

9th Edition

(1995-2020)

BC Fuel Guidelines

This guide summarizes the industry standards for fuel storage, handling and transportation to meet *due diligence* as it relates to prevention.

March 2020



BC Fuel Guidelines

2020 Revision

The 2020 **BC Fuel Guidelines** (9th Edition) was prepared by NorthWest Response Ltd., Smithers, British Columbia, Canada. This field guide summarizes the industry standards for fuel storage, handling and transportation based on applicable and current federal & provincial statutes, industrial codes of practice, engineering standards and best management practices.

This field guide is designed to be a quick reference for anyone working at remote construction and industrial operations in British Columbia. From major construction projects to small independent contractors, this guide has been used to demonstrate *due diligence* and has been recommended by the BC Ministry of Environment, Ministry of Mines and BC Ministry of Forests, Lands and Natural Resource Operations as well as Industrial and Crown Corporations.

While this document refers to applicable legal requirements, users should always reference the current legislation for accuracy and legal interpretation. The BC Fuel Guidelines is not a legal document however, if implemented, it will assist your operation in meeting the test of “*due diligence*”.

Established Industry Standard

R. vs. BC TEL Criminal Court Trial (1998) – The *BC Fuel Guidelines* was used in EVIDENCE with author/expert witness: Ray Hollenberg, NorthWest Response Ltd. to establish Industry Standards for fuel storage, handling and transportation in British Columbia, Canada.

Worker Certification Training

On-Line Fuel Management Training at www.fueltraining.ca (now available)

This course complies with the training and awareness requirements outlined in:

- WorkSafeBC: OH&S [Part 3, Div.3, Section 115(2)(e)];
- BC Fire Code (Division B, Part 4 - Sections 4.5.10 & 4.6.8);
- Environmental Management Act – Environmental Compliance and Risk Based Approach to *Due Diligence* as it relates to prevention;
- Transportation of Dangerous Goods: Training Certification for TDG Class 3 *Flammable Liquids*.

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SMALL CONTAINERS

- TDG Regulation, Motor Vehicle Act & Standards
- ☑ BC Fire Code, CCME AST Code & Industry/ Engineering Standards
- ☐ OH&S Regulation, Env. Mgmt. Act/ Regs. & Best Management Practices

Section 1

| TYPE | CONDITION, DESIGN & MAINTENANCE | STORING AND SECURING | DISPENSING | TRANSPORT |
|---------------------------|--|--|---|---|
| Drums & Jerricans (≤230L) | <p>Condition</p> <ul style="list-style-type: none"> ■ Must be designed, constructed, filled, closed, secured and maintained so that under normal conditions of transport, including handling, there will be no accidental release of the dangerous goods that could endanger public safety. ■ Jerry cans (<150L) have a lifespan of 60-months from date of manufacture but may be used for 120-months if: <ul style="list-style-type: none"> ● Jerry cans are part of a fleet, registered with TC; ● Used only for Class 3, PGII or PGIII products; ● Not damaged, cracked, deformed or leaking. ■ Drums (≥150L) are designed for one-time-use & require reconditioning prior to use. ☑ Designed, constructed and maintained in good condition to securely contain product <p>Construction Standard</p> <ul style="list-style-type: none"> ■ TP14850 (2018) are <i>Small Containers</i> for TDG ≤450L. ■ CSA B376 (2014) are <i>Portable Containers</i> for Gasoline and Other Petroleum ≤25L. ■ ULC/ORD – C30 are <i>Safety Containers</i> >5L and ≤25L. | <p>General requirements</p> <ul style="list-style-type: none"> ☑ Secondary containment is not required for <i>Small Containers</i> less than (<) 230L, however, it is always recommended at high risk locations based on <i>Risk Assessment Matrix</i>. ☑ Store all containers to prevent spillage. ☐ Do not store small fuel containers in <i>Riparian Management Areas</i> without authorization. ☑ Outdoor container storage areas must be designed to accommodate a spill of at least 1,000L when drums or containers are stored, moved or handled in bulk (i.e. on a pallet). ☑ Outdoor container storage areas must be designed to accommodate a spill of the <i>largest container capacity</i> when containers or drums are stored, moved or handled individually (i.e. not in bulk). ☑ For indoor storage of <i>flammable</i> and <i>combustible liquids</i>, use only ULC Approved Storage Cabinets that are vented outside. ☐ Vent with 5cm steel pipe directly outdoors. ☑ For indoor incidental use (<i>example: inside shop with no fire suppression system</i>), the max volume of <i>flammable</i> and <i>combustible liquids</i> allowed outside a storage cabinet is 600L of which not more than 100L shall be Class IA (gasoline). ■ Containers on a vehicle must be secured to prevent shifting, swaying, damage and/or escape. ■ Tie down straps must have safe <u>combined</u> working load rating <i>greater</i> than the secured load. ☐ Helicopter fuel storage is left to the discretion of the pilot but must remove all unwanted or unusable fuel storage drums from remote storage/staging locations. | <p>General requirements</p> <ul style="list-style-type: none"> ☑ Only transfer fuel with a pump designed for the products being handled. ☑ Do not fill containers beyond their safe filling level (<i>approximate: 90%</i>). <p>Labeling</p> <ul style="list-style-type: none"> ☐ WHMIS Labels for Class B: <i>Flammable Liquids</i> (Div.2) & <i>Combustible Liquids</i> (Div.3) <ul style="list-style-type: none"> ● Product Identifier; ● Hazard Pictogram; ● Precautionary Statement; ● Reference to SDS. ☐ Jerry cans are exempt from additional labeling if content matches the product identifier and container color: <ul style="list-style-type: none"> ● Red – Gasoline; ● Yellow – Diesel; ● Blue – Kerosene. <p>Standard Operating Procedures</p> <ul style="list-style-type: none"> ☐ Store the hose above the pump to avoid siphoning. ☐ Dispense all <i>flammable</i> and <i>combustible liquids</i> from drums in an upright position. ☐ Avoid gravity dispensing. ☐ When connecting a horizontal drum to ancillary equipment, always reseal bung connection and check daily for leaks, drips and spills. ☐ Conduct a Risk Assessment and implement additional control measures in high risk areas/operations. | <p>Transport</p> <ul style="list-style-type: none"> ■ All <i>small containers</i> may be relocated (transported) without secondary containment. ■ When transporting <i>used motor oil</i> and/or <i>used glycol antifreeze</i>: <ul style="list-style-type: none"> ● If <450L or sample results confirm no heavy metals & flash point >60°C, then the <i>waste oil</i> and/or <i>waste antifreeze</i> is not regulated as a Hazardous Material under TDG and therefore, no TDG requirements; ● If no sample results are available for heavy metals or flash point, treat the both <i>used oil</i> and/or <i>used antifreeze</i> as a Class 9, PG III; UN3082 – Env. Haz. Substance, Liquid, N.O.S. ☐ Provincially a <u>BC Waste Manifest</u> is not required if shipping less than (≤) 210L (i.e. one drum) of <i>used oil</i> and/or <i>used antifreeze</i>, however if >210L, then a BC Waste Manifest is required regardless if samples were taken. ■ If the <u>combined capacity</u> of one or multiple containers with <i>diesel fuel</i> and/or <i>gasoline fuel</i> is less than or equal to (≤) 2000L, then: <ul style="list-style-type: none"> ● No <i>Documentation</i> (Shipping Document) is required; ● No <i>UN Number</i> on the Placard is required; (<i>note: Safety Marks – Placards or labels & Shipping Name are still required</i>); ● No TDG training Certificate is required; <i>Note: Despite this exemption, TC recommends that operators comply with TDG Training and possess a valid Certificate.</i> ■ Drums must be properly arranged by: <ul style="list-style-type: none"> ● Stacking in a vertical position; ● Stack with dunnage protection; ● Securing with sideboard frames. ■ Empty drums are exempt from TDG Regs Parts: 2-Classification, 3-Documentation, 4-D.G. Safety Marks; & 7-E.R.A.P. provided: <ul style="list-style-type: none"> ● Drum <10% residue; ● Transported for filling or reconditioning; ● If more than 10 drums, then DANGER Placard is required on all four sides of vehicle and include a Shipping Document outlining: <ol style="list-style-type: none"> a) Primary Class; b) Number of Drums; c) "Residue". ■ Any container over 30 liters must have a visible Dangerous Goods Safety Marks including: <ul style="list-style-type: none"> ● Label or Placard; ● Shipping Name; ● UN Number. |

