1.2.1 Contained Tanks And Double-Walled Tanks

The petroleum industry has responded to the regulatory requirement for secondary storage by developing tanks that have built-in secondary containment consisting of either a steel tank enclosed in a steel box (contained tank), or a tank within a tank (double-walled tank). These kinds of systems meet the intent of secondary storage. General requirements follow:

- The tank must be specified and installed by a certified installer;
- If the tank is used as a service station, it should have some kind of secondary containment to capture spills from the tank, piping, and fuel pump as well;
- For double-walled tanks, the space between the two tanks must be monitored for vacuum, have a port to allow monitoring of hydrocarbon vapours by use of a sensor, and an emergency vent;

- For contained tanks, the space between the two tanks should be accessible for manual inspection and leak detection or monitoring;
- The tank must be checked daily and records kept of the daily inspections; and
- The tank must be provided with an overfill device, manhole, emergency vent, containment pump out, ball float vent valve, ladder and platform, cam-loc fill connection and cap, and fill spill containment sump. Normally, the tank will be supplied with these features from the supplier.

3.1.2.2 Dyked Containment

A variety of materials may be acceptable for use in a dyked containment system, including impermeable materials such as steel, concrete, clay and geomembranes. The use of clay materials is generally discouraged because it is difficult to ensure the long-term integrity of the liner, which may be subject to soil cracking and leakage. Also, if a fuel leak were to occur, the clay liner materials would become contaminated, thus creating an additional disposal problem. If clay, steel or concrete materials are proposed for use in a containment system, Mining Inspections may require designs that have been sealed by a qualified professional engineer registered in the Yukon Territory.

Geomembrane is generally the most cost-effective material to use, and is discussed in the following guidelines for the construction and operation of dyked containment for single-walled, aboveground tanks.

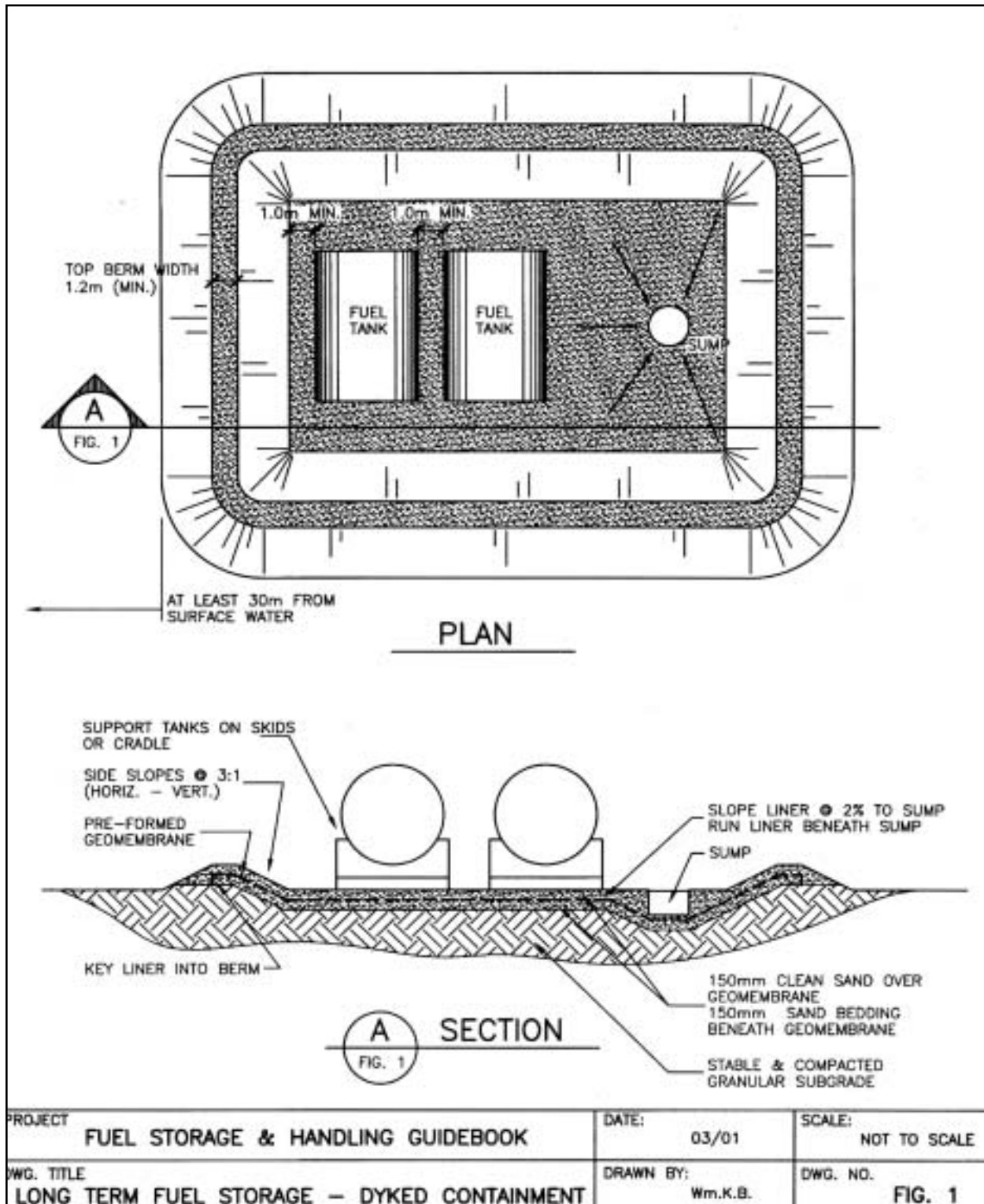
- Grade the storage site so that accidental leaks or spills are diverted from entering any surface or groundwater;
- Calculate the containment volume so that it contains “at least 110 percent of the fuel in the case of a single storage tank. If there is more than one storage tank, the secondary containment facility must be of sufficient size to accommodate 110 percent of the capacity of the largest tank or 10 percent of the total capacity of all the tanks, whichever is greater”;
- Horizontal tanks inside the containment area must be supported OFF THE GROUND on skids or on a cradle. The support system should not be of flammable materials and should preferably be steel, concrete or masonry construction;
- Use appropriate liner material that is rated and suited for the task. For long-term secondary containment systems, use geomembrane material that is at least 0.76 millimetres (30 mil) thick and preferably non-reinforced to allow for deformation while still maintaining its integrity. When possible, it is recommended that the liner be pre-formed and pre-seamed to

