

A Field Guide to Fuel Handling, Transportation & Storage

3rd Edition, February 2002



Ministry of Water, Land
and Air Protection



INTRODUCTION

This document provides guidance on acceptable industry practice for managing fuel handling, transportation and storage in rural and remote areas of British Columbia. It summarizes requirements of applicable statutes of Canada and British Columbia, industry codes of practice and recommendations relating to environmental protection, health and safety, and fire protection.

This document provides general guidance; however, it is not intended to address every type of *fuel facility*. It is the responsibility of each commercial or industrial operator to implement the statutory requirements for which they are responsible.

While this document refers to legislation in effect on the date of publication and proposed legislation, users should always reference the current piece of legislation for accuracy of legal requirements.

To assist the user:

- (1) terms or phrases that are defined in the Section 11. Glossary are italicized in the text of this document; and,
- (2) legislated requirements and recommendations are separately highlighted throughout the document as follows:
 - Denotes statutory requirements of legal documents, such as the *BC Fire Code* and the *Transportation of Dangerous Goods Regulations*, with text references.
 -
 - Denotes recommended practices.
 -

Nothing in this document should be construed as waiving compliance with any applicable statutory or other legal requirement.

ACKNOWLEDGMENTS

The Ministry of Water, Land and Air Protection and the Ministry of Forests acknowledge: Vern Atkinson, Regional Fire Commissioner, Victoria; Ray Hollenberg, NorthWest Response Ltd., Smithers; Bernard A. Bintner, Environmental Management Branch; and Canadian Forest Products Limited (CANFOR) for their contribution toward the development of this document.

TABLE OF CONTENTS

Section 1. SMALL CONTAINERS = 230L – Canisters, Jerry Cans, Pails, Drums	1
1.1 DESIGN	1
1.2 OPERATIONS	1
Spill control.....	1
Safety Awareness	1
Dispensing.....	1
Emergency Response	2
Remote Storage Locations.....	2
1.3 TRANSPORTATION	2
Load Security.....	2
1.4 DOCUMENTATION & TRAINING.....	3
Inspection.....	3
Training.....	3
Section 2. SMALL TDG TANKS ≤ 454L – Truck-Box Fuel Tanks.....	5
2.1 DESIGN	5
2.2 OPERATIONS	5
Spill Control & Secondary Containment	5
Safety Awareness	5
Dispensing.....	6
Emergency Response	7
2.3 TRANSPORTATION	7
Load Security.....	7
Inspection.....	7
Training.....	7
Section 3. LARGE TDG TANKS > 454L – Tank Vehicles	9
3.1 DESIGN	9
Tank Trucks.....	9
Trailers & Semi-Trailers	9
3.2 OPERATIONS	10
Spill Control & Secondary Containment	10
Safety Awareness	10
Dispensing.....	11
Emergency Response	12
3.3 TRANSPORTATION	12
Load Security.....	12
3.4 DOCUMENTATION & TRAINING.....	13
TDG Documentation.....	13
Inspection.....	13
Training and Signage	13
Section 4. FIXED LOCATION ABOVEGROUND STORAGE TANKS (AST) > 230L	14
4.1 DESIGN	14
Temporary-Out-Of-Service.....	15
4.2 OPERATIONS	15
Spill Control & Secondary Containment	15
Safety Awareness	15
Dispensing.....	16
Pollution Prevention	17
Emergency Response	17

4.3 DOCUMENTATION & TRAINING.....	17
Inspection & Documentation	17
Training and Signage	18
Section 5. MARINE FACILITIES – foreshore facilities, wharves, docks, floating structures, barges and boats	19
5.1 DESIGN	19
Siting Requirements.....	19
5.2 OPERATIONS	20
Spill Control & Secondary Containment	20
Safety Awareness	21
Dispensing.....	21
Pollution Prevention	22
Emergency Response	22
5.3 DOCUMENTATION & TRAINING.....	23
Inspection & Documentation	23
Training and Signage	23
Section 6. SECONDARY CONTAINMENT & COLLISION PROTECTION	24
6.1 Secondary Containment	24
6.3 Maintenance.....	24
6.4 Discharge of Wastewater	24
6.5 Collision Protection.....	25
Section 7. RISK ASSESSMENT.....	26
Table 7.1. Risk-Ranking for Land-Based Fuel Facilities	26
Table 7.2. Recommendations on Risk Control Measures	27
Section 8. TREATING HYDROCARBON CONTAMINATED SOILS	28
8.1 Introduction.....	28
8.2 Polluted or Contaminated Soil Remediation	28
8.3 Contaminated Soil Collection.....	28
8.4 Preparing a Windrow.....	29
8.5 Preparing a Biocell	29
8.6 Adding Nutrients	29
8.7 Disposal of Remediated Soil in British Columbia	29
Section 9. SPILL RESPONSE	30
9.1. Initial Spill Identification, Notification and Assessment	30
9.2. Initial Spill Response for Combustible Products.....	31
9.3. Spill Response Equipment	32
Section 10. STATUTES, INDUSTRY STANDARDS & CODES OF PRACTICE	34
Section 11. GLOSSARY	36
Section 12. CONTACTS	40

This guide is meant to assist field operators in reducing the risk and environmental impact where *flammable* or *combustible liquids* (See Section 11. Glossary.) are handled, transported and stored. It provides statutory requirements and recommended practices for preventing fires and enhancing health, safety and environmental protection.

Section 1. SMALL CONTAINERS = 230L – Canisters, Jerry Cans, Pails, Drums

Statutory Requirements & Recommended Practices	
1.1 DESIGN	
(See definition of <i>small container</i> in Section 11. Glossary.)	
<ul style="list-style-type: none"> ■ Containers = 230L, used to store <i>flammable</i> or <i>combustible liquids</i> (e.g., gasoline & diesel fuel), must meet the appropriate design specification. (FC4.2.3.1.) 	
<ul style="list-style-type: none"> □ Maintain containers in good condition – not damaged, rusting or leaking. □ Adequately seal containers with proper fitting lids, caps, bungs or valves to prevent spills and leaks. 	
1.2 OPERATIONS	
Spill control	
Note: <i>Secondary containment</i> is not required for individual <i>small containers</i>	
<ul style="list-style-type: none"> ■ <i>Spill control</i> is required for small <i>containers</i> of flammable and <i>combustible liquids</i> that have the potential to spill. (FC 4.1.6.) 	
<ul style="list-style-type: none"> □ The degree of <i>spill control</i> should be based on the level of risk. (See Section 7. – Risk Assessment.) 	
Safety Awareness	
<ul style="list-style-type: none"> ■ All fuel containers must be labelled in accordance with the Workplace Hazardous Materials Information System (WHMIS), and according to the <i>Fire Code</i>. (FC 4.2.3.2.) ■ Smoking is not permitted where dispensing is being carried out. (FC 4.1.5.4.) ■ One 20-B:C rated <i>fire extinguisher</i> or two 10-B:C rated <i>fire extinguishers</i> are required where containers are stored within a building or structure. (FC 4.2.9.7. & FC 6.2.3.5.) 	
<ul style="list-style-type: none"> □ Signs should be displayed where storage (e.g., <i>fuel cache</i>) or dispensing takes place. 	
Dispensing	
<ul style="list-style-type: none"> ■ Maintenance and operating procedures shall be established to prevent spills. (FC 4.1.6.3.) ■ Containers must not be filled beyond their safe filling level. (FC 4.5.2.7.) 	

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements • □ Recommended Practices ◦ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (≤) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
--	---	--

Statutory Requirements & Recommended Practices

- ❑ Mark containers at a safe maximum fill level corresponding to approximately 90% capacity.
- ❑ Use an electric fuel pump when dispensing from a *drum*. When an electric fuel pump is not available or not practical, use a manual pump. Always store and secure the fuel hose above the *drum* to prevent siphoning.
- ❑ Ensure that dispensing procedures are clearly outlined and posted where all operators can see them.
- ❑ Keep the *drum* upright; avoid dispensing from a horizontal *drum*.
- ❑ Ensure housekeeping is effective in maintaining a clean and tidy facility.

Emergency Response

- Spills of TDG Class 3 – *flammable liquids* ≥ 100L must be reported to the Provincial Emergency Program (PEP) telephone **1-800-663-3456**). (WMA, *Spill Reporting Regulation* – see definition of TDG Class 3 *flammable liquids* in Section 11. Glossary.)
- Ensure that spills are recovered and that all contaminated soil is removed or treated. (FC 4.1.6.3.)
- ❑ Post initial spill response procedures with truck or *fuel cache*. (See Section 9. –Spill Response.)
- ❑ Maintain a spill response plan and a kit capable of containing and absorbing fuel spills. (See Section 9.3. – Spill Response Equipment.)

Remote Storage Locations

- ❑ Forestry landings must not be closer than 30 m to a stream to ensure that the landing provides sufficient buffer for sediment, ash and fuel spill infiltration. (FPC – Community Watershed Guidebook 4, Section 6.4.1)
- ❑ Assess and manage the risk potential at all remote *fuel cache* locations. (See Section 7. – Risk assessment.)
- ❑ Ensure all empty containers are removed from remote locations and returned for refilling or recycling.

1.3 TRANSPORTATION

Note: TDG documentation is not required when the total fuel capacity of all the containers on the vehicle is = 2000L. (TDG 2.31)

Load Security

- No person shall drive or operate on a highway a vehicle carrying a load unless the load is secured in a manner which ensures that:
 - the load will not escape from the vehicle
 - the load will not shift or sway in a manner that may affect the operation of the vehicle. (MVA Division 35.03)

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements • ❑ Recommended Practices ◦ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (≤) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
--	---	--

Statutory Requirements & Recommended Practices

- No person shall drive or operate a commercial vehicle on highway while the vehicle is carrying *drums* or barrels on end unless:
 - where metal *drums* or barrels are stacked on end, or on other metal *drums* or barrels, the stacks are separated by *dunnage*; and,
 - the vehicle has sides, sideboards or side stakes and the *drums* or barrels are blocked or tied down with hardware adequate to prevent the load from shifting on the vehicle. (MVA 35.08)
- Tie Downs must:
 - have a safe working load of not more than the weight of the load secured by the tie downs
 - be marked directly, or on a tag permanently attached, with:
 - (a) the safe working load as warranted by the manufacturer or by a registered professional engineer, or
 - (b) sufficient information so as to enable a peace officer to determine the manufacturer, grade and quality of the tied down. (MVA 35.08)
 - not to be used if worn:
 - (a) beyond a wear limitation specified by the manufacturer, or
 - (b) to the extent that they have become unsafe
 - when in use be protected as necessary against abrasion
 - when in use have any load binder handle that forms part of the tie down assembly locked in place and secured by rope, wire or chain or a locking mechanism that restricts any movement of the handle, and be designed, constructed and maintained so that the driver of a vehicle can tighten them, unless the tied down consists of steel, fibre or synthetic strapping, if the strapping is taut when in use.(MVA 35.12)

1.4 DOCUMENTATION & TRAINING

Inspection

- All sites that require cleanup of contaminated soil must follow the WMA, *Contaminated Sites Regulation*. (Section 8. Treating Hydrocarbon Contaminated Soils.)
- Inspect the storage and dispensing area and document the inspections to ensure the operations are in accordance with this guide.
- Develop an action plan to address potential liabilities and to upgrade facilities or practices that do not meet the industrial standards identified in this guide.
- Do not attempt a site cleanup unless you are familiar with the WMA, *Contaminated Sites Regulation*. (See Section 8. – Treating Hydrocarbon Contaminated Soils.)
- Document any site clean-up with photos, written notes and samples.