- TDG Regulation, Motor Vehicle Act & Engineering Standards
- ☑ BC Fire Code, CCME AST Code & Industry/ Engineering Standards
- ☐ OH&S Regulation, Env. Mgmt. Act/ Regs. & Best Management Practices

| TYPE | CONDITION, DESIGN, & MAINTENANCE | STORING AND SECURING | DISPENSING | TRANSPORT |
|---|---|--|--|---|
| Intermediate Bulk Containers & Portable Tanks | <p>General Requirements</p> <ul style="list-style-type: none"> ■ Must be designed, constructed, filled, closed, secured and maintained so that under normal conditions of transport, including handling, there will be no accidental release of the dangerous goods that could endanger public safety. ☑ Portable Tanks must be compatible with the <i>dangerous goods</i> and in good condition – not damaged, rusting, or leaking. <p>Construction Standard – SMALL MEANS OF CONTAINMENT (≤ 450L),</p> <ul style="list-style-type: none"> ■ Diesel: A spec or non-spec tank may be used. Tanks used for <i>diesel</i> are exempt from being built to an engineering standard but must not pose a danger to public safety. ■ Gasoline: An IBC Portable Tank CAN/CGSB 43.146 spec tank is <u>required</u> and must be designed and constructed to a design standard specification and must bear a visible and legible Spec Plate. <p>Construction Standard – LARGE MEANS OF CONTAINMENT (>450L) with Spec Plates</p> <ul style="list-style-type: none"> ■ UN 31A/B IBC Portable Tanks as per CAN/CGSB 43.146 (2016) <5000L for TDG Class 3 PGIII (Diesel); or <3000L for TDG Class 3, PGII (Gasoline). ■ TC57 Portable Tanks as per CAN/CGSB 43.146 (2016). ■ UN Portable Tanks as per CSA B625-14 (R2018) >450L. ■ TC44 Portable Tanks as per CSA B626-09 (R2015) >3000L for diesel only. ■ ULC/ORD 142.13. <p>Construction Standard for TDG Fuel Bladders suspended from Helicopters (>450L):</p> <ul style="list-style-type: none"> ■ MIL-D-23119G (collapsible drums). ■ MIL-T-52983G (collapsible tanks). | <p>General Requirements: Storage</p> <ul style="list-style-type: none"> ☑ If a mobile tank (>230L) is removed from the vehicle and placed on the ground, then secondary containment is required. ☐ Do not store mobile fuel in Riparian Management areas without authorization. ☐ Ensure mobile fuel units are secured on a solid foundation and remains level when storing and operating. ☐ Protect the fuel tank from wear or damage (i.e. rubber belting or mat). <p>Securing</p> <ul style="list-style-type: none"> ■ Use a pressure relief cap that meets manufacturers design specifications. ■ Containers must be secured to prevent damage to the container and accidental release of product. ■ Containers must be appropriately secured to prevent shifting, swaying, damage or escape from the vehicle. ■ Tie down straps must have safe <u>combined</u> working load ratings <i>greater</i> than the secured load. ☑ Lock valves to prevent unauthorized access to the fuel tank, nozzle and pump. | <p>General Requirements</p> <ul style="list-style-type: none"> ☐ Use fuel dispensing pumps designed for the products being handled. ☑ Use only ULC S612 and ULC S620 approved fuel hose and nozzle for dispensing fuel. ☑ 4.5m hose or 6m with retractor. ☐ Replace worn, leaking or damaged fuel hose or nozzle. <p>Standard Operating Procedures</p> <ul style="list-style-type: none"> ☑ Operators must stay with the nozzle <u>at all times</u> while dispensing fuel. ☑ Do not fill containers beyond their safe filling level. (<i>approximately 90% capacity</i>) ☑ Close valves when not dispensing and lock valves to secure unauthorized access. ☑ Gasoline dispensing - ensure there is suitable bonding between tank and vehicle to prevent static charges. ☐ Do not dispense fuel within a Riparian Management area without authorization. ☐ Secure nozzle to prevent leaks and spills. ☑ Secure fuel hose on a retractor, hose reel or coiled on a bracket. | <p>Transport</p> <ul style="list-style-type: none"> ■ Mobile containers do not require secondary containment. ■ Multiple <i>diesel</i> and/or <i>gasoline</i> portable tanks with a combined capacity that <i>exceeds</i> (>) 2000L, the operator is required to: <ul style="list-style-type: none"> • Complete and carry a Shipping Document; • Placard on all visible sides of the vehicle; • Possess a valid TDG Certificate. ■ Small Portable Tanks (≤) 450L are exempt from TDG Regs Parts 3, 4, 5, 6, 7 & 9 provided the container contains <i>diesel</i>: <ul style="list-style-type: none"> • Container contains Class 3 <i>Flammable Liquids</i> with no subsidiary class; • Includes Packing Group III and a flash point greater than 37.8°C (i.e. <i>diesel</i>); • In one or more small means of containment (≤450L). ■ An <i>Equivalent Level of Safety Permit</i> must be obtained from Transport Canada prior to moving non-spec IBCs and Portable Tanks greater than (>) 450L that contain <i>dangerous goods</i> in any quantity – including “residual” tanks. <ul style="list-style-type: none"> • The <i>Equivalency Permit</i> will outline applicable use of the tank, training and inspection requirements. <p>Labeling</p> <ul style="list-style-type: none"> ■ All IBCs and Portable Tanks must have appropriate TDG safety marks including: <ul style="list-style-type: none"> • Label or placard; • UN Number; • Shipping Name. ■ Spec plates must identify the following: <ul style="list-style-type: none"> • Container Type & Standard; • Manufacturer & Date; • Re-certification Date & TC Registered Facility. |

BC Fuel Guidelines

STATIONARY TANKS

- TDG Regulation, Motor Vehicle Act & Standards
- ☑ BC Fire Code, CCME AST Code & Industry/ Engineering Standards
- ☐ OH&S Regulation, Env. Mgmt. Act/ Regs. & Best Management Practices