its full size at the factory, such that it can be set in place in the field. This eliminates the need for field seaming;

The liner should be covered with at least 150 millimetres (six inches) of clean sand. This sand cover will help to distribute the weight of the tanks and will protect the liner from damage. Most liners will deteriorate over time due to UV radiation and, as such, the sand cover will extend the life of the system;

- For short-term, secondary containment needs such as at fly-in camps, an oil-resistant and ultraviolet light-resistant, reinforced geomembrane liner might be better suited, especially if it is intended to be salvaged and removed at the end of a season and re-used. Common construction grade “vapour barrier” and woven polyethylene tarpaulins are **not suitable** for secondary containment of fuel. In such cases, a protective sand cover may not be warranted except as bedding beneath tank supports;
- The preferred subgrade for construction of the containment area is fine-grained granular soils such as sands or gravels. If gravels or cobbles are encountered, then a 150 millimetres (six inches) layer;
- Berms should have 3:1 (horizontal:vertical) side slopes on both the inside and outside slopes. Berm top width should be at least 1.2 metres (four foot), depending on size and height of berm;
- The liner should be keyed into the top of the berm as indicated in Figure 1;
- Provide for the collection and removal of rainwater from the dyked area by sloping the entire liner at a two percent grade to a sump located at one end of the area. The liner should be sloped at about 5:1 (horizontal:vertical) at the sump to a depth of about 300 millimetres (one foot). A perforated bucket or other suitable container, wrapped in geotextile, can be set in place within the sump to serve as the dispensing point for draining rainwater;
- After the liner has been installed, but prior to placing the sand cover, it should be checked for leaks by filling with water and monitoring level drop after 24 hours. Punctures or tears can be field repaired with a kit from the manufacturer;
- Tanks should be placed no closer than one metre (3.3 foot) apart and should be no closer than one metre (3.3 foot) from the bottom edge of the outside berms. Extra space should be allowed for the sump at one end of the containment area; and
- If there is a drain valve or plug on the fuel tank, it must be closed or sealed at all times.

