Indian and Northern Affairs Canada | Affaires indiennes et du Nord Canada

Indian and Northern Affairs Canada
Box 100
Iqaluit, Nunavut
X0A 0H0

April 2008

Your file Votre référence

Our file Notre référence

Re: Indian and Northern Affairs Canada, Nunavut Region, Draft Fuel Storage and Handling Guidelines

Over the last year Indian and Northern Affairs Canada have heard of concerns from the resource exploration industry and others that it is sometimes unclear what the requirements for fuel storage and handling in Nunavut are. There have also been differences of opinion between private land owners, regulators and industry on what the requirements should be for this activity.

Over the last several months the Nunavut Regional Office of INAC has had extensive discussion and debate on this issue, researched the practice in Nunavut and other jurisdictions and have developed the attached draft guidelines and are now requesting interested parties to review and provide feedback and comments on the guidelines.

Please note that these guidelines, once finalized, are a reference tool to guide this type of activity. It should be understood that land users will always be required to comply with the terms and conditions of regulatory instruments and legislation that apply.

We request that you provide your comments and feedback to Diane Charles, Risk Management Analyst by the 30th of April 2008. You can forward your comments to Diane as follows;
Email: CharlesDM@inac-ainc.gc.ca
Telephone: 867-975-4657
Fax: 867-975-4286

We look forward to receiving your feedback on these draft guidelines.

Sincerely,

Carl McLean
Director, Operations

Attachment: Draft Fuel Storage and Handling Guidelines

Indian and Northern Affairs Canada - Nunavut
Draft Fuel Storage and Handling Guidelines
April 2008

Introduction and Background

Fuel handling and storage in land use applications must 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 Nunavut are numerous and complex, the intent and safeguards created by the laws are similar for most types of land uses on crown land.

These guidelines are a reference tool only and not a legal document. They are designed to assist land users in their required compliance with the rules and regulations relating to fuel storage and handling. This guide does not purport to address all requirements, rules and regulations governing the use of fuel, its transportation and storage, rather, it provides guidelines for responsible environmental practice in dealing with fuel storage and handling. The ultimate responsibility for compliance with legal requirements remains with the land user. For any specific fact situation or particular land use site it is recommended that the operator refer to all relevant regulatory agencies. Land users are encouraged to contact government departments and agencies 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 http://laws.justice.gc.ca or on the Indian and Northern Affairs Canada website at http://www.ainc-inac.gc.ca/nu/nuv/index_e.html

Terms and conditions in regulatory instruments are also based on the environmental assessment conducted by the Nunavut Impact Review Board (NIRB). NIRB can recommend specific requirements for most aspects of land use activity, including terms and conditions related to fuel storage and handling.

Land and water use in Nunavut are regulated by various legislation and policies. Primarily, a water license and a land use permit or a land lease are required to conduct activity on crown land and use water or deposit waste. These permits / leases / licenses may include specific provisions for fuel handling and storage. For all water use, the Nunavut Water Board issues water licences often with conditions related to fuel handling, storage of fuel and handling of waste petroleum products and chemicals.

Containment, Storage and Handling of Petroleum Products and Chemicals

There is a wide range of legislation that may apply to fuel handling and storage. The following is a list of good environmental practices that should be used to guide land use activities. Storage and handling practices are presented for the most common petroleum products used for land use activities: diesel fuel, gasoline, aviation fuel, lubricating oil, solvents, and grease.

The term "chemicals" obviously covers a very broad range of substances, which can mean anything from household bleach to sodium cyanide. The Transportation of Dangerous Goods Act and 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 in most remote land use activities are used here.

Some basic guidelines 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 and easily accessible in the event of a spill.
- When the total quantity of fuel in a single storage tank exceeds 4,000 litres, a secondary containment facility must be constructed. At a minimum, the secondary containment shall be of sufficient size to accommodate at least 110 percent of the fuel storage tank capacity. In addition, it must be lined with a material impervious to petroleum products. If there is more than one storage tank exceeding 4,000 litres in capacity, 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. The definition of storage tanks are tanks greater than 230 litres.
- Vehicles must be maintained and operated in a manner designed to prevent spills of fuel or oil.
- At the present time fuel bladders do not have the necessary industry certification that ensures they meet requirements for use in the Nunavut environment. At this time, INAC will not accept fuel bladders as an acceptable method of fuel storage nor does it consider bladders as an acceptable ground transport method.
- If fuel bladders are in existence prior to January 1, 2008 INAC inspectors will use their discretion and authority to confirm the acceptability of the installation and operation of these existing fuel bladders. These existing bladders will need to be replaced by an acceptable storage tank. The time frame is to be negotiated with INAC's Field Operations Inspector.
- Secondary containment is strongly recommended for all fuel storage.