Section 3

| TYPE | CONDITION, DESIGN & MAINTENANCE | STORING & SECURING ASTs | DISPENSING | TRANSPORT |
|---|--|---|--|---|
| STATIONARY TANKS (>230L) Aboveground Storage Tanks (ASTs) | <p>Tank Condition & Use</p> <ul style="list-style-type: none"> ☑ Follow the BC Fire Code at non-public fuel storage and dispensing stations (including card-locks & key-locks) at all remote construction sites as to meet <i>the test of due diligence</i> for fire and environmental safety as this is the <u>Industry Standard</u> that would most likely meet “good engineering practices”. ■ Stationary tanks are not designed to transport fuel and must be emptied prior to moving. TC has designated the CAN/ULC-S601 as a Utility tank and may be relocated (empty) with an <i>Equivalent Level of Safety Permit</i> (see Transport). <p>Construction Standard</p> <ul style="list-style-type: none"> ☑ All Tanks: must be designed, constructed and tested to a design standard specification and must bear a visible and legible Spec Plate. ☑ Spec Bladder Tanks: <ul style="list-style-type: none"> • CAN/CSA B837-14; • Max capacity 125,000L. ☑ Spec Steel Tanks: used to store <i>flammable</i> or <i>combustible liquids</i> will generally have one of the following Canadian Specifications: (<i>partial list</i>) <ul style="list-style-type: none"> • ULC-S601 Shop Fabricated AST for <i>Flammable & Combustible Liquids</i>; • ULC-S602 AST for Fuel Oil & Lubricating Oil; • ULC-S630 AST Vertical Tank; • ULC-S643 AST Shop Fabricated Utility Tank; • ULC-S653 AST Steel Contained Tank Assembly; • ULC-S655 AST Protected Tank Assembly; • ULC-S677 Fire Tested AST with a resistance rating of 2hrs. ☑ For Inspection Schedules check Appendix D. ☑ Ensure secondary containment conforms to a ULC specification for stationary aboveground storage tanks (ASTs). | <p>Site Preparation</p> <ul style="list-style-type: none"> ☑ Secondary contained Spec Tanks ≤50,000L do not require additional Spill Control (<i>Federal - CCME Code</i>). ☑ Secondary contained Spec Tanks ≤80,000L do not require additional Spill Control (<i>Provincial - BC-Fire Code</i>). ☑ Ensure physical protection against collision damage. ☑ Measures must be taken to prevent unauthorized access. ☑ Use non-combustible materials to support tank cribbing, secondary containment and spill control berms. <p>General Requirements</p> <ul style="list-style-type: none"> ☑ All stationary tanks (>230L) must have secondary (110%) containment. Options: <ul style="list-style-type: none"> • Tank-in-tank (vacuum monitored); • Tank-in-tank (visible access port); • Tank-in-box (visible access hatch); • Tank-in-berm with geotextile liner (or equivalent). ☑ Skid tank shall be equipped with overfill protection. ☐ Do not leave skid tank with fuel unattended in Riparian Management areas without authorization. ☑ Use a pressure relief cap that meets manufacturers design specifications. ☑ Ensure all stationary tanks are properly grounded. ☐ All ASTs containing <i>gasoline</i> require a vapour recovery system unless: <ul style="list-style-type: none"> • Gasoline is delivered by marine barge; • Storage capacity <2000L; • Equipment used at same location as storage and dispensing facility; • AST is <21,000L and supply tanker does not have a capacity >21,000L. | <p>Site Preparation</p> <ul style="list-style-type: none"> ☑ Spills, overfills and storm water from <u>product transfer area</u> shall be contained, treated and disposed of as per provincial guidelines (<i>Federal - CCME Code</i>). ☑ Dispensing areas shall be designed to control a spill of not-less-than (≥) 1000L (<i>Provincial - BC-Fire Code</i>). <p>General Requirements</p> <ul style="list-style-type: none"> ☐ Use fuel dispensing/ transfer pumps designed for the product being handled. ☑ Overfill protection may consist of: <ul style="list-style-type: none"> • Visually supervise bulk fuel delivery operation by trained & qualified personnel; <i>and/or</i> • Equip tank with a ULC S661 overfill protection device. ☑ Equip facility with accessible emergency shut-off device to stop both power and flow of product. ☑ To prevent unauthorized access, close and lock valves when the dispensing station will be left unattended. ☑ Use only ULC S612 and ULC S620 approved fuel hose and