Figure 1



Removal of Rainwater

When rainwater accumulates within the dyked area, it must be removed in order to maintain the required storage volume for spill containment. However, since this water may contain some hydrocarbons due to minor spills or leaks, it must be separated from the oil prior to discharging the water to the environment. Acceptable methods for rainwater removal are as follows:

1. Oil Water Separator

There are many commercial oil water separators on the market, and an option is to contact a local supplier and have them attend the site and dewater the containment as required.

The main thing about separating oil and water is to allow enough time for oil droplets to float to the surface as water continuously flows underneath. The bigger the separator, the more quiet time there is for oil to collect at surface. Tiny oil droplets can form an emulsion with water. It might take too long for these small droplets to rise before the oil/water leaves the separator, so a three-chamber design is usually recommended. The first chamber would be the largest, allowing for most of the removal.

The separator should be three times as long as it is wide, and three times as deep as it is wide. Minimum capacity should be about 45 gallons.

2. Special Waste Collection

Oil and water mixes can be considered a special waste, particularly if it appears to contain large amounts of petroleum products that are otherwise awkward to deal with.

The Department of Environment holds an annual collection for the removal and disposal of special wastes from the Yukon. Special waste generators in any community can have their wastes collected and transported for proper treatment and/or disposal. The Environmental Protection and Assessment Branch (EPA) covers the cost for the collection and transportation, while the generator is responsible for the disposal costs. Costs vary depending on the type and volume of special wastes to be collected. The collection is usually held in the fall of each year. To participate, or for more information on waste oil disposal, contact the YTG Environmental Protection and Assessment Branch (EPA) at (867) 667-8177.

3. On-site Separation and Removal

If the amount of hydrocarbons in the containment area is relatively minor or apparently non-existent, then it may be cost effective to absorb any floating hydrocarbons from the water with the use of commercial sorbents especially designed to collect fuel

products. These should be floated on the water surface and a small diameter hose (i.e. 12 millimetres diameter (½ inches)) can be used to siphon the clear water from the bottom of the sump and over the dyke to the ground surface, where it can drain away. The water should be disposed from the pump at a low flow rate, so that turbulence is minimized and hydrocarbons are not carried into the hose.

3.1.3 Handling And Dispensing

- Ensure all containers are sealed when not in use;
- Ensure that every precaution is taken to avoid spillage during fuel transfers. Provide a dispensing area with drainage and liner to collect spilled product during transfer. High quality oil absorbent powder is effective for this purpose;
- Do not fill tanks to capacity, leave at least one percent air space for expansion of the product. Provide an overfill device, and use a dipstick to check fuel levels;
- All hoses and nozzles must be compatible with hydrocarbon fuel;
- Ignition must be shut off and a no smoking policy enforced around all flammable liquids;
- Twenty-pound BC fire extinguishers should be on site while handling fuel;
- Protect against static charge during transfer by connecting a metallic bond wire from the fill stem to the tank;
- Provide a valve which can be securely locked if the area is unsupervised;
- If using a portable pump to dispense fuel, the device must be thermally protected and approved for dispensing flammable and combustible liquids;
- Comply with requirement of Workplace Hazardous Materials Information System (WHMIS) regarding use, handling, storage, and disposal of hazardous materials; and regarding labelling and provision of material safety data sheets acceptable to Labour Canada and Health and Welfare Canada;
- Employees should be trained in safe handling of materials as well as in fire hazards and procedures to follow in an emergency. Refer to the MSDS (Materials Safety Data Sheet) for the product and review the emergency response and fire response methods for that product;
- Maintain appropriate spill equipment for emergency spill response; and
- Post Spill Response Plan at dispensing/storage site in plain view.

3.2 CHEMICALS

Chemicals for use in mining applications must conform to the same storage and handling requirements that apply anywhere in the Yukon. These requirements come mainly from the *Transportation of Dangerous Goods Act* and Regulations (TDG) and from the Workplace Hazardous Materials Information System (WHMIS). Schedules I and II of the TDG Regulations list well over 2,000 chemical formulations and common products in use in Canada.

3.2.1 General Requirements

Every chemical has its own particular characteristics, and its own storage and handling requirements. To comply with the regulations, the product specific Materials Handling Data Sheet (MSDS) must be consulted as to storage, handling, and emergency response measures. All chemical products must be labelled in accordance with WHMIS. The following are some common “chemicals” that may be used in mining applications and their general storage and handling requirements.