Fuel stored in 205L Drums

Caches of drummed fuel can be particularly subject to spillage as they are susceptible to damage from equipment, become buried in snow, etc.. Fuel stored in drums must follow these guidelines:

- To prevent spreading in the event of a spill, whenever practical, the drums should be located in a natural depression a minimum distance of 31m from all water bodies.
- Fuel drum storage locations must be surrounded by impact barriers and clearly identified with safety markers which are high enough to be visible during snow cover. This is to protect the fuel storage from being impacted and damaged by the mobile equipment.

- Store fuel drums in an upright position to prevent the possibility of spills and leaks; or store fuel drums in a horizontal position with the bungs at 3 and 9 o-clock.
- All fuel barrels must be labelled with the owners name and the year delivered to site.
- It is not recommended to reuse (refill) barrels as the seals are not as secure.
- Fuel drums must be organized and stored in a safe and sound manner. eg. The base should not be lumpy or rocky (reasonably flat). The height and method of stacked drums should be safe to ensure they are stable.
- Large fuel caches in excess of 20 drums should be inspected daily. For long term storage >6 months it is strongly recommended that drummed fuel be stored on pallets to prevent rusting.
- All fuel barrels must be labelled with the owners name and date of delivery to site. It is not recommended that fuel barrels remain longer than two years at remote sites.

In addition to the above conditions which relate to fuel and chemical storage and handling, one must also comply with all of the appropriate terms and conditions of regulatory instruments and any applicable legislation.

FUEL PRODUCTS

This section applies to commonly used products in land use activities such as diesel fuel, gasoline, and aviation fuel.

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 at least 31 meters horizontal distance away from the high water mark of any watercourse or waterbody; If fuel storage area includes secondary containment, the perimeter of the secondary containment must also respect the 31 meters condition.
- Spill kits of appropriate size/capacity must be made readily accessible near all fuel storage and fuel transfer areas
- Fuel transfers or refueling operations must be done in an area that is equipped with drip pans and / or secondary containment, a spill kit and a copy of the spill clean up and contingency plan. All transfer and refueling operations must be done by trained staff.
- All waste petroleum products must be safely stored on-site and comply with the guidelines for regular fuel storage and handling. Inspection and monitoring logs must be kept – include when waste was put in storage, what the product is, quantity, date of inspection, by whom. These logs could be kept with other camp logs.
- All fuel spills must be immediately contained, cleaned up and reported to the spill line –

complete report must be filed with the inspector within 30 days.

- Fuel storage locations must be surrounded by impact barriers and clearly identified with safety markers which are high enough to be visible during snow cover. This is to protect the fuel storage from being impacted and damaged by the mobile equipment.

Secondary Containment

Secondary Containment means a container that prevents leaks or spills 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 and guidelines. The following is an overview of the most common types: contained tanks, double-walled tanks, and dyked containment systems.

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 containment. General requirements follow:

- The tank must meet all federal and territorial regulations and guidelines that apply.
- If the tank is used in a fuel transfer area, it must 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;
- The tank must be provided with an overfill device, manhole, emergency vent, containment pump out, ball float vent valve, ladder and platform, cam-lock fill connection and cap, and fill spill containment sump. Normally, the tank will be supplied with these features from the supplier.

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, Institutions of Public Government or other responsible authorities may require designs that have been approved and sealed by a qualified professional engineer registered in the Nunavut. 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 aboveground tanks with capacity of 4000L or greater.

- 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 must be covered with a non-combustible material of such nature and thickness that it will ensure the continued integrity of the liner The liner should be covered with at least 150 millimetres of clean sand underneath the tank. 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. In such cases, a protective sand cover may not be warranted except as bedding beneath tank supports; Common construction grade "vapour barrier" and woven polyethylene tarpaulins are not suitable for secondary containment of fuel.

- 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 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 , depending on size and height of berm;

- The liner should be keyed into the top of the berm as indicated in Figure 1;