nozzle for dispensing fuel. ☑ Use 4.5m hose or 6m with retractor. ☐ Replace worn, leaking or damaged fuel hose or nozzle. <p>Standard Operating Procedures:</p> <ul style="list-style-type: none"> ☑ Written and posted SOPs. ☑ All operators of must be trained & qualified. ☑ Operators must stay with the nozzle <u>at all times</u> while dispensing fuel. ☐ Maintain record of inventory. ☑ Store & secure nozzle & hose in a safe manner to prevent damage and leaks (i.e. on a retractor, hose reel or coiled). <p>Safety</p> <ul style="list-style-type: none"> ☑ Suitable bonding required between tank and equipment to prevent static charges. ☐ Maintain a current SDS of products. | <p>General Requirements</p> <ul style="list-style-type: none"> ■ Stationary tanks (>450L) must never be used to transport fuel. <p>TDG Transport</p> <ul style="list-style-type: none"> ■ Prior to moving a stationary fuel (diesel or gasoline) tank with a capacity greater than (>) 450L and less than or equal to (≤) 2000L ensure: <ul style="list-style-type: none"> • Tank is pumped empty (5% or less); • Obtain an <i>Equivalent Level of Safety Permit</i> from TC; • The AST is placarded on all four sides with: <ul style="list-style-type: none"> ○ TDG Classification; ○ Shipping Name. ■ When relocating an empty stationary AST with a total capacity greater than (>) 2000L, the following TDG Regulations must be implemented: <ul style="list-style-type: none"> • Tank must be emptied to <5% and/or contain <500L; • Obtain an <i>Equivalent Level of Safety Permit</i> from TC; • A shipping document must be completed for the <i>Residue Last Contained</i>; • The hauler/operator must possess a valid TDG training Certificate; • The skid tank must be placarded on all four sides: <ul style="list-style-type: none"> ○ TDG Classification; ○ Shipping Name; and ○ UN Number. |

APPENDIX

- A Risk Assessment Matrix**
- B Risk Management: Prevention, Preparedness & Due Diligence**
- C Site Preparation: Secondary Containment vs. Spill Control**
- D Container & Tank Inspection Matrix**
- E SOP: Treating Fuel Leaks, Drips and Non-Reportable Fuel Spills**

BC Fuel Guidelines

| Risk Assessment Matrix | | | | Appendix A |
|--|--|--|--|---------------------------|
| For Land Based Fuel Storage & Dispensing Facilities or Caches at Remote Construction Sites | | | | |
| Risk Identification | HIGH | MEDIUM | LOW | Assigned Numerical Value* |
| Numerical Value | 3 | 2 | 1 | |
| Environmental Factors | | | | |
| Distance to nearest watercourse | < 50m | 50m-100m | > 100m | |
| Soil characteristics around the storage area | Porous or unknown – coble/ gravel | Semi-porous – silt/ sand | Non-porous – clay/ bedrock | |
| Terrain slope | > 6% slope | 2%-6% slope | < 2% slope | |
| Operational Factors | | | | |
| Site description | Isolated access: – no road access: <i>fly-in</i> only; – barge only access | Remote access: – 3-5hrs from town/ Hwy access; – no cell phone coverage | Easy access: – within 1hr of town; – cell phone coverage | |
| Duration of project | > 30 days | 10-30 days | < 10 days | |
| Volumes stored | >1000L | 230L-1000L | < 230L | |
| Daily access | > 12x per day | 6-12x per day | < 6x per day | |
| Personnel access | Everyone has access | Everyone with training has access | Only designated (qualified & trained) personnel have access | |
| Prevention & Preparedness Factors | | | | |
| Distance or access to the respond to an incident | Requires helicopter & weather dependent | More than a day to respond with additional equipment | Same day response time with additional equipment | |
| Additional <i>Spill Control measures implemented</i> | No <i>spill control</i> for the storage area or the dispensing area | <i>Spill control</i> for the dispensing area only | <i>Spill control</i> for the storage & dispensing area with additional <i>Control Measures</i> | |
| Preparedness and Response Training: <i>Fuel Management & Spill Response</i> | No one trained in <i>Spill Response</i> or <i>Fuel Management</i> | At least one person on-site has a <i>Spill Response & Fuel Management</i> Training Certificate | Everyone who handles fuel has a valid <i>Spill Response & Fuel Management</i> Training Certificate | |
| Risk Value | *Add the Assigned Numerical Values: | | | |