Training

Note: TDG training is not required when the total fuel capacity of all the containers on the vehicle is = 2000 L. (TDG 2.31)

- TDG training and spill response training is recommended for anyone transporting *small containers*.

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements • □ Recommended Practices ◦ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (=) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
--	---	--

Statutory Requirements & Recommended Practices

- Ensure all operators have been given some awareness training in fuel handling, storage and dispensing procedures for *small containers*.
- Review *risk assessment* and spill response procedures with employees.

Bullets:	■ Statutory Requirements	Symbols: less than (<)	Abbreviations: meter (m)
	•	greater than (>)	litre (L)
	□ Recommended Practices	equal to or less than (=)	kilogram (Kg)
	◦	equal to or greater than (≥)	

Section 2. SMALL TDG TANKS ≤ 454L – Truck-Box Fuel Tanks

Statutory Requirements & Recommended Practices

2.1 DESIGN

(See definition of *small TDG tank* in Section 11. Glossary.)

- All small tanks ≤ 454L must be designed, constructed, filled and closed so that, under normal conditions of handling and transport, there will be no discharge, emission or escape of the dangerous goods from the container that could constitute a danger to public safety. (TDG 7.21.)
- All small TDG tanks must meet the UN31 standard for *flammable or combustible* liquids on January 1, 2003.

Tanks Used to Transport Diesel Fuel and other **Combustible liquids**

(Note: For FC and TDG definitions of *flammable liquids* and *combustible liquids*, see Section 11. Glossary.)

- Small TDG tanks (≤ 454L) used for *combustible liquids* that are constructed to a non-specified standard but meet the intent of TDG Section 7.21 (See 2.1 Design above.) will be acceptable. (Note: This remains in the proposed amendment to the TDG Regulation.)

Tanks Used to Transport Gasoline and other **Flammable Liquids**

- Small TDG tanks (≤ 454L) used for *flammable liquids* that are constructed to a non-specified standard but meet the intent of TDG Section 7.21 (see Design above) may be used until January 1, 2003. Note:
 - A *non-specified tank* manufactured before 1996 (with visible data plate or date stamp) with a capacity = 454L, that meets the criteria in TDG Section 7.21, is a permitted substitute for gasoline fuel until January 1, 2003.
 - A *TC57 portable tank* is a permitted substitute for gasoline fuel.
 - A *ULC/ORD 142.13* specified mobile refuelling tank manufactured before January 1, 2003, with a capacity = 454L may be used as a permitted substitute for gasoline until January 1, 2010. (TDG)

2.2 OPERATIONS

Spill Control & Secondary Containment

Note: *Secondary containment* is not required for *truck-box fuel tanks* where the tank is mounted or built as an integral part of the vehicle.

- *Secondary containment* is required for any *truck-box fuel tank* that is > 230L and removed from the truck, trailer or mobile unit and operated in a *fixed location* for any length of time. (FC 4.3.7.1.)
- The degree of *spill control* should be based on the level of risk. (See Section 7. Risk assessment.)

Safety Awareness

- A *truck-box fuel tank* must be labelled with a *flammable/combustible* sticker or placard so that it is visible from outside the truck. (FC 4.2.3.2 & TDG Part 5.1.2 & TDG Part 5.7)
- Take appropriate measures against static charge build-up when transferring *flammable liquids* or *combustible liquids* in trucks with plastic box liners or rubber mats.

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements • □ Recommended Practices ◦ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (≤) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
--	---	--

Statutory Requirements & Recommended Practices

- Tanks must not be filled beyond their safe filling level. (FC 4.5.2.7.)
- Any vehicle fitted with a portable fuel tank is required to have at least one 20-B:C rated portable *fire extinguisher* or two 10-B:C rated portable *fire extinguishers* are within 9m of the *truck-box fuel tank*. (FC 4.11.2.1.)
- Signs, indicating that the ignition must be turned off and smoking is not permitted while the vehicle is being refuelled must be visible to every driver approaching the dispenser.
- Do not fill beyond a safe-filling level corresponding to 90% capacity.

Dispensing

- When dispensing *flammable liquids*, ensure that static electrical charges are controlled by establishing an electrical connection between the tank or container and truck box fill stem, or by providing other appropriate measures as applicable. (FC 4.1.8.2. FC Appendix A-4.1.8.2.(1)(b))
- Hose nozzle valves must conform to CAN/ULC-S620-M, “Hose Nozzle Valves for *Flammable and Combustible Liquids*” (FC 4.5.5.2.)
- An automatic shut-off nozzle must be used when using an integral hold-open device. (FC 4.5.5.2.)
- When a hose nozzle valve with a hold-open device is used, a break-away coupling conforming to CAN/ULC-S644-M, “Emergency Break-away Fittings for *Flammable and Combustible Liquids*” shall be provided. (FC 4.5.5.2.)
- Do not use any object or device to maintain the flow of fuel that is not an integral part of the hose nozzle valve assembly. (FC 4.5.8.6.)
- Use only manufacturer’s specified pressure relief security caps. (FC 4.2.3.1.)
- Use fuel dispensing pumps conforming to good engineering practice, and designed for *flammable* or *combustible liquids* (See Section 10 – Statutes, Industry Standards & Codes of Practice – Office of the Fire Commissioner, Interpretation Bulletin No. IB 016, Pumps for Transferring Flammable or Combustible Liquids.)
- Do not fuel or service equipment within a riparian management area of a stream or wetland, or within 30m of a lakeshore identified in an operational plan, unless (i) the equipment is hand held, or (ii) the fuelling or servicing is required for carrying out fire fighting activities, required to move broken down equipment, or authorized by the district manager. (FPC, *Timber Harvesting Practices Regulation 24* (3); *Range Practices Regulation 6* (3); *Forest Road Regulation Part 3, 12* (1)(f) & (m))
- Operators should minimize the potential for overfilling a *truck-box fuel tank* by providing continuously supervised filling operations using suitably qualified personnel. (FC 4.3.1.8)
- Hoses and nozzles used for dispensing fuel should be maintained in good repair.
- Use nozzles that must be kept open by continuous application of manual pressure.

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements • □ Recommended Practices ◦ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (≤) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
--	---	--

Statutory Requirements & Recommended Practices

- Secure nozzles in the back of pickup trucks with some means of drip containment.
- Do not use hand pumps where power is available.
- Ensure that all dispensing procedures are made available to operators.

Emergency Response

- Spills of TDG Class 3 – *flammable liquids* ≥ 100L must be reported to the Provincial Emergency Program (PEP) telephone **1-800-663-3456**. (WMA, *Spill Reporting Regulation* – see definition of TDG Class 3 *flammable liquids* in Section 11. Glossary.)
- Ensure that spills are recovered and that all contaminated soil is removed or treated. (FC 4.1.6.3.)
- All vehicles transporting fuel must have a spill response kit capable of containing and absorbing fuel spills. (FC 4.1.6.3.)
- Provide spill response procedures and a current spill response plan with the vehicle.
- Maintain a spill response kit, capable of containing and absorbing fuel spills, with the vehicle. (See Section 9. 3. Spill Response Equipment.)

2.3 TRANSPORTATION

Load Security

- No person shall drive or operate on a highway a vehicle carrying a load unless the load is secured in a manner which ensures that:
 - the load will not escape from the vehicle
 - the load will not shift or sway in a manner that may affect the operation of the vehicle. (MVA Division 35.03)
- Tanks should be placed on plywood or equivalent material to prevent the tank from rubbing on the truck box platform.

2.4 DOCUMENTATION & TRAINING

Inspection

- All sites that require cleanup of contaminated soil must follow the WMA, *Contaminated Sites Regulation*. (Section 8. Treating Hydrocarbon Contaminated Soils.)
- Ensure that drips and leaks are routinely cleaned so that the truck box remains clean.

Training

- TDG training and Spill Response training is recommended for anyone transporting fuel using a *truck-box fuel tank*.

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements • <input type="checkbox"/> Recommended Practices ◦ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (≤) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
---	---	--

Statutory Requirements & Recommended Practices

- Review *risk assessment* and spill response procedures with employees. (See Sections 7. Risk assessment & 9. Spill Response.)

Bullets:	■ Statutory Requirements • □ Recommended Practices ◦	Symbols: less than (<) greater than (>) equal to or less than (=) equal to or greater than (\geq)	Abbreviations: meter (m) litre (L) kilogram (Kg)
-----------------	---	---	---

Section 3. LARGE TDG TANKS > 454L – Tank Vehicles

This section deals with *tank vehicles* used as temporary fuelling facilities that are intended to be mobile.

Statutory Requirements & Recommended Practices

3.1 DESIGN

Tank Trucks

- The tank truck must be certified to the current CSA B620-1987/TC306 standard. If the proposed CSA B620-98/TC406 standard is adopted into the TDG Regulations, upgrades will not be required as long as it continues to pass inspections. (TDG)
- The current inspection requirements for tank trucks include:
 - inspection by a facility that is registered by Transport Canada
 - visual inspections every two 2 years and pressure testing is required every 5 years;
 - under the proposed CSA B620-98 standard visual inspections and a leak test will be required every (1) year and an internal inspection and pressure test will be required every five (5) years. (TDG)
- A tank truck that does not meet the current CSA B620-1987/TC306 standard may be certified under a “grandfather clause” or equivalence clause if it meets the intent of the CSA B620 standard. (TDG 7.33.1): This certification is valid only until January 1, 2005. After this date the tank must be disposed of or upgraded to meet the CSA B620-98/TC406 standard. Only a Certified Transport Canada Inspector can certify the tank under the “grandfather clause”. (TDG)
- Ensure that all trucks used to transport fuel tanks meet commercial vehicle inspection requirements.
 - Inspection may not be required in some remote locations where the trucks are not used on public roads; however, commitment to inspection is recommended to provide assurance that the trucks meet an industrial standard for safety and performance.

Trailers & Semi-Trailers

- On January 1, 2003 all large TDG tanks >454 L must meet UN31A or UN31B standard for *flammable or combustible liquids*.
- For specified manufactured fuel tanks:
 - a ULC/ORD standard 142.13 Mobile Refuelling Tank and a TC Standard 57 *Portable tank* are acceptable substitutes for transporting *flammable liquids* or *combustible liquids*;
 - a ULC/ORD standard 142.13 Mobile Refuelling Tank may be used until January 1, 2010 only if it was manufactured before January 1, 2003. (ULC)
- For non-specified manufactured fuel tanks, the following interim requirements must be met:
 - non-specified fuel tanks (of any size) may be used to transport combustible liquid (e.g., diesel fuels) until December 31, 2002 if it is “designed, constructed, filled and closed so that under normal conditions there will be no leakage that could endanger public safety”
 - a non-specified tank that is < 3000L, manufactured before July 1, 1996 and used for *flammable liquid* (e.g., gasoline) may be used if the tank is:

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements • □ Recommended Practices ◦ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (≤) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
--	---	--

Statutory Requirements & Recommended Practices

- (a) “designed, constructed, filled and closed so that under normal conditions there will be no leakage that could endanger public safety”, and
- (b) leak-tested, inspected and date stamped every 30 months by a facility registered by Transport Canada.
 Note: If the fuel tank is used for *flammable liquids* (gasoline) and was manufactured on July 1, 1996 or later, it must satisfy UN 31A or UN 31B (CGSB 43.146 standard). (TDG)

- Ensure that all tank trucks, trailers and semi-trailers used to transport fuel tanks meet commercial vehicle inspection requirements.

Note: Inspection may not be required in some remote locations where the trucks are not used on public roads; however, commitment to inspection is recommended to provide assurance that the trucks meet an industrial standard for safety and performance.