Lead Acid Batteries

The hazards of waste batteries come from the sulphuric acid and lead content. If they are poorly handled, they can harm garbage collectors, landfill workers, and people and animals scavenging at waste disposal sites. If they are smashed in an ordinary garbage dump, the lead and acid are released into the soil, which can result in contamination of groundwater by leachate.

If you are storing or preparing larger amounts of batteries for collection or shipment, follow this procedure: Use sound wooden pallets. Place enough plastic sheeting over the pallet to cover all of the batteries top, bottom and sides. Stack the batteries not more than than two layers high, then enclose in the plastic sheeting.

Antifreeze (Ethylene Glycol)

Antifreeze is poisonous to people and animals and contains small amounts of metal contaminants. Similar to waste oil and batteries, it can contribute to contaminated leachate if thrown into common garbage dumps. Store antifreeze in containers similar to those used for waste oil, or in the manufacturer’s container. Retain larger volumes for special waste collection or deliver to one of the special waste facilities. Engage a company to recycle the antifreeze on site.

Solvents

Solvents used for cleaning, thinning, degreasing, and stripping such as mineral spirits, turpentine, petroleum distillates, varsol, and kerosene, are very toxic to people and animals. Some solvents cause cancer; some are combustible. When handling solvents, avoid contact with the skin or breathing fumes.

Minimize waste solvent (waste reduction). It may not be possible to avoid some final disposal, but it can be significantly reduced by:

- using a cleaning tank to collect and reuse solvent;
- not contaminating with water;
- removing sludge continuously;
- using detergent cleaners as an alternative; and
- pre-cleaning parts with detergent before resorting to solvent. Allow pieces to dry before cleaning.

Recover solvents. If using more than 200 litres per month, install a solvent reclamation unit. Small amounts of solvent can be recovered for re-use by simply letting the solvent settle in a clean container and then pouring off the clean solvent for re-use.

Waste Paints

Latex paints are not special waste. Oil-based paints, lacquers, enamel and sealers are toxic because of the solvent they contain. Old paint might contain metals or PCBs. About 80 percent of oil-based paint can be recycled. Waste paint can be blended to produce grey paint, which can be used for primer. Share your waste paint – someone else may be able to use it. Refer to *Special Waste Collection* section mentioned previously.

Asbestos

Asbestos fibre was used for insulation and piping. Microscopic fibres are invisible to the eye, and when suspended and inhaled, can cause asbestosis or cancer. It is only harmful when the fibres are liberated into the air. Handling asbestos requires special care. If there is a significant amount to be removed or disposed, contact Occupational Health for assistance. The disposal option is solidification with cement permanently preventing escape of fibres. Burial should be in containers at approved sites. Final deposition should be under at least one metre of soil cover.

3.3 WASTE PETROLEUM PRODUCTS

Used oil is the most common special waste in the Yukon. When poorly stored or disposed of, used oil can leach into the soil and contaminate the soil itself or the groundwater. The most common types of used oil are crank case oil, gear oil, transmission fluid, and hydraulic oil. Contaminants such as metals, chlorinated

solvents and glycol make used oil harmful to the environment. If used oil is carelessly disposed into ordinary garbage dumps, leachate may develop which can contaminate ground water and surrounding soil.

3.3.1 General Requirements

A water licence or other permit for mining may include a clause that requires handling and disposal of waste oil as per the *Yukon Environment Act* Special Waste Regulations. Operating Condition F(14) of the MLUR states “All waste petroleum products must be safely stored on site or be removed to a special waste disposal facility approved under the Special Waste Handling Regulations of the *Environment Act* of the Yukon.” The general requirements of these regulations are that all waste oil above a certain quantity must be stored, transported and disposed in a way that protects the environment and human health and safety. As *special waste*, waste oil must be stored properly, be transported in line with the *Transportation and Dangerous Goods Act* Regulations, and be disposed of properly.

3.3.2 Handling and Disposal

Unfortunately, at present, there are few practical options for dealing with large quantities of waste oil in the Yukon. To dispose of routine amounts, consider mixing with fuel and burning it in heavy equipment. Very small quantities may be burned in outdoor garbage incinerators. Larger amounts may be stored on site in containers or tanks. It may be transported and used in a waste oil burner at an approved facility, or it may be collected and transported outside for recycling.