CONTROL MEASURE RECOMMENDATIONS

| Numerical Value | Risk Ranking | Control Measures |
|-----------------|--------------|---|
| < 12 | Low Risk | <ul style="list-style-type: none"> No additional measures are considered necessary |
| 12-23 | Medium Risk | <ul style="list-style-type: none"> Additional control measures should be considered to reduce the risk |
| > 23 | High Risk | <ul style="list-style-type: none"> See Additional Control Measures for High Risk Sites |

Risk Management: Prevention, Preparedness & Due Diligence

Appendix B

| | | |
|---|--|--|
| <p><i>Additional Control Measures</i></p> | <p>Additional Control Measures to consider for Small Containers:</p> <ul style="list-style-type: none"> - Move storage location to low-risk area; - Install additional spill control at the storage and dispensing area; - Daily visual inspection to check for leaks, drips and spills; - Regularly check and replace bung-ring gasket on drums; - Apply liquid gasket (compatible with product) on drum-bung threads; - Use non-drip spout attachments on jerricans; - Limit access and appoint a fuel storage and handling operator; - Ensure everyone who handles fuel has <i>Fuel Management & Spill Response</i> training; - Replace small containers that may have been compromised; - Review and update <i>Fuel Handling Procedures</i> and <i>Risk Assessment Matrix</i> on a regular basis. | <p>Additional Control Measure to consider for Portable and/or Stationary Tanks:</p> <ul style="list-style-type: none"> - Install spill control for fuel storage facility; - Install additional spill control for fuel transfer/ dispensing area; - Petroleum hydrocarbon sensors and alarm systems; - Anti-siphon foot valves; - Overflow protection and/or alarm system; - Spill containment fill-box; - Dry disconnect valves; - Shear valve on tank; - Breakaway valves on hose; - Hose reel or hose retractor system; - Additional site-specific awareness training in Fuel Management & Spill Response. |
| <p>Fire Safety</p> | <p>Equipment:</p> <ul style="list-style-type: none"> ☑ Maintain one or more BC-rated fire extinguisher of a suitable size(s) to handle the potential risk at small fuel caches or with portable fuel systems. ☑ Maintain two or more 80-BC rated fire extinguishers to handle the potential risks at larger fuel storage and dispensing facilities. | <p>Fire Control and Response Plan:</p> <ul style="list-style-type: none"> ☑ Conduct Fire Response Training and maintain a Fire Response Plan. ☑ Post Fire Safety Procedures including “No Smoking” signs at stationary fuel storage and dispensing facilities. |
| <p>Spill Control</p> | <p>Spill Control for Small Containers:</p> <ul style="list-style-type: none"> ☑ Credible Spill Volume: minimum capacity is that of the largest container; however, when small containers are handled and moved in bulk, the credible spill volume is the sum of the small containers. <ul style="list-style-type: none"> ▪ Slope and grade site with geotextile liner (hydrocarbon compatible) to collect & contain a spill - away from main storage containers; ▪ Use plastic totes, collapsible containment berms or equivalent; | <p>Spill Control for ULC Stationary Tanks <80,000L:</p> <ul style="list-style-type: none"> • Dispensing Area must have Spill Control of at least 1000L; <ul style="list-style-type: none"> ▪ Slope and grade site with geotextile liner (hydrocarbon compatible) to collect & contain a spill - away from main storage containers; ▪ Use collapsible containment berms or equivalent; ▪ Conduct a Risk Assessment to determine Significant Aspects of Operation and Implement Additional Control Measures. |
| <p>Training</p> | <ul style="list-style-type: none"> ☑ Anyone responding to a spill must have had Spill Response Training and carry a valid certificate; ☑ Anyone who handles, stores and transports flammable or combustible liquids must be adequately trained and qualified | <ul style="list-style-type: none"> ☑ Fuel Management Training Certification: <ul style="list-style-type: none"> - On-Line Course: www.fueltraining.ca (now available) ☑ Spill Response Training Certification: <ul style="list-style-type: none"> - On-Line Course: www.northwestresponse.ca (available September 2020) |

Continued...