3.2 OPERATIONS

Spill Control & Secondary Containment

Note: *Spill control*, including *secondary containment*, is not required for *tank vehicles* where the tank is mounted or built as an integral part of the vehicle including tank trucks, trailers and semi-trailers.

- A fuel *storage tank* > 230L requires *spill control* (or *secondary containment*) when it is removed from a mobile unit and installed in a *fixed location*. (FC 1.2.1.2.) (See Section 6. Secondary containment & Collision Protection.)
- Consider additional *spill control* for all fuel storage and dispensing units (including secondary containment systems) that operate in high-risk areas as determined by *risk assessment*. (See Section 7. Risk assessment.)

Safety Awareness

- Signs, indicating that the ignition must be turned off and smoking is not permitted while the vehicle is being refuelled must be visible to every driver approaching the dispenser. (FC 4.5.8.8.)
- Maintain at least one 20-B:C portable *fire extinguisher* with the *tank vehicle* (FC 4.11.2.1.)
- During loading and unloading bulk fuel from a *tank vehicle*, measures shall be taken against static electrical charges. (FC 4.11.3.2.)
- Ensure fuel storage is physically protected against collisions, including:
 - moving the *tank vehicle* (or mobile skid) to a safe location or place a barrier (i.e. a log or equivalent protection) between the traffic area and the tank. (FC 4.5.2.1. & FC 4.11.2.4.) (See Section 6. 5. – Collision Protection.)
- Tanks must not be filled beyond their safe filling level. (FC 4.5.2.7.)
- When providing collision protection for fuel storage areas, consider selecting:
 - a site that is easily visible
 - a site that is way from traffic.

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements • □ Recommended Practices ◦ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (=) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
--	---	--

Statutory Requirements & Recommended Practices

Dispensing

- A *storage tank* shall be prevented from being overfilled by providing one or both of the following:
 - continuous supervision of the filling operations by personnel qualified to supervise such operations (FC4.3.1.8.)
 - an *overflow protection* device that meets the intent of ULC/ORD-C58.15, “*Overflow protection Devices for Flammable Liquid Storage Tanks*”.
- Refuelling equipment from a *tank vehicle* is permitted if the following conditions are met:
 - only diesel fuel is dispensed into the fuel tanks (not gasoline)
 - the fuelling is conducted in connection with commercial or industrial operations
 - the fuelling is conducted outdoors on commercial or industrial establishments
 - the fuelling is conducted using approved hose-reel and automatic closing nozzles
 - appropriate training and equipment are supplied to deal with any incidental spillage. (FC 4.11.3.8.)
- Do not fuel or service equipment within a riparian management area of a stream or wetland, or within 30m of a lakeshore identified in an operational plan, unless (i) the equipment is hand held, or (ii) the fuelling or servicing is required for carrying out fire fighting activities, required to move broken down equipment, or authorized by the district manager. (FPC, *Timber Harvesting Practices Regulation* 24 (3); *Range Practices Regulation* 6 (3); *Forest Road Regulation* Part 3, 12 (1)(f) & (m))
- Do not use any object or device to maintain the flow of fuel, that is not an integral part of the hose nozzle valve assembly. (FC 4.5.8.6.)
- When a hose nozzle valve with a hold-open device is used, a break-away coupling conforming to CAN/ULC-S644-M, “*Emergency Break-away Fittings for Flammable and Combustible Liquids*” shall be provided. (FC 4.5.5.2.)
- Fuel hose length must not exceed 4.5m, or 6m where a retracting system is used. (FC 4.5.5.1.(2)(3) & FC 4.11.3.8)
- There should be no leaks from the valve or pipe system to the pump. Draw-off valves must be threaded at the discharge end or otherwise designed to provide a liquid-tight connection to the delivery hose.
- Post all fuel handling procedures.
- Operators should always stay with the nozzle while refuelling.
- Any delivery hose that has the potential to cause a spill, if it were pulled from the delivery pump or valve, should be fitted with a *breakaway valve*.

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements • □ Recommended Practices ◦ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (=) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
--	---	--

Statutory Requirements & Recommended Practices

- Gravity-feed systems are considered high-risk facilities and should be phased out as soon as possible. Additional control measures are strongly recommended to ensure:
 - the bottom-of-tank valve is protected
 - the dispensing hose will not be pulled from the bottom of the tank without a break-away valve
 - additional collision protection is installed to prevent the accidental contact with the tank
 - the tank cannot be overfilled
 - access to the top of the tank meets legal requirements
 - the volumes of fuel are recorded through a meter system.
- The use of automatic shut-off nozzles is recommended to discourage the use of devices to hold the nozzle valve assembly open while refuelling.
- Use fuel-dispensing pumps according to manufactures' specifications.
- Close and lock valves as required.

Emergency Response

- Spills of TDG Class 3 – *flammable liquids* \geq 100L must be reported to the Provincial Emergency Program (PEP) telephone **1-800-663-3456**). (WMA, *Spill Reporting Regulation* – see definition of TDG Class 3 *flammable liquids* in Section 11. Glossary.)
- Ensure that spills are recovered and that contaminated soil is removed or treated. (FC 4.1.6.3.) (See Section 8. Treating Hydrocarbon Contaminated Soils.)
- All vehicles used to transport fuel must have a spill response plan and spill response kit, capable of containing and absorbing fuel spills, . (FC 4.1.6.3.) (See Section 9. 4. & 9.5. Spill Response Equipment.)
- Post spill response procedures and maintain a spill response plan with the fuel system.

3.3 TRANSPORTATION

Load Security

- No person shall drive or operate on a highway a vehicle carrying a load unless the load is secured in a manner which ensures that:
 - the load will not escape from the vehicle
 - the load will not shift or sway in a manner that may affect the operation of the vehicle. (MVA Division 35.03)
- Appropriate placards must be visible on all four sides of any fuel truck or mobile refuelling trailer that is > 2000 L whether filled or empty. (TDG Part V)

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements ○ Recommended Practices 	<p>Symbols:</p> <ul style="list-style-type: none"> < greater than (>) = equal to or less than (=) ≥ equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> m meter (m) L litre (L) kg kilogram (kg)
--	--	---

Statutory Requirements & Recommended Practices

3.4 DOCUMENTATION & TRAINING

TDG Documentation

- TDG documentation (TDG 2.31 & TDG4.8) is required when transporting more than 2000L of TDG Class 3 – flammable liquid. (See Section 11. – Glossary.) The shipping document must show:
 - document number and date
 - the name, address and signature of the shipper
 - the consignee’s name and address and the carrier’s name
 - fully trained-operator status
 - full description and total volume of dangerous good(s);
 - a 24 hour contact number
 - the type and number of placards, if required. (TDG Part V)
- When transporting an empty tank, the shipping document must use the words: “Residue – Last Contained”.
 - Tanks that are cleaned and *purged* do not require any documentation. (TDG 4.19)

Inspection

- All sites that require cleanup of contaminated soil must follow the WMA, *Contaminated Sites Regulation*. (Section 8. Treating Hydrocarbon Contaminated Soils.)
- Regular inspections must be conducted and documented to ensure that fuel trucks and mobile refuelling tanks meet all safety specifications. (TDG 7.33.1)
- Inspections should be documented and inspection reports kept on file.

Training and Signage

- Post clearly legible operating instructions at card or key activated dispensers. (FC 4.5.8.4. & FC 4.5.8.8.)
- Emergency instructions must be conspicuously posted. (FC 4.1.6.3.)
- Spill response training needs should be assessed and implemented annually.
- All drivers who transport bulk fuel should be trained through the Canadian Petroleum Producers Institute (CPPI) Drivers Certification Training and Transportation of Dangerous Goods certification course or equivalent.
- Only experienced drivers with a Transportation of Dangerous Goods (TDG) certificate and emergency response training (ERT) should transport bulk fuel.

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements • □ Recommended Practices ◦ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (=) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
--	---	--

Section 4. FIXED LOCATION ABOVEGROUND STORAGE TANKS (AST) > 230L

Statutory Requirements & Recommended Practices

4.1 DESIGN

- All *storage tanks* for combustible and *flammable liquids* must be built and maintained in accordance with Underwriters Laboratories of Canada (ULC) tank specifications, and bear a current ULC certification plate or label. (FC 4.3.1.2.)
- Where a *storage tank* > 230L is removed or abandoned, it is permitted to be reused for the storage of *flammable liquids* and *combustible liquids* only after having been refurbished and found to conform to one of the acceptable standards. (FC4.3.1.2 & FC4.10.4.2.)
- Materials, systems, equipment and procedures not specifically described in the *Fire Code*, or that vary from the specific requirements of the *Fire Code*, or for which no recognized test procedure has been established, are permitted to be used if it can be shown that these alternatives are equivalent on the basis of tests, evaluations or past performance. (FC 1.1.2.1.)
- All *aboveground storage tanks* must be installed on firm foundations designed to minimize uneven settling and corrosion, and to prevent the design stress of the tank from being exceeded. (FC 4.3.3.1.)
- Multiple tanks must have a minimum 1m separation between them. (FC 4.3.2.2.)
- Hose Nozzle valves must conform to CAN/ULC-S620-M, “Hose Nozzle Valves for Flammable and *Combustible Liquids*” (FC 4.5.5.2.)
- When a hose nozzle valve with a hold-open device is used, a breakaway coupling conforming to CAN/ULC-S644-M, “Emergency Break-away Fittings for Flammable and *Combustible Liquids*” shall be provided. (FC 4.5.5.2.)
- Valves at the *storage tank* must be constructed of steel according to the *Fire Code*. (FC 4.3.6.2.(1))
- To ensure a tank meets a specified engineering standard, check for a current certification plate or label.
- Annual *risk assessments* should be conducted on all gravity-feed systems currently in operation and control measures implemented to reduce and manage the risk(s).
- Gravity-feed systems are considered high-risk facilities and should be phased out as soon as possible. Additional control measures are strongly recommended to ensure:
 - the bottom-of-tank valve is protected
 - the dispensing hose will not be pulled from the bottom of the tank without a break-away valve
 - additional collision protection is installed to prevent the accidental contact with the tank,
 - the tank cannot be overfilled
 - access to the top of the tank meets legal safety requirements
 - the volumes of fuel are recorded through a meter system
 - a record of daily inspections and recorded volumes.

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements • □ Recommended Practices ○ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (=) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
--	---	--

Statutory Requirements & Recommended Practices

Temporary-Out-Of-Service

- *Aboveground storage tanks*, which will be out of service for a period not exceeding 180 days, must be isolated by closing and securely locking the necessary valves, or by capping the piping from the tank. (FC 4.10.2.2.)
- If the tank contains flammable or *combustible liquids*, the liquid level in the tank must be measured and the readings compared at intervals not greater than one month. (FC 4.10.2.2.)
- When an *aboveground storage tank* will be out of service for a period exceeding 180 days:
 - all liquid and vapour must be removed from the tank and its connected piping
 - the tank markings must clearly indicate that the tank is empty. (FC 4.10.2.2.)
- If the aboveground tank is on a cradle, so that the bottom of the tank is exposed, the bottom of the tank should be visually inspected and documented on a regular basis.
- Remote facilities, that are difficult or impossible to access on a monthly basis, should be secured to prevent spills and contamination. This may include leak detection monitoring equipment with wireless communication alarms.