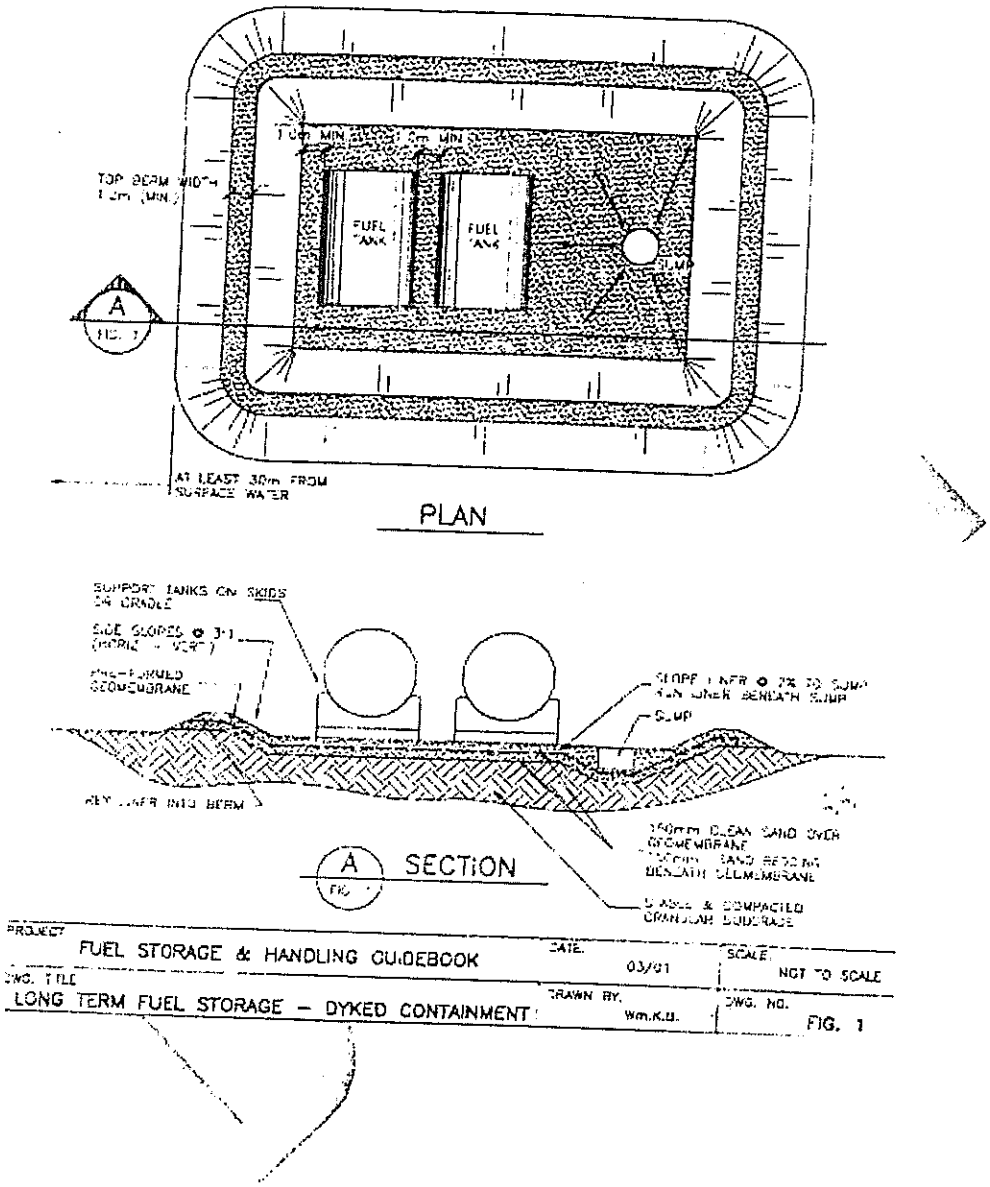
- Provide for the collection and removal of rainwater from the dyked area by sloping the entire liner at a two percent grade to a sump located at one end of the area. The liner should be sloped at about 5:1 (horizontal:vertical) at the sump to a depth of about 300 millimetres (one foot). A perforated 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 or pad locked at all times.

Figure 1: Long-Term Fuel Storage-Dyked Containment



Removal of Rainwater

When rainwater or snow accumulates within the dyked area, it must be removed in order to maintain the required storage volume for spill containment. However, since this water / snow 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. 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.

3. Discharge limit criteria

Any rainwater or snow removed from the containment area must meet acceptable discharge limit criteria. Please refer to applicable legislation for details on acceptable discharge limits.

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 matt 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 stored product;
- Ignition must be shut off and a no smoking policy enforced around all flammable liquids;
- Twenty-pound ABC 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.

CHEMICALS

Chemicals for use in land use applications must conform to the same storage and handling requirements that apply anywhere in Nunavut. 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.

Guidelines which apply to fuel would apply to any chemical (eg 31 meters from high water mark – stable ground etc)

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 mounts 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 an approved special waste facility. 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..If asbestos is found in the field contact Occupational Health and the Workmans Compensation Board for assistance.

Calcium Cloride (CaCl)

CaCl is identified as a toxic substance by Canadian Environmental Protection Act. If CaCl is to be used as a drill additive, ensure that all sumps containing CaCl are properly constructed and located in such a manner as to ensure that the contents will not enter any water body.

WASTE PETROLEUM PRODUCTS

Used oil is one of the most common hazardous waste in Nunavut. 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.

General Requirements

A water licence or other permit for land use activities may include a clause that requires handling and disposal of waste oil "All waste petroleum products must be safely stored on site or be removed to a special waste disposal facility 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.

Handling and Disposal

Unfortunately, at present, there are few practical options for dealing with large quantities of waste oil

in Nunavut. To dispose of routine amounts, consider mixing with fuel and burning it in heavy equipment. Very small quantities may be burned in approved waste oil 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 Nunavut 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 site 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).

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.