Risk Management: Prevention, Preparedness & Due Diligence

Appendix B

| | | |
|---|--|---|
| <p>Spill Preparedness</p> <ul style="list-style-type: none"> - Risk Based Assessment - Each spill kit should reflect the risk and the potential response. Therefore, no spill kit will be the exact same - <i>Example of Equipment List for ≤ 1000L Diesel Storage for Land-based Operation</i> | <ul style="list-style-type: none"> ◆ SPILL PLAN or Emergency Response Procedures must be with each kit or within easy access to the spill kit ◆ CONTAINMENT: <ul style="list-style-type: none"> ○ Tarp Containment®: <ul style="list-style-type: none"> - Large tarp for containment - 2x4 lumber or equivalent to use as a crossbeam ○ Culvert Block Containment®: <ul style="list-style-type: none"> - Plywood or equivalent for blocking a culvert - Small tarp for sealing culvert block ○ Underflow Containment®: <ul style="list-style-type: none"> - Sandbags for diversion or containment dam - PVC Pipes for underflow construction ○ Patch & Plug ○ Site Specific Containment Systems: <ul style="list-style-type: none"> - Bentonite clay material or equivalent - Wooden dowels & wedges or equivalent ◆ ADVANCED WATER RESPONSE EQUIPMENT <ul style="list-style-type: none"> ○ Watergate® (MegaSecure Dam) ○ Water Barrier® (AquaDam) | <ul style="list-style-type: none"> ◆ MOP-UP & TREATMENT <ul style="list-style-type: none"> ○ Absorbent pads (i.e. petroleum) or equivalent material (i.e. peat moss) appropriate for the type and volume of spilled product, ○ Appropriate number of absorbent booms for skimming and absorption ○ Drum liner bags or plastic pails (20L) ○ Bioremediation product to treat contaminated soil ○ Shovels, rakes or appropriate hand tools ◆ SAFETY <ul style="list-style-type: none"> ○ Fire extinguisher (BC type) ○ Traffic Control where required ◆ PPE (personal protective safety gear) <ul style="list-style-type: none"> ○ Rubber boots ○ Rubber, Nitrile or equivalent protective gloves ○ Hard Hat, Hearing & Eye Protection ○ Rain gear or chemical splash protection ◆ PPE (Advanced Equipment with Certified Training) <ul style="list-style-type: none"> ○ Respirators ○ Gas Meter (or Vapour Monitor) ○ Decontamination Unit |
| <p>Due Diligence</p> | <ul style="list-style-type: none"> ◆ Prevention: <ul style="list-style-type: none"> ○ <i>Due diligence is a legal argument that reasonable measures were taken to prevent an incident from occurring.</i> ○ This may include: <ul style="list-style-type: none"> ▪ Implement industry standards for fuel management; ▪ Implement a risk assessment approach to fuel management; ▪ Implement employee awareness and training for fuel management; ▪ Implement pre-work inspections, standard operating procedures and documentation. | <ul style="list-style-type: none"> ◆ Response <ul style="list-style-type: none"> ○ <i>Due diligence is a legal argument that reasonable measures were taken to minimize the impact of the incident on the environment.</i> ○ This may include: <ul style="list-style-type: none"> ▪ Implement a risk assessment approach to understanding spill preparedness and response; ▪ Implement employee awareness and response training that reflects the operational risks; ▪ Maintain a spill response kit based on the risk. |

Site Preparation: Secondary Containment vs. Spill Control

Appendix C

| | | |
|--|--|---|
| <p>BC Fire Code: Defining Secondary Containment & Spill Control</p> | <p>Secondary Containment Definitions: Under the BC Fire Code, a storage tank (containing <i>flammable liquids</i> or <i>combustible liquids</i>) installed in a fixed location, is required to have secondary containment as per Section 4.3.7 <u>Secondary Containment</u> for ASTs. <i>Note:</i> A storage tank is defined as a tank that has a volumetric capacity of more than (>) 230L.</p> | <p>Spill Control Requirements: Under the BC Fire Code Section 4.1.6.1 (1) <u>Spill Control</u> A spill of <i>flammable liquids</i> or <i>combustible liquids</i> shall be prevented from flowing outside the spill area and from reaching waterways, sewer systems and potable water sources by: (a) constructing a non-combustible barrier capable of containing the spill or (b) grading the site or sloping the floor to divert the spill to a drainage system.</p> |
| <p>Discussion: Complying with Secondary Containment & Spill Control</p> | <p>QUESTION: Does a CAN/ULC-S601 double walled tank with a capacity of less than (<) 80,000L require additional Spill Control? The BC Fire Code (FC) outlines the following: FC Sentence 4.1.6.1(1) Spill Control – requires the construction of a noncombustible barrier capable of containing a spill, as per Sentence 4.1.6.1(2). FC Sentence 4.1.6.1(2) states: When barriers required in Sentence 4.1.6.1(1) are provided to contain accidental spillage from ASTs, they shall conform to the requirements for secondary containment in Subsection 4.3.7. FC Sentence 4.3.7.1 (2) Secondary Containment for Aboveground Storage Tanks (ASTs) states: When barriers described in Sentence 4.1.6.1(1) are provided to contain accidental spillage from ASTs, they shall conform to the requirements for secondary containment in this Subsection. This includes: Construction, Capacity, Clearance, Access, Emergency Venting, Leak Detection, Drainage and Use of Secondary Containment. AND... FC Sentence 4.3.7.1(3), which states: A storage tank conforming to Sentence 4.3.7.4(2) <u>shall be considered as conforming to this Subsection</u> provided it is used and maintained in conformance to <i>drainage</i> (Section 4.3.7.8) and <i>use of secondary containment</i> (Section 4.3.7.9). FC Sentence 4.3.7.4(2) states: The storage tank has a capacity of not more than (<) 80,000L and is constructed in accordance with a CAN/ULC Standard that incorporates secondary containment or a double walled system for the storage tank. ANSWER: In this example, <i>Spill Control</i> is considered to be met by conforming to the <u>Construction Standard</u> for secondary containment/double walled tank [ULC-S601 as per FC Sentence 4.3.1.2.(1)(e)] and the <u>Volume</u> (<80,000L). Therefore, no additional <i>spill control</i> is required, however this does not take into consideration the dispensing and fuel transfer areas (see below) or meeting the test of <i>due diligence</i> for a high-risk area/operation.</p> | |
| <p>BC Fire Code: Defining Spill Control at Dispensing & Fuel Transfer Areas</p> | <p>Dispensing & Fuel Transfer Areas: BCFC Section 4.6.7 Spill Control is required at any premise at which <i>flammable liquids</i> or <i>combustible liquids</i> are dispensed from fixed equipment into the fuel tanks of motor vehicles (equipment); 4.6.7.1 (1) Areas where <i>flammable liquids</i> or <i>combustible liquids</i> are dispensed shall be designed to: (a) be able to handle accidental spillage in conformance with subsection 4.1.6 and (b) control a spill of not less than 1000L</p> | |