4.2 OPERATIONS

Spill Control & Secondary Containment

- *Spill control* may include one or more of the following:
 - double-walled tank
 - tank-in-a-box system
 - a graded or sloped site capable of diverting and containing a spill and preventing spills from entering natural waterways, storm drains and sanitary sewers
 - a paved or concrete pad sloped so that water and spilled fuel is directed to an oil/water separator
 - a non-combustible barrier of sufficient height to contain the spill. (FC 4.1.6 & FC 4.3.7.)
- *Secondary containment* areas must not be used for storage purposes. (FC 4.3.7.9.)
- Tanks within the containment area must be on the ground, mounted on a skid or securely positioned on a cradle. The cradle or tank support shall have a fire-resistance rating of not less than 2 hours (i.e. steel). (FC 4.3.3.1.)
- Precipitation must not be allowed to accumulate within the containment area. (FC 4.3.7.8.)

Safety Awareness

- Signs, indicating that the ignition must be turned off, smoking is not permitted while the vehicle is being refuelled, and any other fuelling procedure, must be visible to every driver approaching the dispenser. (FC 4.5.8.8)

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements • □ Recommended Practices ◦ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (≤) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
--	---	--

Statutory Requirements & Recommended Practices

- At least 2 portable 20-B:C rated *fire extinguishers* must be available within 9m of the work area. (FC 4.6.5.1 & FC 6.2.3.5.)
- Establish proper bonding, grounding and isolation components for protection against static charges during loading of *tank vehicles* when transferring *flammable liquids* or *combustible liquids*. (FC 4.6.4.5.)
- Ensure fuel *storage tank* is physically protected against collisions. (FC 4.5.2.1.(3))
- Tanks should be filled to an acceptable safe filling level corresponding to approximately 90% of capacity.

Dispensing

- Fixed dispensers must be protected against collision damage by either:
 - a concrete island not less than 100mm high, or
 - guard rails. (FC 4.5.3.3.)
- Fuel dispensing hose length must not exceed 4.5m, or 6m where a retracting system is used. (FC 4.5.5.1.(2)(3))
- An automatic shut-off nozzle must be used when using an integral hold-open device. (FC 4.5.5.2.)
- Do not use any object or device to maintain the flow of fuel that is not an integral part of the hose nozzle valve assembly. (FC 4.5.8.6.)
- There must be no leaks from the valve or pipe system to the pump. Draw-off valves must be threaded at the discharge end or otherwise designed to provide a liquid-tight connection to the delivery hose. (FC 4.4.5.)
- During loading and unloading bulk fuel from a *tank vehicle*, precautionary measures must be taken to prevent static electrical charges. (FC 4.11.3.2.)
- Ensure that all operators stay with the fuel nozzle while refuelling.
- Any delivery hose that has the potential to cause a spill, if it were pulled from the delivery pump or valve, should be fitted with a *breakaway valve*.
- The fuel dispensing hose should be stored inside the containment *berm* where applicable.
- The use of automatic shut-off nozzles with an integrated hold-open device is recommended to discourage the use of devices or objects to hold the nozzle valve assembly open while refuelling.
- The fuel dispensing hose should be stored inside the containment *berm* where applicable.
- Keep hoses off the ground and valves closed and locked when not in use.
- Always stay with fuel dispensing system while refuelling.

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements • □ Recommended Practices ◦ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (=) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
--	---	--

Statutory Requirements & Recommended Practices

- A hose retractor should be used to keep the hose off the ground when not in use.
- All pumps used to transfer fuel should conform to manufactures' specification.
- Use automatic shut-off nozzles.
- Nozzles should be equipped with some means of drip containment.

Pollution Prevention

- Storage tanks* must not be overfilled, and precautions must be taken to prevent overflow or spillage by providing continuous supervision of the filling operations by personnel qualified to supervise such operations (FC 4.5.8.6.)
- To help minimize spills while filling the tank, an over-fill spill box should be located around the fill stem pipe.

Emergency Response

- A spill response kit capable of containing and absorbing fuel spills must be made available and maintained (FC 4.2.6.3) (See Section 9.3 spill Response Equipment.)
- Ensure that spills are recovered and that contaminated soil is removed or treated. (FC 4.1.6.3.) (See Section 8. Treating Hydrocarbon Contaminated Soils.)
- Spills of TDG Class 3 – *flammable liquids* \geq 100L must be reported to the Provincial Emergency Program (PEP) telephone **1-800-663-3456**. (WMA, *Spill Reporting Regulation* – see definition of TDG Class 3 *flammable liquids* in Section 11. Glossary.)
- Post spill response procedures and maintain an emergency response manual with the *fuel facility*.

4.3 DOCUMENTATION & TRAINING

Inspection & Documentation

- Visual inspections must be made daily and during each shift of the piping system, pumps and ancillary equipment for leaks spills and obvious abnormal conditions. Any leakage must be repaired immediately. (FC 4.4.11.5.)
- At *fuel dispensing stations* where the tank is resting on the ground (and visual inspection beneath the tank is not possible) the measurement (by tank dip) and computation of any gain or loss of liquid shall be taken each day that the station is in operation. (FC 4.3.16.1.)

<p>Bullets:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Statutory Requirements <input type="checkbox"/> Recommended Practices 	<ul style="list-style-type: none"> • ◦ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (=) equal to or greater than (\geq) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
---	--	---	--

Statutory Requirements & Recommended Practices

- All sites that require cleanup of contaminated soil must follow the WMA, *Contaminated Sites Regulation*. (Section 8. Treating Hydrocarbon Contaminated Soils.)
- Keep a record of all volumes before and after deliveries.

Training and Signage

- Ensure that the training of and fuel dispensing attendants includes procedures for:
 - supervising the dispensing of flammable and *combustible liquids*
 - taking appropriate measures to prevent sources of ignition from creating a hazard at the dispensers
 - taking appropriate action in the event of a spill to reduce the risk of fire
 - shutting off the power to all dispensers in the event of a spill or fire. (FC 4.5.8.5., FC 4.5.8.6. & FC 4.4.11.2)
- Spill and fire-training requirements should be assessed and implemented annually.
- All drivers who transport bulk fuel should be trained through the Canadian Petroleum Producers Institute (CPPI) Drivers Certification Training and Transportation of Dangerous Goods certification or equivalent.

Bullets:	■ Statutory Requirements • □ Recommended Practices ◦	Symbols: less than (<) greater than (>) equal to or less than (=) equal to or greater than (≥)	Abbreviations: meter (m) litre (L) kilogram (Kg)
-----------------	---	--	---

Section 5. MARINE FACILITIES – foreshore facilities, wharves, docks, floating structures, barges and boats

Statutory Requirements & Recommended Practices	
5.1 DESIGN	
■	All <i>aboveground storage tanks</i> for <i>combustible</i> and <i>flammable liquids</i> must be built and maintained in accordance with Underwriters Laboratories of Canada (ULC) tank specifications, and bear a current ULC certification plate or label. (FC 4.3.1.2.)
■	All <i>aboveground storage tanks</i> must be installed on firm foundations designed to prevent the allowable design stress of the tank from being exceeded, and to minimize corrosion and uneven settling. (FC 4.3.3.1.)
■	Refurbished <i>aboveground storage tanks</i> for <i>flammable</i> and <i>combustible liquids</i> must meet the standards specific in the <i>Fire Code</i> before reuse. (FC 4.3.1.2 & FC 4.10.4.2.)
■	All fuel facilities around marine facilities require additional control measures as outlined in <ul style="list-style-type: none"> • Marine <i>Fuel dispensing Stations</i> (FC 4.5.6.6) • Piers and Wharves. (FC 4.7).
□	Implement the basic industrial standards provided in <i>B. C. Coastal Marine Facility and Operating Standards, Second Edition 1992</i> .
□	Tanks on floating structures should have additional controls including: <ul style="list-style-type: none"> ◦ Additional floatation to ensure buoyancy and stability of the floating structure ◦ Additional log-boom protection to ensure protection against large irregular swells and wave action ◦ Emergency shut off devices on the tank assembly ◦ Pressure relief valves on the tank ◦ A baffle system within tank to keep the product within the tank more stable ◦ Sheer valves inside the tank ◦ Anti-siphon valves for the tank.
□	Fuel dispensing from tanks should be carried out from the tops of the tanks.
□	All gravity-feed systems should be phased-out as a precaution against spills.
□	An annual <i>risk assessment</i> should be conducted on all gravity-feed systems and measures implemented to reduce the risks.
Siting Requirements	
■	<i>Storage tanks</i> at marine <i>fuel dispensing stations</i> must not be located closer than 4.5m horizontally from the normal annual high-water mark. (FC 4.5.6.6.)
■	Solid piping must be used between <i>storage tanks</i> located on shore. Suitable lengths of acceptable flexible hose may be used between piping on floating structure and solid piping located on shore. (FC 4.5.6.6.)

Bullets:	■ Statutory Requirements • □ Recommended Practices ◦	Symbols: less than (<) greater than (>) equal to or less than (=) equal to or greater than (≥)	Abbreviations: meter (m) litre (L) kilogram (Kg)
-----------------	---	--	---

Statutory Requirements & Recommended Practices

- Where *storage tanks* at marine *fuel dispensing stations* are at an elevation above the dispenser, an electrically operated solenoid valves, designed to open only when the dispensing apparatus is being operated, must be provided at the *storage tank* outlet. (FC4.5.6.6.)

5.2 OPERATIONS

Spill Control & Secondary Containment

- All fuel *storage tanks* > 230L capacity require *secondary containment*. (FC 4.3.7.)
(See Section 6. 1. Secondary Containment.)
- *Spill control* must include one or more of the following:
 - double-walled tank
 - tank-in-a-box system
 - a graded or sloped site capable of diverting and containing a spill and preventing spills from entering natural waterways, storm drains and sanitary sewers
 - a paved or concrete pad sloped so that water and spilled fuel is directed to an appropriately designed oil/water separator
 - a non-combustible barrier of sufficient height to contain the spill. (FC 4.1.6 & FC 4.3.7.)
- *Secondary containment* must be able to contain 110% of the primary tank plus 10% of all the additional containers. *Secondary containment* must not be used for storage purposes. (FC 4.3.7.3 & FC 4.3.7.9)
- Tanks within the containment area must be on the ground, mounted to a skid or securely positioned on a cradle. The cradle or tank support shall have a fire-resistance rating of not less than 2 hours (i.e. steel). (FC 4.3.3.1.)
- Visual inspections must be made daily and during each shift of the piping system, pumps and ancillary equipment for leaks, spills and obvious abnormal conditions. Any leakage must be repaired immediately. (FC 4.4.11.5.)
- Precipitation must not be allowed to accumulate within the containment area. (FC 4.3.7.8.)
- Safety measures for docks and floating structures should take into account wave action, tidal movement and wind storms, and may include:
 - additional containment (e.g., 150%) with an increased distance between the tank and the wall of the *secondary containment* (e.g., 1m)
 - floats engineered, designed and constructed to be stable when the fuel tank, and possibly the *secondary containment*, are at maximum capacity due to water accumulation.
- Ensure that the *secondary containment* is kept clean of fuel and oil contamination.

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements □ Recommended Practices ○ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (=) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
---	---	--

Statutory Requirements & Recommended Practices

Safety Awareness

- At least 2 portable 20-B:C rated *fire extinguishers* and one spill response kit must be provided on site. (FC 4.1.5.1.)
- Only trained personnel must be allowed to use the fuel dispensing system. (FC 4.4.11.2.)
- Signs, indicating that the ignition must be turned off and smoking is not permitted while the vehicle is being refuelled, must be visible to every driver approaching the dispenser. (FC 4.5.8.8.)
- Mark each *storage tank* at a level corresponding to 90% capacity, and do not fill beyond that level.
- Ensure that clearly marked sign outlining the fuelling procedures is visible to all operators.
- All personnel on floating structures should use coast guard-approved life jacket/vests.
- Non-skid surfaces should be used in areas of high traffic and on tidal fluctuating ramps.
- For docks and floating structures, additional safety measures should be considered to take into account wave action, tidal movement and wind storms. These measures may include:
 - stabilizers under the fuel dock
 - one-way flow valves on all solid lines connecting *storage tank* to dispensers
 - break-away devices between docks and dock/shore.