Mixing With Diesel Fuel: Mixing of waste oil with diesel fuel for engines is allowed, providing that the mixture doesn't exceed 10 percent by volume of waste oil, and that the waste oil has first been passed through a five-micron filter. Caution: when the mix exceeds five percent, warranties may be affected.

Incineration at Special Waste Facilities: There are some approved waste oil burning facilities in the Yukon which have special waste permits allowing them to burn waste oil for the purpose of space heating. The furnace must meet a specification and the oil cannot be contaminated beyond allowable limits of metals and other contaminants including water, solvents, and antifreeze.

Collection and Delivery to Outside Facilities: Transporting waste oil off claims requires a *Transportation and Dangerous Goods* permit, with the basic requirement being a waste manifest. This may be the only realistic alternative for large amounts of waste oil (greater than 1,000 gallons).

Annual Special Waste Collection: YTG Environment organizes annual collection and removal of special wastes throughout the Yukon. In this collection, the Yukon Government will pay for transportation cost, while the waste oil generator pays the disposal cost.

On-Site Storage: Waste oil storage must conform to the same requirements as fuel storage. Containers and tanks must meet specifications, and secondary containment must be provided.

4.0 Spill Containment and Emergency Response

Accidents happen even if precautions are taken to prevent spills. The person who is first on the scene when a spill of petroleum products occurs has to know what to do. First, if the spill is not serious – less than 200 litres (44 gallons) that DOES NOT threaten fresh water supplies, groundwater, or health and safety, it does not need to be reported – these are handled on site by the operators. If the spill is more than this, or threatens the environment, operators should be prepared to get help and follow some basic steps as in any emergency. Training is important – operators should be able to identify the dangerous good and be familiar with the safety hazards through *Workplace Hazardous Materials Information Systems* and *Transportation and Dangerous Goods* training. Operators should then be familiar with the basic steps – what to do when first on the scene. Spill reporting procedures should be known by everyone. Containing the spill and planning the overall response (contingency planning) is the responsibility of the operator whenever large quantities of fuel are handled and stored. It is good practice to have a safety meeting at some regular interval, so that everyone on site is up on the emergency response plan. Hold the meeting at the shift change or at the start of work. Have everyone assembled in one spot, and simply review the fire, spill, and health emergency plan. Count heads if there is a large crew.

4.1 GENERAL REQUIREMENTS

Legislation requires that mine operations maintain spill response capability, and that a contingency plan is developed for emergencies. A version of this plan must be posted in the place where fuel is handled. Materials such as sorbents, hand tools, and fire extinguishers must be kept on site to respond to spills.

4.2 FIRST ON THE SCENE

These are guidelines intended to explain what a trained person would likely do in case of a serious spill. Remember — personal safety is number one; know the dangers and, if in doubt, get help.

1. **PROTECT** human health and safety – eliminate ignition sources. Secure the area so people know where to avoid. Pass on information to the RCMP or the Spill Line. Control Access with barriers.

2. **IDENTIFY THE PRODUCTS** and potential dangers. Look at the container or vehicle for *Transportation and Dangerous Goods* or *Workplace Hazardous Materials Information Systems* safety marks.
3. **STOP THE FLOW.** Approach with care – assume danger and think before rushing in.
4. **CONTAIN THE SPILL.** Assess the situation – is there a risk of fire or explosion? Is containment possible? What can be done right away to protect people and the environment? What kind of equipment is needed?
5. **RESPOND.** Rescue when you know it is safe to do so, notify the spill line or RCMP, recover the product and contaminated soil or water, maintain control of the site – stay put.

4.3 SPILL REPORTING

As soon as the situation is stable, the spill must be reported. Minor spills that do not appear to be a threat to the environment do not require reporting. Reportable spills are going to cause harmful effects to air, water, or land; injury or damage to property; harmful health effects; loss of enjoyment of normal use of property; harm to fish or wildlife. Some examples of obviously reportable spills would include an overturned fuel tanker, a ruptured fuel storage tank, or a recently discovered leaking tank. Spills of over 200 litres (44 gallons) are reportable by law. A rating of the seriousness of a spill can be described as follows:

Minor – less than 200 litres (44 gallons)

Major – less than 1,000 litres (220 gallons)

Environmental Emergency – more than 1,000 litres

Here is how spills are reported:

- **First at the scene notifies the 24-hour**

SPILL LINE • (867) 667-7244

**And the nearest office of
MINING INSPECTIONS:**

(867) 667 3209 • Whitehorse

(867) 993 6952 • Dawson

(867) 996 2568 • Mayo

- Be prepared to answer the questions you will be asked: Is the spill confined to the claims, or is it on federal, territorial, First Nation Settlement, or private land? What is the product? How much has been released? How close to water? Who or what might be affected? Has the spill been contained?
- Complete a Spill Report Form. See **Appendix A** attached.