BC Fuel Guidelines

| Small Container Inspection Matrix | | | | | Appendix D-1 |
|--|---|---|---|---|---|
| Small Containers | External Inspection | Internal Inspection | Leak Testing | Pressure, Hydro or Pneumatic | General Information |
| <p>Jerry Cans: (TP14850 Standard) <150L have a 60-month lifespan</p> <p>Plastic drums & jerry cans (<150L) may exceed the 60-month expiry date (but not 120-months) if:</p> <ul style="list-style-type: none"> - Container is part of a fleet of containers under the control of a single operator; - Operator conducts an External Inspection - Used for Class 3 Products; - Capacity <150L; - For a fleet of containers, the Operator is registered with the Director TC (Transport Canada). | <p>Container shows no sign of cracking, crazing, swelling, gouging, permanent deformation, degradation or compromised integrity</p> | <p>Not required</p> | <p>Not required</p> | <p>Not required</p> | <p>Lifespan is 60-months (5-yrs) from date of manufacture.</p> <p>For containers that are used more than once, be in such condition, including closure devices and cushioning materials, that they conform to all applicable requirements of the TP 14850 including:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Free of corrosion and contamination that may render the container unsafe for transport |
| <p>Drums & Pails: (TP14850 Standard) >150L plastic drums, steel drums and salvage containers</p> <p>A container must not be filled with dangerous goods, unless the following conditions are met:</p> <ol style="list-style-type: none"> a. the single packaging, the inner packaging or the inner receptacle is compatible with the dangerous goods; b. the container is free from corrosion, contamination or other damage that that may render the container unsafe for transport. Any container that shows signs of reduced strength compared with the registered design must not be used; c. the steel or plastic drum has been reconditioned in accordance with CGSB-43.126 before reuse. | <p>Reconditioning, remanufacturing and repair of drums for TDG as per CGSB 43.126-2008 (R.2014) Section 6.2.3</p> | <p>Reconditioning, remanufacturing and repair of drums for TDG as per CGSB 43.126-2008 (R.2014) Section 6.2.2</p> | <p>Reconditioning, remanufacturing and repair of drums for TDG as per CGSB 43.126-2008 (R.2014) Section 6.2.4</p> | <p>Reconditioning, remanufacturing and repair of drums for TDG as per CGSB 43.126-2008 (R.2014) Section 6.2.4.3</p> | <p>For containers that are used more than once, be in such condition, including closure devices and cushioning materials, that they conform to all applicable requirements of the TP 14850 Standard including reconditioning.</p> |

BC Fuel Guidelines

| Portable Container & Tank Inspection Matrix | | | | | Appendix D-2 |
|--|---|----------------------------|--|-------------------------------------|--|
| Containers & Tanks | External Inspection | Internal Inspection | Leak Testing | Pressure, Hydro or Pneumatic | General Information |
| Bladder Drums & Tanks MIL-D-23119G Mobile Drums MIL-T-52983G Mobile Tanks | Bladders show no sign of leaking, chafing, cracking, crazing, swelling, gouging, permanent deformation, degradation or compromised integrity. | Not required | Not required | Not required | Typical lifespan according to manufacture is 7-10 years, however this is not a Standard. There is no engineering inspection schedule for bladder tanks. |
| Intermediate Bulk Containers (IBC <3000L) Standard: CGSB 43.146 | 60-months (5-yrs) from date of manufacture | Not required | 60-months (5-yrs) from date of manufacture | Not required | IBC Portable Tanks must be inspected by a TC Registered Facility every 60 months |
| TC 44 Portable Tanks (>3000L) As per CSA B620 Standard | 1-year | 5-years | 1-year | 5-years | TC Portable Tanks must be inspected by a TC Registered Facility |
| TC406/306 Highway Tanks As per CSA B620 Standard | 1-year | 5-years | 1-year | 5-years | TC Highway Tanks must be inspected by a TC Registered Facility |