Dispensing

- Dispensers at *marine fuel dispensing stations* shall be at a location which will permit safe access by watercraft. (FC 4.5.2.4.)
- At *marine fuel dispensing stations*, a readily accessible valve shall be provided in each pipeline at or within 7.5m of the pier to shut off the supply from shore. (FC 4.5.4.3.)
- Tanks and pumps that are not integral with the dispenser shall be located on shore or on a pier of the solid-fill type. (FC 4.5.6.6.)
- Where shore locations would result in excessively long supply lines to the dispenser, *storage tanks* to a maximum capacity of 5,000L to a maximum capacity of 5000L are permitted on a pier provided applicable spacing, *secondary containment* and piping requirements are met. (FC 4.5.6.6 & FC 4.3.7.)
- The length of extended fuel dispensing hose at *marine fuel dispensing stations* is permitted to exceed the values which apply to other *fuel dispensing stations* (4.5m, or 6m). (FC 4.5.5.1.(4))
- All hoses must be fitted with a *breakaway valve* when using a nozzle with a hold-open device. (FC 4.5.5.2.)
- Keep all fuel delivery hoses off the surface of the dock walkway.

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements • □ Recommended Practices ○ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (≤) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
--	---	--

Statutory Requirements & Recommended Practices

- ❑ Use anti-surge valves in all the fuel vent lines.
- ❑ Use *breakaway valves* between all jump-hoses for dock-to-dock and dock-to-shore connections.
- ❑ Any delivery hose that has the potential to cause a spill, if it were pulled from the delivery pump or valve, should be fitted with a *breakaway valve*.
- ❑ A clearly marked sign outlining fuelling procedures should be visible to all operators including:
 - one person should stay with the fuel nozzle at all times during refuelling
 - sorbent pads should be used to catch drips from the nozzle.
- ❑ Tanks should be marked at a level corresponding to 90% capacity, not filled beyond that level, and care should be taken so that:
 - fuel levels are checked prior to filling
 - valves are closed and the hose properly secured when refuelling is finished
 - appropriate fuel caps are secured after refuelling
 - portable fuel tanks are filled onshore.
- ❑ For docks and floating structures, safety measures should be taken, to account for wave action, tidal movement and windstorms, including one-way flow valves on solid lines from *storage tanks* to dispensers.

Pollution Prevention

- All dock facilities must have spill response kits capable of containing and absorbing fuel spills on water. (FC 4.1.6.3.) (See Section 9.5 Spill Response Equipment.)
- Suitably qualified personnel must prevent a boom boat from being overfilled by providing continuous supervision of the filling operations. (FC 4.3.1.8.)
- ❑ Sorbent pads should be used around the fill stem pipe to catch any drips from the nozzle while refuelling.
- ❑ Standard industrial refuelling equipment and parts should be used to ensure that the design meets industrial standards.

Emergency Response

- Spills of TDG Class 3 – *flammable liquids* $\geq 100L$ must be reported to the Provincial Emergency Program (PEP) telephone **1-800-663-3456**. (WMA, *Spill Reporting Regulation* – see definition of TDG Class 3 *flammable liquids* in Section 11. Glossary.)
- Ensure that spills are recovered and that contamination is removed or treated. (FC 4.1.6.3.) (See Section 8. Treating Hydrocarbon Contaminated Soils.)

Bullets:	<ul style="list-style-type: none"> ■ Statutory Requirements • ❑ Recommended Practices ◦ 	Symbols:	<ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (≤) equal to or greater than (≥) 	Abbreviations:	<ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
-----------------	---	-----------------	--	-----------------------	---

Statutory Requirements & Recommended Practices

- Maintain a spill response kit capable of containing and absorbing fuel spills. (FC 4.1.6.3.)
- Review fire safety plans annually. (FC 2.8.2.)
- Post spill response procedures in locations that are visible to all operators
- An emergency response plan should be implemented immediately following a spill.
- Use all available resources and technical expertise to ensure a quick and effective response.
- Maintain an adequate spill response kit capable of containing and absorbing fuel spills. (See Section 9.3. Spill Response Equipment.)
- An emergency shut-off system should be used to immediately close all valves between fuel storage units and dispensing units.

5.3 DOCUMENTATION & TRAINING

Inspection & Documentation

- Visual inspections must be made daily and during each shift of the piping system, pumps and ancillary equipment for leaks, spills and obvious abnormal conditions. Any leakage must be repaired as quickly as practicable. (FC 4.4.11.5.)
- A fuel-*storage tank* that is resting on the ground, such that visual inspection beneath the tank is not possible, must be measured daily (using tank dip measurements) and any gain or loss of liquid recorded. (FC 4.3.16.1.)
- Implement an *environmental management system (EMS)* to assess and assist in managing risks.
- The owner/operator should keep a record of all volumes before and after deliveries.
- Develop a checklist system to ensure all aspects of the facility are inspected and working as required.

Training and Signage

- Post clearly legible operating instructions. (FC 4.5.8.4. & FC 4.5.8.8.)
- Emergency instructions must be conspicuously posted. (FC 4.5.8.4.)
- Spill and fire training procedures should be assessed annually and changes implemented as necessary.
- A record of training scenarios and exercises should be kept on file.

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements • □ Recommended Practices ◦ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (=) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
--	---	--

Section 6. SECONDARY CONTAINMENT & COLLISION PROTECTION

Statutory Requirements & Recommended Practices	
6.1 Secondary Containment	
<ul style="list-style-type: none"> ■ The Ministry of Water, Land and Air Protection may order preventive measures to reduce the risk of a spill entering the environment. (WMA Section 33) □ <i>Secondary containment</i> works should include <i>spill control</i> measures for preventing <i>petroleum products</i> from entering natural waterways, storm drains and sanitary sewers. These measures may include the following: <ul style="list-style-type: none"> ○ site selected for adequate slope or graded to divert and containing a spill ○ double-walled tanks or tank-in-a-box systems that operate in high-risk areas (See Section 7. – Risk assessment) ○ paved or concrete pad sloped so that water and spilled fuel will be directed to an appropriately designed oil/water separator ○ tank-farm <i>berm</i> that conforms to FC 4.1.6 or containment for a single tank of sufficient size to contain the volume of the tank plus 10% ○ for a multi-tank <i>farm</i> facility, a <i>berm</i> capable of containing 110% of the largest tank or 100% of the largest tank plus 10% of the aggregate volume of all the tanks within the <i>berm</i>, whichever is greater. 	
6.2 Design, Materials & Construction	
<ul style="list-style-type: none"> □ <i>Secondary containment</i> works should be designed and constructed by incorporating: <ul style="list-style-type: none"> ○ concrete, steel or soil with an impermeable geotextile material of 30 mil ○ soil permeability should be sufficient to contain a spill (i.e. clay of not more than 10^{-6} cm/s) ○ geotextile with sand above and below the geomembrane liner when used in combination with soil ○ a means of removing accumulated precipitation and any spills within the <i>bermed</i> area. (For example a sump and siphon system, an oil/water separator or a hydrocarbon detection electric sump pump) ○ necessary means of testing for leaks after construction. (For example, fill the <i>berm</i> with water and monitor the level over a period of a few days.) ○ covered containment where practicable to minimize maintenance. 	
6.3 Maintenance	
<ul style="list-style-type: none"> □ Maintenance should include regular inspection of containment works to ensure: <ul style="list-style-type: none"> ○ the integrity of the containment system ○ containment systems are emptied of rainwater/snow accumulations ○ drainage valves and plugs in steel <i>secondary containment</i> units are closed or sealed ○ geomembranes are not exposed or damaged. 	
6.4 Discharge of Wastewater	
<p>Subject to compliance with the WMA, <i>Petroleum Storage and Distribution Facilities Stormwater Regulation</i>, the <i>Special Waste Regulation</i>, and a permit, approval or order, an operator may introduce hydrocarbon contaminated storm water effluent into the environment from a petroleum storage and distribution facility.</p>	

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements • □ Recommended Practices ○ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (≤) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
--	---	--

Statutory Requirements & Recommended Practices

- A petroleum storage and distribution facility that:
 - has a cumulative storage capacity >100,000 L,
 - occupies a location for a period ≥180 consecutive days, or
 - is not part of a retail service station,
 must maintained the discharge of stormwater from its operations to the environment, so that the total extractable hydrocarbon in the discharged effluent is = 15mg/L.
- Maintain any sized operation so that the quality of a discharge to the environment does not exceed a total extractable hydrocarbon content of 15 mg/L.
- If the accumulated precipitation has an oily sheen, a bad odour or appears to be contaminated, it should be sampled and analyzed according to Schedule 2, WMA, *Petroleum Storage and Distribution Facilities Storm Water Regulation*.
- Use an oil/water separator, carbon filter, coalescing separator or other approved treatment/filter system as appropriate.
- Contaminated water from a *secondary containment* can be pumped into *drums* (or other containers) and disposed of through a suitably qualified disposal company.

6.5 Collision Protection

- *Storage tanks* that are exposed to risk of collision must be protected by posts or guardrails. (FC 4.3.7.4. (2)(c))
 - the B. C. Fire Commissioner has ruled that *aboveground storage tanks* at permanent *fuel facilities* require barriers consisting of not less than 100mm diameter steel pipes filled with concrete, that are set into the ground to a depth of at least 1m and extend above ground for at least 750mm. These posts must be spaced not more than 1400mm apart and positioned at a distance of 1m from the exterior of the tank assembly’s outer shell. (HM 09 91-11-21).
- Regarding a tank-in-a-box storage system the B. C. Fire Commissioner has ruled that the aboveground tank assembly satisfies the intent of FC 4.1.6. and is acceptable without the need for a conventional dike. (HM 09 91-11-21).

<p>Bullets:</p> <ul style="list-style-type: none"> ■ Statutory Requirements • □ Recommended Practices ◦ 	<p>Symbols:</p> <ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (=) equal to or greater than (≥) 	<p>Abbreviations:</p> <ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
--	---	--

Section 7. RISK ASSESSMENT

The objective of *risk assessment* is to help operators understand the level of risk they are taking in managing their *fuel facility* for the purpose of taking appropriate risk-control measures.

This section provides a simple risk-ranking approach:

- assign a risk-rank value (3 for high, 2 for medium and 1 for low) for each of the risk identification categories indicated in the column on the left in Table 7.1.
- add these values to arrive at the total risk-ranking value for the fuel storage facility.