4.4 SPILL CONTAINMENT

The objectives of containing a spill are to limit the spread of the spill, keep the spill concentrated so it will be easier to clean up, and prevent the spill from entering watercourses or flowing down to the groundwater table. The amount of time between notifying the spill line and having experts on the scene can make all the difference in containment. That is why a spill kit should be part of the fuel handling system at all levels of mining. Spill response kits are available from local suppliers. The kits should be prepared for both spills onto land or spills into water. Both types will have absorbent materials. The most common and efficient sorbents are in the form of absorbent cloth, which retains petroleum products but does not retain water. Absorbent cloth is available in small quantities or in commercial quantities such as rolls.

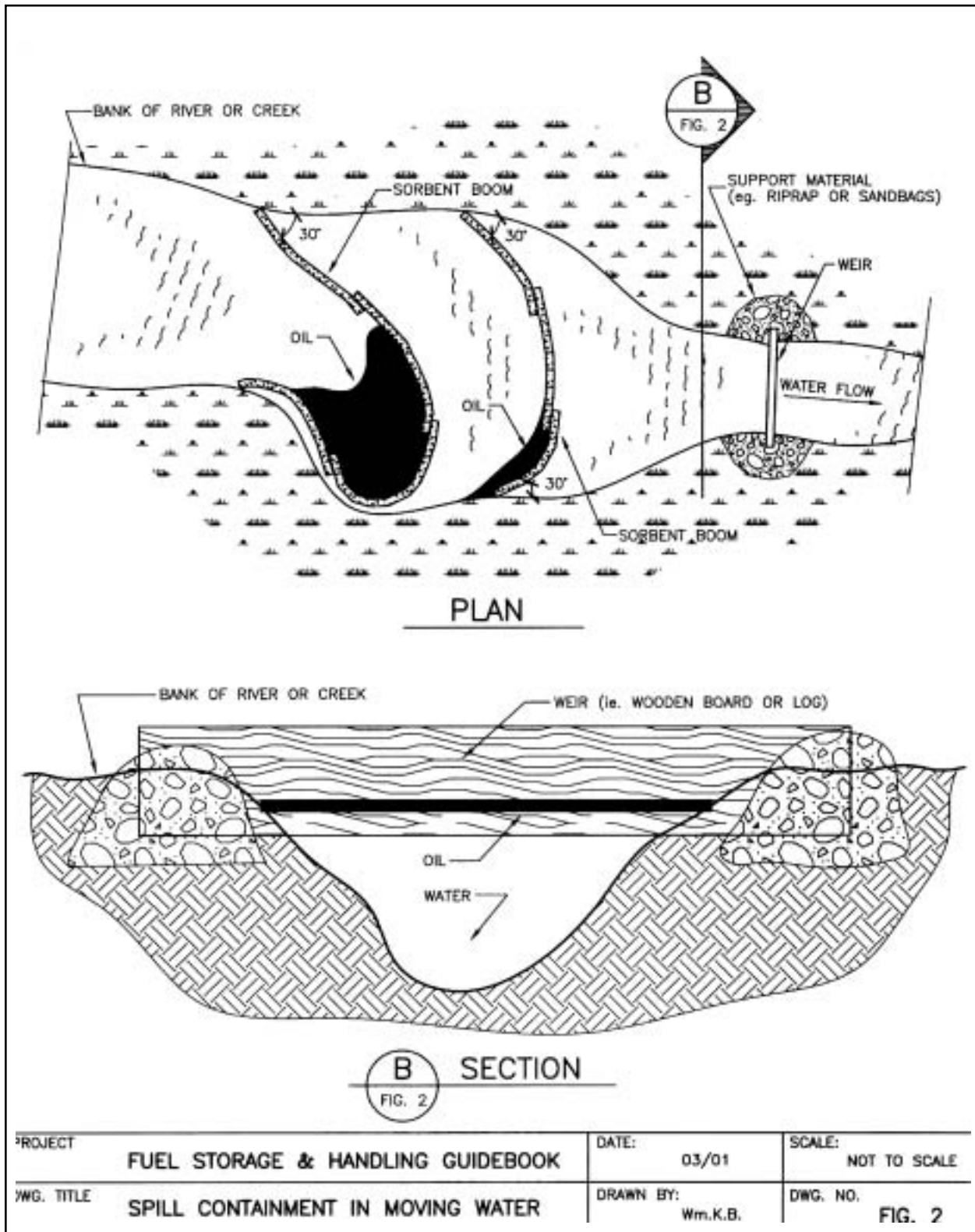
CONTAINMENT ON LAND

- If there is danger of widespread contamination, use hand tools and/or heavy equipment to build berms or trenches to redirect or stop the spill until it can be recovered; and
- Use the absorbent cloth, powder, or absorbent socks, to soak up the product immediately. If there is not enough sorbent, check around for natural sorbents. Straw, leaves, snow, or moss can be very effective.

CONTAINMENT IN WATER

- Fuel floats. Use of a boom or barrier will be required. If the spill is in moving water, anchor the boom at the bank and set it out at about 30 degrees to the flow path. Direct the spill to a back eddy or quiet spot if possible. **(See Figure 2.);**
- In small streams, plywood or logs can be set across the stream to contain the floating fuel. A small earthen weir with a culvert underflow might be used, but there is seldom enough time for such an elaborate plan to work;
- Soak up what you can from behind the boom with sorbents. Absorbent cloth should be hauled out when it becomes saturated, and the product strained out into a recovery container, then reused. (There are commercial products available for recycling absorbent cloth that resembles ringers from the old style ringer/washing machines.); and
- Burning may be acceptable in some cases on the advice of the 24-hour spill response person, or the Mining Inspector.

Figure 2



4.5 CONTINGENCY PLANNING

When a spill happens, as in any emergency, workers might forget what to do in the excitement. Making and posting a plan will help everyone know what their job is when a spill happens.

A fuel spill emergency plan is required as a condition of the Mining Land Use Approval. Having a regular safety meeting where all emergency measures are explained to everyone on site is strongly recommended. An example of a typical spill contingency plan for a small-scale program is provided. **See Appendix B.**