| Double Walled (or otherwise contained) Aboveground Storage Tanks: In-Service Monitoring | | | Appendix D-3 |
|---|--|---|---|
| Stationary Tanks | In-Service Monitoring: BC Fire Code – Part 4: <i>Section 4.4 Leak Detection</i> Tables 4.4.1.2.-A to 4.4.1.2.-E | Annual In-Service Inspection: BC Fire Code – Appendix: <i>Notes to Part 4 as per A-4.4.1.2 (1)</i> | General |
| Double Walled Tank Inspections: a. BC Fire Code b. CCME Code of Practice for Storage Tank Systems Containing Petroleum & Allied Products; and c. ULC S601 as per CAN/ULC-S676-15 Standard for Refurbishing of Storage Tanks for Flammable and Combustible Liquids | Continuous visual in-service pre-work monitoring each day the facility is in operation: ✓ Check for leaks, drips and spills: ☑ Pumps, hoses & nozzles; ☑ Valves, flanges & fittings; ✓ Check secondary containment: ☑ Vacuum monitor gauge is in the correct position; ☑ Visually check secondary containment if AST does not have a vacuum gauge. ✓ Weekly visual in-service monitoring: ☑ Spill containment sump (if applicable). <i>Note: Always follow your written & posted fuel procedures.</i> | Visual in-service leak-detection & monitoring will ensure the following: ✓ All access lids, caps and ports are tight and correctly sealed; ✓ Tank, supports and sump integrity have not been compromised; ✓ Secondary containment, spill control trays & sumps are clean and free of debris, liquid and ice; ✓ Piping, fittings & connections are not leaking or dripping liquid; ✓ No new stains have developed since last inspection; ✓ Sensors are functioning and confirm correct values/ reading; ✓ Visual inspection of tank wall integrity (i.e. not damaged); ✓ Overfill protection devices is functioning. <i>Note: Document annual inspection.</i> | BC Fire Code: S. 4.4 Leak Detection Double-walled storage tanks, which have an interstitial space that allows for monitoring using high- or low-tech methods. <i>Note: If a leak is suspected, the AST inspection and performance testing needs to be performed by a Qualified Professional.</i> |
| Bladder Tanks CAN/CSA-B837-14 Stationary Tanks | Bladders show no sign of leaking, chafing, cracking, crazing, swelling, gouging, permanent deformation, degradation or compromised integrity. There is no engineering inspection schedule for bladder tanks. | | Typical lifespan is 7-10 years however this is not a Standard |

SOP: Treating Fuel Leaks, Drips and Non-Reportable Fuel Spills

Appendix E

Best Management Practices (BMP): This SOP will ensure that BMP are implemented when treating small volumes of hydrocarbon waste material.

Specifications for this SOP:

- The contamination is petroleum hydrocarbon based (synthetic oil will not bio-remediate)
- The source of the petroleum hydrocarbon contamination is from:
 1. Non-reportable spills to land including: Class 3 *Spills* less than (<)100L / Leaks / Drips / Hydrocarbon Stains
 2. On-site facilities including: Wash-Pad Sumps / Oil-Water Separator Sumps / Sediment & Storm Drain Sumps / Shop Sweepings
- On-going treatment is a long-term maintenance plan to reduce site contamination from increased concentrations of petroleum hydrocarbons;
- Criteria for identifying contamination follow these general guidelines:
 1. The depth of contamination does not exceed 0.5m below surface grade
 2. The surface staining is less than 3m in diameter
 3. The volume of contaminated media is less than (<) 5m³

In-situ Treatment (see Table 1)

The visible suspect/contaminated material will not be excavated or removed. All treatment will be performed within the boundaries of the stained/ contaminated area.

Spill Assessment:

- Contain and remove any free product:
 - Use petroleum absorbent pads or equivalent absorption product(s) to remove free product prior to treatment

Environmental Assessment:

- Identify the characteristics of the contaminated media:
 - Clay, Silt and Mud mixtures
 - Sand and Gravel mixtures
 - Pebbles and Cobble mixtures
 - Gravel and mixed fragments
 - Fibric, Silt and Sand mixture
 - Humic, Silt and Sand mixture

Bioremediation in-situ Treatment:

- Add treatment product to contaminated area (see Table 1)
 - Dry or liquid product, depending on the media
 - Dry product: 1 bag/ 1m³ of contaminated media
 - Liquid product: 1L concentrate to 50L water or as prescribed
- Mix treatment product with contaminated media
 - Use excavator, grader or equivalent to ensure a good mix
 - On hard surfaces (i.e. asphalt or cement pads) spread product to absorb, sweep and remove
- Assess the treated area:
 - Check for petroleum hydrocarbon odors & visible staining
- Repeat *in-situ* treatment if staining or odors persist

Ex-situ Treatment (see Table 1)

- Stockpile contaminated media in a mini-biocell for treatment;
 - A small cell lined with 20mil poly and 1m soil cover, a cement pad or equivalent
- Mix treatment product with contaminated media
 - Dry product: 1 bag/ 1m³ of contaminated media (see Table 1);
 - Use excavator or equivalent to ensure a good mix
 - Aerate with excavator every two weeks
 - Leave uncover if no precipitation is in the forecast
- Assess the treated area:
 - Check for petroleum hydrocarbon odors & visible staining
- Repeat treatment within *biocell* if petroleum hydrocarbon odors or staining persist

Disposal Options:

- Landfill intermediate cover and/or final cover material (Check with *Permit* requirements)
- On-site restoration (no *off-site* media relocation permitted):
 - Construct berms, ditches & use to backfill around the site
 - On-site road surface improvements

Table 1. Remedial Options for Media Characteristics.

| Remedial Options for Media Characteristics | <i>In-situ</i> Bioremediation Dry Product ¹ | <i>In-situ</i> Bioremediation Liquid Product ² | <i>Ex-situ</i> Bioremediation Cell Dry-Product |
|--|--|---|--|
| Clay/ Silt/ Mud | YES | | YES |
| Sand/ Gravel | YES | | YES |
| Pebbles/ Cobble | | YES | YES |
| Gravel/ Mixed Fragments | | YES | YES |
| Fibric/ Silt/ Sand | YES | | YES |
| Humic/ Silt/ Sand | YES | | YES |
| Cement Pad/ Asphalt Road | YES | YES | |
| Large Rocks & Boulders | | YES | |

¹Oil Gator® or equivalent

²Microblaze® or equivalent