Table 7.1. Risk-Ranking for Land-Based Fuel Facilities

Risk Identification Category	Risk Rank High	Risk Rank Medium	Risk Rank Low	Assigned Risk-Rank Value
Numerical Value	3	2	1	
Environmental				
Distance to nearest water course	< 50m	50m-100m	>100m	
Characteristic of soil at the <i>fuel facility</i>	Porous or unknown	semi-porous	Non-porous clay/bedrock	
Slope of terrain surrounding the <i>fuel facility</i>	>6% slope	2%-6% slope	<2% slope	
Operational				
Site designation or description	High traffic logging road (Main Line)	Low traffic logging road (Side Spur)	No through traffic logging road	
Duration of <i>fuel facility</i> operations	> 6 days	2-6 days	< 2 days	
Volume of fuel stored at the <i>fuel facility</i>	> 4500L	500L-4500L	<500L	
Number of times the <i>fuel facility</i> is used per day	> 12 times per day	6-12 times per day	<6 times per day	
Amount of traffic around the <i>fuel facility</i>	> 15 people on site	5-15 people on site	<5 people on site	
Prevention / Preparedness				
Distance to additional spill response cache	> 60 minutes	15-60 minutes	<15 minutes	
Additional <i>spill control</i>	Tank with no <i>secondary containment</i>	Tank with <i>secondary containment</i>	Tank with <i>secondary containment & additional spill control – graded site</i>	
Last spill response training session for everyone handling fuel	Operator not trained in >2 years	Operator not trained in 1-2 years	Operator trained in the last year	
Total Risk-Rank Value (total of the Assigned Risk-Rank Values) =				

Bullets:	<ul style="list-style-type: none"> ■ Statutory Requirements • □ Recommended Practices ◦ 	Symbols:	<ul style="list-style-type: none"> less than (<) greater than (>) equal to or less than (≤) equal to or greater than (≥) 	Abbreviations:	<ul style="list-style-type: none"> meter (m) litre (L) kilogram (Kg)
-----------------	---	-----------------	--	-----------------------	---

Section 7. RISK ASSESSMENT

In Table 7.2. use the total Risk Rank Value determined from Table 7.1. to determine appropriate levels of effort to mitigate the risks at the fuel handling facility.

Table 7.2. Recommendations on Risk Control Measures

Numerical Value	Risk Ranking	Recommendations on Risk Control Measures
<12	Low Risk	(a) No additional control measures are necessary.
12-23	Medium Risk	(a) Additional control measures should be considered to reduce risk. (b) Document inspections.
>23	High Risk	(a) Additional controls are necessary to reduce risk. (b) Consider moving the fuel facility. (c) Document inspections.

Bullets: <ul style="list-style-type: none"> ■ Statutory Requirements • □ Recommended Practices ◦ 	Symbols: less than (<) greater than (>) equal to or less than (=) equal to or greater than (≥)	Abbreviations: meter (m) litre (L) kilogram (Kg)
--	--	---

Section 8. TREATING HYDROCARBON CONTAMINATED SOILS

8.1 Introduction

The objective of this section is to provide some information on processes for handling, treating and disposing of soil that has been contaminated with petroleum hydrocarbons (gasoline, diesel fuel, lubricating oil and waste oil).

The ongoing remediation of polluted or contaminated sites will help minimize the long-term environmental impacts of contamination from minor spills, leaks and drips from mobile equipment. These remediation activities are meant to complement ongoing maintenance programs for the handling, transportation and storage of fuel.

The reader is referred to the *Contaminated Sites Regulation B. C. Reg. 375/96*, and the WMA, *Special Waste Regulation B. C. Reg. 63/88* for requirements related to the notification, investigation, remediation and if desired, certification of petroleum hydrocarbon contaminated sites and the movement, disposal or alternate use of petroleum hydrocarbon contaminated soil.

8.2 Polluted or Contaminated Soil Remediation

"Land farming" is a commonly used method of soil remediation for lightly hydrocarbon-contaminated soil that relies on natural breakdown of hydrocarbons by microbial action. This is done by spreading a shallow layer of contaminated soil onto a lined *bermed* area referred to as a *biocell*, or by piling the soil in long row known as a windrow.

Factors that determine the efficiency of microbial action include temperature, moisture, aeration and the availability of nutrients. In many cases, natural microbes present in soil are adequate to commence treatment; however, a commercially available microbial mixture may be worked into the soil along with dry nutrients (nitrogen and phosphorus) during periodic cultivation of the land farm.

Biocells and windrows should be located on impermeable soil (i.e. clay), as far away from watercourses or *riparian zones* as possible and secure from public access (i.e. within a fenced compound). Locate the *biocell* or windrow on high ground and above the seasonal high water table to facilitate proper drainage. It is important to check with a Ministry of Water, Land and Air Protection (MWLAP) Regional Office before finalizing the siting of proposed soil treatment facilities.

8.3 Contaminated Soil Collection

Contaminated soil or visually stained soil should be collected on a regular basis. Visual inspection of the ground surface should provide a rough estimate of the amount of soil that must be removed. Samples of the base and walls of the excavation pit will help ensure that all the contamination has been removed and provide a record of clean up.

In areas where the contaminated soil lies below existing structures (i.e. *storage tanks*, storage sheds, generator sheds, pumping stations, waste oil storage sheds) the following steps should be taken:

Ensure that all hydrocarbon leak(s) is/are stopped at the source. This includes leaking pipes, oil *drums*, drip trays, etc.

- Contact the MWLAP Regional Office to assist in a site assessment.
- Remove as much of the contaminated soil as possible.
- If the structure cannot be removed, the location of the contamination should be noted.

At historically contaminated sites, the depth of oil or fuel seepage may be considerable. Under these conditions an environmental consultant should be retained to assess the contamination and develop an effective remediation and monitoring plan.

8.4 Preparing a Windrow

A windrow is usually formed 1m to 2m in height and is as wide as the soil naturally falls during its construction. The soil is turned over frequently to promote aeration of the soil and evaporation of the hydrocarbon. During wet seasons, the windrows should be covered with plastic tarps to minimize the potential for leachate formation and the contamination of storm water runoff.

8.5 Preparing a Biocell

A *biocell* should be constructed over a period of time to a maximum depth of no more than about 3-4 ft (1 meter) in depth as the natural breakdown of hydrocarbons occurs. To allow for effective aeration, successive layers of contaminated soil should be spread up to 1 – 2 feet deep over a buffer layer of clean soil on the bottom of the *biocell*.

Stockpiled soil should be banked or sloped close to the perimeter of the *biocell*, and covered as necessary to deflect surface water run-off.

The *biocell* should have a built-in ramp at one end and to allow front-end loader/back-hoe operations while at the same time preventing runoff carrying hydrocarbons and fertilizer. The base of the *biocell* should be sloped to one corner to collect leachate. A pump-and-treat system may be required to ensure that leachate does not escape to the environment.

Where a geotextile-type liner is used, a protective buffer layer of uncontaminated soil or plywood should be used over and under the liner on the *biocell* floor.

8.6 Adding Nutrients

Based on the level of contamination and the soil type, add a commercially available microbial mixture and nutrient blend to the soil using a spray system. Work the soil until the fertilizer is adequately mixed throughout the layer of soil.

To avoid anaerobic poisoning of microbes, leachate accumulation and the need for leachate treatment, avoid excess water accumulation in the *biocell*.

Aerating the soil is very important, especially during the initial stages, because the bacteria in the soil require oxygen to break down the petroleum contamination. Aeration can be achieved using a cultivator or by turning it with a front-end loader every two weeks.

8.7 Disposal of Remediated Soil in British Columbia

Sufficiently treated soil can be useful as cover material for landfills or as material for road construction.

Prior to removing the soil for disposal or alternate use, written approval must be obtained from the MWLAP Regional Office. Complete information on contaminated site remediation in B. C. is available at the ministry's contaminated sites web page at: http://www.elp.gov.bc.ca/epd/epdpa/contam_sites/

Section 9. SPILL RESPONSE

This Section provides information on the spilled material, notification of appropriate authorities, initial assessment of the extent of the spill in the environment, initial spill response and a list of spill response equipment.

9.1. Initial Spill Identification, Notification and Assessment

The first responder must make an initial identification of the spilled material, and assess the incident prior to taking action to ensure that resources are used effectively. This assessment includes collecting information on safety and the extent of the spill in the receiving environment. The assessment is followed by an initial response procedure.

Table 9.1. Initial Spill Identification, Notification and Assessment Procedure

PRIORITY	ACTION
Identify Spilled material	<ul style="list-style-type: none"> □ Identify product spilled and flammability of the product (<i>What</i>) (See Section 11. Glossary for FC and TDG definitions of <i>flammable liquid/combustible liquids</i>.)
Safety	
(a) Use the buddy system	<ul style="list-style-type: none"> □ For spills of gasoline or other <i>flammable liquids</i> – clear and secure the site and notify the fire department and the Provincial Emergency Program (PEP) – see telephone number below. Further spill assessment and response for these products is usually too dangerous.
(b) Never work alone.	
(c) Initiate action	
Safety Action	<ul style="list-style-type: none"> □ Determine safety and protective equipment for working in or around the spill. <ul style="list-style-type: none"> ○ Provide first aid to injured persons ○ Monitor vapour levels ○ Prioritize the safety action plan.
Initial Spill Description	<ul style="list-style-type: none"> □ Describe the spill (<i>Where, When and How</i>) <ul style="list-style-type: none"> ○ Identify the tank volume ○ Note the duration of spill from tank or line ○ Note any potential fire hazards ○ Note any other physical hazards ○ Determine if the spill can be stopped ○ Determine if the spill can be contained at the source or downstream
Notify PEP 1-800-663-3456	<ul style="list-style-type: none"> ■ Immediately report spills ≥ 100 litres of TDG Class 3 – <i>flammable/combustible liquids</i> or waste oil to PEP. (<i>WMA Spill Reporting Regulation</i>) <ul style="list-style-type: none"> • Complete a spill reports form, including <i>whom, what, where, when and how.</i>
Description of Spill in the Receiving Environment	<ul style="list-style-type: none"> On land <ul style="list-style-type: none"> ○ Mark the extent (perimeter) of the spill area. ○ Dig test pits to determine the depth of the spill in the ground. In streams, creeks or ditches <ul style="list-style-type: none"> ○ Note the destination of spilled product downstream. ○ Identify eddies, pools or culverts to use in diverting the spill. ○ Note the depth and the velocity of the water. ○ Note soils, vegetation, fish spawning areas, bird habitat, and wildlife. In lakes, ponds & lake foreshore <ul style="list-style-type: none"> ○ Identify any downstream areas and the rate of spread of the main slick. ○ Visually inspect the foreshore to identify the extent of contamination. ○ Note where the product is pooling along shore. ○ Note any marsh areas that must be protected.
Determine equipment needed for initial containment, recovery, and clean-up.	

9.2. Initial Spill Response for Combustible Products

The first response action provided in Table 9.2. is to be used in conjunction with annual spill response training.

Table 9.2. Initial Spill Response for Combustible Products (See Section 11. Glossary for FC and TDG definitions of *flammable liquids* and *combustible liquids*.)

PRIORITY	RESPONSE ACTION
Act Fast & Think Safety	<ul style="list-style-type: none"> ❑ Use Common Sense! ❑ Prior to taking any action, ensure that a complete assessment is made to ensure that resources are used effectively. ❑ Use appropriate safety procedures and personal protective equipment. ❑ An intense & quick response is essential to minimize the potential impact on the environment.
Containment & Recovery	<p>Spill to Land</p> <ul style="list-style-type: none"> ❑ Mark the perimeter of the spill. ❑ Dig recovery ditches around the perimeter (and pits within the spill area) to contain the spill. ❑ Monitor the ditches and pits to ensure the collection system are effective. ❑ Use sorbent pads to remove free product and excavate the contaminated soil. ❑ Sample the soil to determine the extent of contamination. ❑ Pump the product from the containment area or obtain approval from BC MWLAP to burn the product. <p>Spill to Water</p> <p>To effectively contain the spill, use several containment methods in series:</p> <ul style="list-style-type: none"> ❑ In a ditch or stream, contain the spill using tarp containment system, underflow system or containment booms. ❑ In open water (i.e. lake) divert the spilled product to the containment system using sorbent booms, synthetic booms. ❑ Use sweeps to corral the spilled product to one corner. Add a second containment boom if required. ❑ Use sorbent pads and/or pumps to collect the spill products from the containment area. ❑ Use sweeps and sorbent pads to recover the product. Use a wringer to extract the excess product then reuse the sorbent pads. ❑ Use a skimmer or suction pump (i.e. pump truck) if the volume is significant and the spill is contained. ❑ Develop a monitoring program to assess and remove free product over a given time frame.
Disposal & Site Restoration	<ul style="list-style-type: none"> ❑ Confirm disposal options and approval with BC MWLAP. ❑ Take photos and notes to document the spill incident, response and clean-up. ❑ Ensure samples are taken and the results are properly documented and kept on file.