4.6 SITE ASSESSMENT AND CLEAN-UP

When the mining operator or his contractors, agents or employees believe a site has been contaminated by petroleum products – either the soil, surface water, or groundwater – a site investigation or site assessment may be required to find out the extent of contamination and how best to clean it up. The Yukon Contaminated Sites Regulations specify the way in which hydrocarbon contamination is to be assessed and the level of contamination allowed in soil and water. Similar federal and provincial legislation may apply, depending on the jurisdiction. Regardless of the applicable law, assessment and clean-up of hydrocarbon contamination have these elements in common:

- A site investigation. Research into the past use and sources of contamination, or a historical review to determine who, where, what and how much was released;
- Sampling and analysis. A field program to collect samples of soil, water, or groundwater to determine the extent and effect of the contamination. Sampling to verify that a site is clean will also be required during “remediation” (clean-up); and
- Restoration or remediation. A plan will be required as to what method will be most cost-effective and efficient to clean up the site. The plan will then have to be carried out and verified.

The most common method of cleaning up hydrocarbon-contaminated sites is by removing the contaminated soil and treating it either on site or at a treatment facility. Land farming is the most common and simplest method. In this case, contaminated soil is spread onto an impermeable layer and allowed to break down through volatilization, evaporation, and bacterial action into harmless components. This approach may not always be feasible. In such cases, the contamination may have to be treated in place by soil venting with the addition of bacteria nutrients, or installation of wells to remove the hydrocarbons from the groundwater.

Appendix I

Fuel Spill Emergency Plan

APPENDIX A

FUEL SPILL EMERGENCY PLAN

XYZ GOLD INC.

1.0 INTRODUCTION

This is a contingency plan for the operations to be carried out on XYZ Inc. mineral exploration properties in the XYZ River area for the field season in 2000. The activities will take place on mineral properties.

2.0 ACCESS

Access to the property is via the XYZ River Road. Depending on repair of bridges, access may be limited to off-road vehicles only for this season.

3.0 HAULAGE CONTRACTOR

Due to the small scale of operations, a tanker truck is not anticipated. Fuel will be purchased in drums and taken to the site either by rotary aircraft or off-road vehicle.