9.3. Spill Response Equipment

The necessity for spill response equipment will depend on the environment, the time of year and the type of incident. The following table – “General Spill Response Equipment Cache” serves as a guide to equipment that should be maintained within a reasonable distance of any potential spill location. Separate lists are provided for pick-up trucks and tank vehicles to help implement response preparedness.

The need for additional response equipment, resources or expertise will depend on the initial assessment of a spill, including safety, initial *spill control* and the extent of the spill in the receiving environment. These resources should be listed in the emergency response plan.

Table 9.3 (a) General Spill Response Equipment Cache

General Equipment
Communication
Up-to-date Emergency Spill Response Plan
Inventory of spill response equipment and locations
Spill assessment forms (i.e. Environmental, safety and spill assessments)
Two-way radios, cell phone or other appropriate radio transmitter/receiver
Personal Protection and Safety
PVC gloves, insulated rubber gloves, leather gloves
Rain gear (pants and jackets), steel toe rubber boots
Safety glasses, hard hat, hearing protection
20:BC rated <i>fire extinguisher</i> , first aid kits
Hand Tools
Tool kit, <i>drum</i> bung-wrench
Pointed and/or broad shovels
Flagging / barrier tape, traffic cones
Tie wire, duct tape, 100m of nylon rope (braided or twisted)
Containment
1L of commercially available bentonite clay or equivalent (in dry or pre-mixed form) used to plug holes in leaking containers
3 tarps (large and medium)
80-100 empty sand bags (to be filled when required)
River boom 100-600 ft (30-180 m)
Re-bar (12 stakes)
Rope 1/4" diameter x 300 ft (200 m)
5 PVC pipes, 4" x 12'
Recovery and Storage
3-6 bails of sorbent pads
2-4 bails of sorbent booms
1 roll of sorbent blanket
1,000 gallon (4,546 litre) port-a-tank
45 gallon <i>drums</i> - open tops with lids
Wringer for pads with open top <i>drum</i>
Plastic <i>drum</i> liners

Section 9. SPILL RESPONSE

Table 9.3 (b) Spill Response Equipment Located with Pick-Up Truck

Equipment for 500L truck-box fuel tanks, 200L drums, & pails
Personal Protective Equipment
Rubber steel toe boots, hard hat
Rain gear, PVC gloves, eye/ splash protection
Hand Tools
Shovel
Flagging / barrier tape
Containment
250ml commercially available bentonite clay (in dry or pre-mixed form) used to plug holes in leaking containers.
1 tarp (4m x 5m) and rope
10-20 empty sand bags (to be filled when needed)
Plywood (1m x 2m)
Recovery and Storage
Plastic <i>drum</i> liners (heavy plastic bags)
25 absorbent pads (for petroleum)
1 absorbent boom (3m) and rope

Table 9.3 (c) Spill Response Equipment Located with Tank Vehicles

Equipment for 2,000L – 5,000L tanks & 10,000L fuel trucks
Personal Protection and Safety
Rubber steel toe boots, hard hat
Rain gear, PVC gloves, eye/ splash protection
Hand Tools
2 shovels
Tool kit
Reflective traffic warning triangles
Containment
1L of commercially available bentonite clay (in dry or pre-mixed form) used to plug holes in leaking containers.
2 tarps (medium and large)
<i>Hatch-cone kit</i> and hatch lock kit
3 plastic pails
Mobile Operations
Plastic <i>drum</i> liners (heavy plastic bags)
25 absorbent pads (for petroleum)
1 sorbent boom (3m) and rope

Section 10. STATUTES, INDUSTRY STANDARDS & CODES OF PRACTICE

A *fuel facility* should be operated and maintained according to (and not limited to) the following statutes, industry standards and codes of practice:

- B. C. Coastal Marine Facility and Operating Standards, Second Edition 1992
- British Columbia *Fire Code* 1998, and Office of the Fire Commissioner – Interpretation Bulletins (See below: Interpretation Bulletin No. IB 016 Pumps for Transferring Flammable or Combustible Liquids.)
- Fire Services Act [RSBC 1996] Chapter 144
- Fisheries Act (See *note below)
- Forest Act
- Forest Practices Code of British Columbia Act B. C. Reg. 106/98 Consolidated to November 24, 2000. (FPC)
 - Community Watershed Guidebook – 4
 - Forest Road Regulation
 - Operational Planning Regulation & Forest Road Engineering Guidebook
 - Range Practices Regulation
 - Timber Harvesting Practices Regulation
- Motor Vehicle Act, B. C. Reg. 26/58 (MVA)
- Transportation of Dangerous Goods Act and Regulations (TDG)
- ULC/CSA standards
- Water Act [RSBC 1966] Chapter 483
- Water Protection Act [RSBC 1996] Chapter 484
- Waste Management Act (WMA) (See *note below)
 - Contaminated Sites Regulation B. C. Reg. 375/96
 - Petroleum Storage and Distribution Facilities Storm Water Regulation B. C. Reg. 168/94.
 - Special Waste Regulation B. C. Reg. 63/88
 - Spill Reporting Regulation B. C. Reg. 263/90.
- Workplace Hazardous Materials Information System (WHMIS)

Office of the Fire Commissioner – Interpretation Bulletin No. IB 016 Pumps for Transferring Flammable or Combustible Liquids

In response to some questions on the issue of pumps and the power source for pumps used to transfer flammable or combustible liquids from containers or portable tanks, clarification of the OFC position and interpretation of the BC Fire Code is offered.

Part 4 of the BC Fire Code deals with transferring of flammable or combustible liquids from containers or portable tanks, whether mounted on trucks or service vehicles or installed in remote areas outside of buildings.

Section 4.22 “Tank Vehicles” is silent about pumping equipment yet the scope of Section 4.22 covers any vehicle with a cargo tank having a capacity of more than 450 L, (100 gallons) mounted or built as an integral part of the vehicle.

Dispensers at fuel dispensing stations must conform to CSA B346-M “Power operated Dispensing Devices for Flammable Liquids”. Pumps used to transfer flammable or combustible liquids from containers and tanks are required to be designed in conformance with good engineering practice. Pumps tested and listed by recognised agencies such as Underwriters Laboratories Inc. and Factory Mutual Engineering Corporation are considered to be designed in conformance with good engineering practice.

The power sources for driving these recognised pumps are varied and range from hand operated, electric motors, internal combustion engines and transfer box drives from the vehicle gear box.

Section 10. STATUTES, INDUSTRY STANDARDS & CODES OF PRACTICE

Hand operated pumps pose little if any concerns and should be used only for transfer from drums. Electric driven units shall be listed for use with flammable or combustible liquids and are used frequently on tanks mounted on service vehicles.

Internal combustion engines used to drive pumps transferring flammable or combustible liquids have created some concerns in the last few years. However, NFPA 385 "Standard for Tank Vehicles for Flammable and Combustible Liquids" recognises this practice and lays out some requirements where internal combustion engines are used to drive pumps.

1. The engine air intake shall be equipped with an effective flame arrester, or an air cleaner having effective flame arrester characteristics, substantially installed and capable of preventing emission of flame from the intake slide of the engine in the event of a backfire.
2. The fuel system shall be so located or constructed as to minimize the fire hazard from spillage during filling and leakage from the tank or the fuel system.
3. The engine shall be so located in relation to the pump that spillage from the pump shall be prevented from coming in contact with the engine or any part of the ignition and exhaust system. Adequate shielding can be provided to attain the same purpose.
4. Where the engine is carried within an enclosed space, adequate provision shall be made for air circulation at all time to prevent accumulation of explosive vapours and avoid overheating of the engine.
5. The exhaust system shall be substantially constructed and installed and free from leaks. The exhaust line and muffler shall have adequate clearance from combustible materials, and shall discharge at a location that will not constitute a hazard. When engines are carried within an enclosed space, the exhaust gases shall discharge outside of such enclosed space.
6. The ignition wiring shall be substantially installed with firm connections. Spark plugs and other terminals shall be suitably insulated to prevent sparking in event of contact with conductive materials. The ignition switch shall be of the enclosed type.

***Under the Waste Management Act**

- Failure to report the fuel spill – a violator may be liable to a penalty of up to \$200,000 and/or up to six months imprisonment.
- Introduction of waste into the environment (air, land or water) – a violator may be liable to a penalty of up to \$1,000,000 and/or up to six months imprisonment.
- Introduction of waste into the environment in such a quantity as to cause pollution – a violator may be liable to a penalty of up to \$1,000,000 and/or up to six months imprisonment.

***Under the Fisheries Act**

- A fuel spill or deposit of other deleterious substances into waters frequented by fish is a violation – a violator may be liable to a penalty under Summary Conviction of up to \$300,000 and/or up to six months imprisonment. If convicted under Indictment, the violator is liable to a penalty of up to \$1,000,000 and/or up to 36 months imprisonment.

The onus is on the company or responsible person to demonstrate to the Conservation Officer Service the means taken to prevent a fuel spill in their operations involving handling, storage, and transportation of fuels.

Section 11. GLOSSARY

<i>aboveground storage tank (AST)</i>	means a <i>storage tank</i> (capacity greater than 230 litres (L)) which is at least 90% above surface grade.
<i>berm</i>	means an impermeable system for containing leaks or spills. In <i>tank farms</i> containing a single tank, it must be of sufficient size to contain the volume of the tank plus 10%. For a multi- <i>tank farm</i> facility the <i>berm</i> must contain 110% of the largest tank or 100% of the largest tank plus 10% of the aggregate volume of all the tanks within the <i>berm</i> , which ever is greater. The <i>berm</i> can be constructed of steel, concrete, or soil in combination with a geotextile liner that is compatible with and impermeable to the stored liquid.
<i>biocell</i>	means a <i>bermed</i> and lined area used for application of biological methods for treating hydrocarbon-contaminated soil.
<i>breakaway valve</i>	means valves used on fuel hoses to prevent spills from hose and valve connectors. The typical breaking point is 300 lbs. (136 kg). These valves are usually located on either end of the fuel dispensing hose.
<i>combustible liquids</i>	(See <i>flammable liquids</i> below – this glossary)
CGSB 43.146	refers to the Canadian General Standards Board (CGSB) standard for “Intermediate Bulk Containers (IBC) for the Transportation of Dangerous Goods” and the United Nations (UN) requirements for IBC’s. The requirements for certification include material type, construction and pressure relief requirements, design type, tests, and quality assurance.
CSA B620-87	means the Canadian Standards Association (CSA) <i>Preliminary Standard B620-1987 Highway Tanks and Portable Tanks for the Transportation of Dangerous Goods</i> . This standard outlines the requirements for certification including: material thickness, weld thickness, material alloy and properties, structural integrity, circumferential reinforcement, rollover protection, rear bumpers, emergency flow control and piping protection, vents and, closure for manholes.
CSA B620-98	means the Canadian Standards Association (CSA) <i>Preliminary Standard B620-98 Highway Tanks and Portable Tanks for the Transportation of Dangerous Goods</i> . This second edition of the CSA Standard B620 is expected to replace and supersede (in 2001) Preliminary Standard B620 published in 1987 under the proposed regulation.
<i>dunnage</i>	means loose material used around a cargo to prevent damage.
<i>drum</i>	means a barrel having a capacity of less than 230L (50 imperial gallons) but greater than 23 litres (5 imperial gallons).
<i>environmental management system (EMS)</i>	means a system including “organizational structure, responsibility, practices, procedures, processes, and resources for developing, implementing achieving, reviewing, and maintaining the environmental policy” - (ISO 14001)
<i>fire extinguisher</i>	includes: a 10-B:C rated portable <i>fire extinguisher</i> (weighing approximately 5lbs. depending on manufacturer); a 20-B:C rated portable <i>fire extinguisher</i> weighing approximately 10lbs. depending on manufacturer).