4.0 SPILL PREVENTION PROCEDURES

- In order to prevent fuel spillage, use proper handling techniques when transferring products between containers or vehicles.
- Inspect all vehicles to make sure there are no fuel or oil leaks.

5.0 SPILL RESPONSE AND EMERGENCY EQUIPMENT

- Keep the following fire and spill response equipment in the commonly used transfer area in a well marked and tidy order:
 - two 20-pound ABC fire extinguishers
 - shovels
 - polaskis
 - axes
 - pails of sand
 - oil-absorbent material (either fabric pads or commercial oil spill absorbent powder)

6.0 EMERGENCY PROCEDURES

**(POST THE FOLLOWING PAGE IN PLAIN VIEW
AT FUEL HANDLING SITE)**

APPENDIX B

SPILL CONTINGENCY PLAN

XYZ GOLD

Operating Plan ### Water Licence Number PM9999

- This is a placer mine which has been actively mined for many years. We have been mining at this location for x years.
- Access is gained using _____.
- The fuel is hauled by _____ in a _____ truck.
- To prevent spills:
 - Maintain vehicles on an ongoing basis;
 - Inspect fuel tanks on an ongoing basis; and
 - When transferring fuel:
 - Secure valve before and after fuelling;
 - Do not leave pump unattended;
 - No smoking while fuelling;
 - Do not grease machine while fuelling; and
 - Use 20 litre pail to drain pump hose after use.

Emergency Response:

1. In the event of any spill, contact _____ as soon as possible.
2. If this is not immediately possible, follow any or all of the following as appropriate:
 - Stop any further leakage;
 - Contain fuel to prevent reaching the creek – trench or berm;
 - Temporary dam, if necessary – use booms or logs on the creek;
 - Use the spill kit absorbent powder or cloth to clean up the spill; and
 - Recover the product, saturated cloth, or strained product from cloth in the empty drums marked “MT – RECOVERY”;
 - **Call spill hot line (867)667-7244; and**
 - **Call inspections DIAND (867) appropriate mining district.**

7.0 CONTAINMENT

- Enough 200 litre fuel drums will be on site to contain at least 10 percent of total fuel stored at any given time; and
- In the event that the project requires a fuel storage site greater than 4,000 litres, a secondary containment facility will be implemented.

8.0 CLEAN - UP

RESPONSE FOR GASOLINE OR DIESEL FUEL SPILL IN WATER:

- Stop discharge by plugging leaks, uprighting drums, fully closing valves or similar steps which can be done quickly and in a safe manner;
- Contain discharge by using absorbent pads, logs, or any material at hand;
- If in fast flowing water, direct the spill to a backwater using booms;
- In hot weather where there is a danger of fire or explosion, do not contain a gasoline spill – allow it to disperse and evaporate; and
- Dispose by recycling or incineration after discussion with Mining Inspector.

RESPONSE FOR GASOLINE OR DIESEL FUEL SPILL ON LAND:

- Stop discharge by plugging leaks, uprighting drums, fully closing valves or similar steps which can be done quickly and in a safe manner;
- Contain the spill by diking with snow, soil, plywood or other materials at hand;
- Dig a sump down gradient to capture free product;
- Absorb residuals with absorbent materials; and
- Dispose or store well away from water bodies, and remediate with absorbent material, fertilizer, or other method after discussion with Mining Inspector.

9.0 REPORTING

Spills must be reported by the field supervisor to the project supervisor, who will call the **Spill Hot Line (867) 667-7244**, and report to the Mining Inspector at **(867) 667-3265**.

Spills in excess of 200 litres are reportable by law and considered serious. Minor spills are less than 200 litres which do not pose imminent threats to human health or the environment. Spills in excess of 1000 litres constitute an environmental emergency.

Appendix II Initial Spill Report

Notifications :

Time	Agency	Person / Means
_____	Whitehorse Fire Dept.	_____
_____	DIAND	_____
_____	DFO	_____
_____	YTG, EMO	_____
_____	YTG, EPB & AB	_____
_____	YTG, PSB	_____
_____	YTG, EHS	_____
_____	YTG, Hwys. Enforcement	_____
_____	CYFN	_____
_____	RCMP	_____
_____	Local First Nation	_____
_____	DND	_____
_____	N.E.E.C.	_____
_____	_____	_____
_____	_____	_____

Comments / Diagrams / Other:

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