Section 11. GLOSSARY

- Fire Code (FC)** Means the British Columbia *Fire Code*, 1998.
- fixed location** means any location that is used to store a fuel tank (or container), regardless of the length of time it is being stored.
- flammable liquids
combustible liquids** In the B. C. FC (and National *Fire Code* – NFC), liquids with a *flash point* below 37.8 °C are referred to as *flammable liquids*, whereas liquids with a *flash point* at or above 37.8 °C are referred to as *combustible liquids*. In contrast, TDG Regulations classifies *flammable liquids* as Class 3 Dangerous Goods, and defines them as liquids having a *flash point* below 61 °C.

Comparison of FC and TDG classifications based on flash point (FC A-4.1.2.1.)	Flash point °C	NFC Classification	TDG Classification
	below –18	IA	3.1
	at or above –18 & below 22.8	IA	3.2
	below 22.8 (equivalent to 23 in TDG)	IB	3.2
	at or above 22.8 & below 37.8	IC	3.3
	at or above 37.8 & below 60 (equivalent to 61 in TDG)	II	3.3
	at or above 60 & below 93.3	IIIA	Not Regulated
	at or above 93.3	Not Regulated	Not Regulated

- flash point** means the lowest temperature at which a liquid or solid (e.g., petroleum product) gives off vapour of sufficient concentration to form an ignitable mixture in air as determined by a closed cup test describe in Part I of Schedule IV of the TDG Regulations.
- FPC** means Forest Practices Code of British Columbia Act B. C. Reg. 106/98 Consolidated to November 24, 2000
- fuel cache** means a temporary storage (e.g. seasonal) of *drums* at a remote location.
- fuel dispensing (or service) station** means any *fuel facility* (operating on marine or fresh waters) including service stations, self-service outlets or *tank farms* at isolated industrial projects at which *flammable liquids* or *combustible liquids* are dispensed from fixed equipment into the fuel tank of a vehicle, watercraft, or other equipment.
- fuel facility** means any location (may include a remote *fuel cache*) at which *flammable liquids* or *combustible liquids* are dispensed from a *tank vehicle* or fixed *storage tank* into the fuel tank of a motor vehicle, equipment or watercraft.
- hatch-cone kit** is a funnel-shaped bag used to off-load fuel from the hatch of a rolled over fuel truck. The wide end of the funnel is fitted with a wire clamp that can be secured under the lip of the dome. The small end of the funnel is fitted with a cam-lock fitting for a hose connection.
- hydrocarbon fuels** means flammable or combustible *petroleum products* including but not limited to, gasoline, diesel, aviation gasoline, jet fuel A (kerosene), jet fuel B (naphtha).
- marine fuel dispensing (or service) station** See *fuel dispensing station* above – this glossary.

Section 11. GLOSSARY

<i>overflow protection</i>	includes: prevention of tanks from being overfilled by providing continuous supervision of the filling operation by personnel qualified to supervise such an operation; or, an <i>overflow protection</i> device conforming to ULC/ORD-C58.15, “ <i>Overflow Protection Devices for Flammable Liquid Storage Tanks.</i> ” Examples include float valve shut off devices, audible or visible overflow alarm systems, automatic sensing and shut-off devices and vent restriction devices.
<i>petroleum products</i>	includes pure hydrocarbon products or mixtures of hydrocarbons, which have been refined from crude oil, with or without additives, that is used as a fuel or lubricant. Such products include gasoline, diesel fuel, aviation fuel, kerosene, naphtha, lubricating oil, fuel oil, hydraulic oil and engine oil (including used oil) and exclude propane, paint, and solvents.
<i>portable tank</i>	means a closed container that is designed to be movable while containing liquid, which is equipped with skids, mountings or accessories to facilitate handling of the tank by mechanical means, and is not permanently attached to a transport vehicle.
<i>purged</i>	means a tank from which all vapours have been properly removed by forced air venting or by a non-combustible gas (CO ₂ or Nitrogen).
<i>riparian zones or areas</i>	mean those terrestrial areas where vegetation complexes and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables, and soils that exhibit some wetness characteristics. The terms have traditionally been used in reference to zones within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs and wet meadows. The <i>riparian zone</i> is influenced by and exerts an influence on the associated aquatic ecosystem.
<i>risk assessment</i>	means the rating of relative risks which includes: environmental, operational and prevention/preparedness factors (See Section 7. Risk Assessment.) that is expected be made and documented whenever fuel is stored at a new location.
RSBC	means Revised Statutes of British Columbia
<i>secondary containment</i>	means structures used for <i>spill control</i> such as: (a) a double walled container (or tank within a tank design); (b) a steel or concrete container (tank within a box design) capable of containing 110% of the volume being stored (should be manufactured to a ULC specification); (c) an earth or clay dike which is lined with an impermeable geomembrane material and is capable of containing 110% of the volume being stored; or, (d) a site which is graded or sloped to divert a spill into a collection system where it will not impact public health, safety or the environment. The containment should be lined with a geomembrane to prevent contaminating the subsurface soil layer.
<i>small container</i> <i>small TDG tank</i>	<i>Small container</i> means a container with a capacity of less than 230L, including canisters, jerry cans, pails and <i>drums</i> , that is covered by the <i>Fire Code</i> . <i>Small TDG tank</i> means a container with a capacity less than 454L, that is covered by the TDG Regulation. <i>Small TDG tanks</i> can be recognized by ULC or CSA label or logo.
<i>specified tank</i>	means a tank that was designed and manufactured to recognized engineering standards, in contrast to a “ <i>non-specified tank</i> ” which does not meet recognized engineering standards.

Section 11. GLOSSARY

<i>spill control</i>	means site selection and storm water management practices and techniques to prevent spills from entering natural waterways. It may include techniques and structures for diverting or containing spills and preventing them from entering storm drains and sanitary sewers, and may include grading the site, and using double walled tanks and tank-in-a-box systems.
<i>storage tank</i>	means a vessel for flammable or <i>combustible liquids</i> having a capacity greater than 230L, and designed to be installed in a <i>fixed location</i> . (FC 1.2.1)
<i>tank farm</i>	means any facility where bulk <i>petroleum products/ hydrocarbon fuels</i> are stored in <i>storage tank(s)</i> .
<i>tank vehicle</i>	means any vehicle, other than railroad tank cars and boats, with a cargo tank having a capacity greater than 454L, mounted or built as an integral part of the vehicle and used for the transportation of <i>flammable liquids</i> or <i>combustible liquids</i> and including tank trucks, trailers and semi-trailers. (FC 1.2.1)
Transportation of Dangerous Goods (TDG)	means the Transportation of Dangerous Goods Act, 1992 and Regulations, a comprehensive Canadian statute to promote public safety in the transportation of dangerous goods. .
truck-box fuel tank (includes slip tank or Tidy tank)	means a portable container used for transportation of fuels on a truck. The capacity may vary depending on the type of tank (see Section 2.1. Design.).
Underwriters Laboratory of Canada (ULC)	means the Underwriters Laboratory of Canada, a non-profit organization that maintains and operates laboratories, certification services and a quality system registration program for the examination, testing and classification of devices, construction, materials and systems to determine their relation to life, fire and property hazards.
ULC/ORD-C 142.13 – 1997	means to the Underwriters' Laboratories of Canada /Other Recognized Document requirements for steel tanks that are to be used for the limited transportation of flammable and <i>combustible liquids</i> employed in the servicing of off-road equipment. This document outlines the fabrication, inspection and testing for leakage before shipment from the factory as complete assemblies. These requirements cover tanks having a maximum capacity of 5,000L or single wall tanks and tanks with <i>secondary containment</i> either as double-wall vacuum monitored or contained tanks. These supply tanks are intended for off road use in forest management and construction or other areas where permitted by the authority having jurisdiction. Tanks manufactured before 2003 are acceptable to Transport Canada and may be used until 2010.
UN 31A/UN 31B	means the United Nations specification for acceptable intermediate bulk containers (IBC) for the transportation of dangerous goods (as per the TDG Regulation), that outlines the acceptable requirements for transporting <i>flammable liquids</i> and <i>combustible liquids</i> on all public roads. This specification will be the only recognized specification after 2010.

Section 12. CONTACTS

Regional & Sub-Regional Offices	MWLAP	Other Agencies
Vancouver Island Region	2080-A Labieux Road Nanaimo BC V9T 6J9 Tel: 250-751-3100 Fax: 250-751-3103	Office of the Fire Commissioner Victoria Tel: 250-356-9000 BC Forest Service Vancouver Forest Region, Nanaimo Tel: 250-751-7001
Lower Mainland Region	10470 152nd Street Surrey BC V3R 0R3 Tel: 604-582-5200 Fax: 604-582-5334	Canadian Coast Guard North Vancouver Tel: 604-631-3951
Southern Interior Region	1259 Dalhousie Road Kamloops BC V2C 5Z5 Tel: 250-371-6200 Fax: 250-828-4000	Office of the Fire Commissioner Kamloops Tel: 250-828-4001 BC Forest Service Kamloops Forest Region, Kamloops Tel: 250-828-4131
Southern Interior Sub-Region	201 - 3547 Skaha Lake Road Penticton, BC V2A 7K2 Tel: 250-490-8200 Fax: 250-492-1314	
Kootenay Region	401 - 333 Victoria Street Nelson BC V1L 4K3 Tel: 250-354-6355 Fax: 250-354-6367	BC Forest Service Nelson Forest Region, Nelson Tel: 250-354-6200
Kootenay Sub-Regional Office	205 Industrial Road G Cranbrook, BC V1C 6H3 Tel: 250-489-8570 Fax: 250-498-8506	Office of the Fire Commissioner Cranbrook Tel: 250-426-1272
Skeena/ North Coast Region	3726 Alfred Street Bag 5000 Smithers BC V0J 2N0 Tel: 250-847-7260 Fax: 250-847-7591	BC Forest Service Prince Rupert Forest Region, Smithers Tel: 250-847-7500 Canadian Coast Guard Prince Rupert Tel: 250-624-5390

Section 12. Contacts

Regional & Sub-Regional Offices	MWLAP	Other Agencies
Omineca-Peace	1011 - 4th Avenue Prince George BC V2L 3H9 Tel: 250-565-6155 Fax: 250-565-6629 Rm. 400, 10003 110 Ave Fort St. John, BC V1J 6M7 Tel: 250-787-3283 Fax: 250-996-5290	Office of the Fire Commissioner Prince George Tel: 250-561-5607 BC Forest Service Prince George Forest Region, Prince George Tel: 250-565-6100
Cariboo Region	400-640 Borland Williams Lake Tel: 250-398-4533 Fax: 250-398-4296	Cariboo Forest Region, Williams Lake Tel: 250-398-4345
Environment Canada Oil, Gas and Energy Division National Task Force on <i>Storage Tanks</i>		Tel: 819-997-1221
Office of the Fire Commissioner		Tel: 250-356-9000
Underwriters' Laboratories of Canada (ULC)		Tel: 416-757-3611
Canadian Standards Association (CSA)		Tel: 1-800-463-6727
<i>Provincial Emergency Program</i>		(PEP) 1-800-663-3456