

10th Edition

(1995-2021)

Fuel Guidelines[©]

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

July 2021



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2021 Fuel Guidelines

INDUSTRIAL, COMMERCIAL & PRIVATE SECTORS USING THIS GUIDE			
MINING & EXPLORATION	GOVERNMENT AGENCIES	FUEL BULK CARRIERS	FIRE DEPARTMENTS
PIPELINE CONSTRUCTION	ENV. & ENG. CONSULTANTS	MOBILE & MECHANIC SHOPS	AIRPORTS & HELIPORTS
OIL & GAS INDUSTRY	FORESTRY CONTRACTORS	FUEL STORAGE FACILITIES	GOLF COURSES
FORESTRY SAWMILLS & WOODLANDS	CONSTRUCTION OF MAJOR PROJECTS	FIRST NATIONS GOVERNMENTS	SKI & HELI-SKIING OPERATIONS
INDUSTRIAL SUPPORT & ENDORSEMENT			
FORESTRY	MINING	COMMERCIAL SECTORS	
CANFOR – Houston Division ¹	Skeena Resources ¹	CMH Heli-Skiing ¹	
West Fraser Mills Ltd. Co.	Pretivm ¹	Terus Construction	
Pineridge Holdings Ltd.	Rugged Edge Holdings ¹	Northwest Fuels	
Carruthers Forest Solutions ¹	Geotech & GREGG Drilling ¹		
	Matrix ¹		
GOVERNMENT AGENCIES & ASSOCIATIONS REFERENCING THIS GUIDE			
FORESTRY	MINING	AGENCIES	ASSOCIATIONS
BC Timber Sales BCTS-Provincial Ministry of Forests	Ministry of Mines Association of Mineral Exploration	BC Oil & Gas Commission BC Ministry of Environment	Canada West Ski Areas Association BC Golf Superintendents Association
Western Canada Sustainable Forest Initiative Implementation Committee (WCSIC)		Ministry of Transportation and Infrastructure	Forest Safety Council

¹ These companies are preparing to take or have taken the NWR *Fuel Management & TDG* training for which this guideline was developed.

2021 Fuel Guidelines

2021 Revision

The 2021 **Fuel Guidelines** (10th Edition) was prepared by NorthWest Response Ltd., Smithers, British Columbia, Canada.

This Guideline is a reference document for the *on-line* **Fuel Management Training** course available at: www.fueltraining.ca

Information within this Guideline 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. Although the information in this Guideline is thought to be accurate and reliable, the official Statutes and Regulations should be consulted for all purposes of interpreting and applying the law.

This 10th Edition was reviewed against the National Fire Code and most of the Provincial Fire Codes. Although there were some minor differences between National and Provincial Fire Codes, NWR found the pertinent information referenced in this Guideline were identical and therefore applicable as a quick field reference for anyone working at remote construction sites and industrial operations across Canada.

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:

- **Training** Requirements as per Provincial & National Fire Codes: All employees involved in storage and handling of *dangerous goods* shall be trained in safe handling procedures and correct responses to an emergency situations as per Division B, Part 3 - Sections 3.2.7.15 & 3.3.4.6; & Part 4 – Sections 4.5.10 & 4.6.8
- **WorkSafeBC:** OH&S Reg. S5.6 & S5.7
- **Canada OH&S Reg.** Part X-S10.1 to S10.14; Part XIV-Fueling S14.41 & Part XIX-Training S19.6.
- Transportation of Dangerous Goods (Part 6 - Training): **Training Certification** for TDG Class 3 *Flammable Liquids*.
- Environmental Management Act – Environmental Compliance and Risk Based Approach to *due diligence* as it relates to prevention.

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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 & maintained so that under normal conditions of transport & handling, there will be no accidental release/ spill of TDG that could endanger public safety. ■ Jerry cans (<60L) 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, PGI or PGII products; • Not damaged, cracked, deformed or leaking. ■ Drums (≤450L) 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"> ■ CGSB 43.150-2020 (replaces TP14850) are <i>Small Containers</i> ≤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> (≤) 230L, however, it may be required to manage high-risk locations, based on the <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 credible spill based on the volumetric sum of the containers when stored, moved or handled in bulk (i.e. 4-drum on a pallet = 820L). ☑ 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 1A (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>Recommended Standard 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 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". ■ Containers over 30 liters must have a visible TDG Safety Marks: <ul style="list-style-type: none"> • Label or Placard; • Shipping Name; • UN Number.

IBCs & Portable Tanks

- 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

Section 2

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 <u>spec tank is 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. ☑ For Inspection Schedules check Appendix D. <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"> ■ All IBC and Portable Tanks transporting liquids require a pressure relief device. ☑ If a mobile tank (>230L) is removed from the vehicle and placed on the ground, then secondary containment is required. ☐ Do not store fuel (cache) 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>Recommended Standard 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.

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 or 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 & Lub. Oil; • ULC-S630 AST Vertical Tank; • ULC-S643 AST Shop Fab. Utility Tank; • ULC-S653 AST Steel 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>) ☑ 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; and/or • 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.

2021 Fuel Guidelines

Compressed Gases – TDG Class 2

PROPANE/ ACETYLENE/ AIR/ OXYGEN/ CO2/ NITROGEN/ ARGON

- 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 4

TYPE	GENERAL CONDITIONS & DESIGN	PROPANE STATIONARY TANKS	MOBILE CYLINDERS	PREPAREDNESS & PREVENTION
COMPRESSED GASES TDG Class 2	<p>General</p> <ul style="list-style-type: none"> ☑ Containers must be in good condition – not damaged, rusting or leaking ☑ Only Qualified Individuals may inspect and service a pressure tank or cylinder <p>Stationary Tanks: Construction Standard</p> <ul style="list-style-type: none"> ■ CSA B51 Boiler, Pressure Vessel & Pressure Piping Code - Propane <ul style="list-style-type: none"> • Data Tag/ Name Plate (legible) with Canadian Registration Number for use in BC • Serial # matches Operating Permit • Maximum Allowable Working Pressure clearly identified <p>Stationary Tanks: Maintenance</p> <ul style="list-style-type: none"> ☑ Up-to-date service schedule ☑ No leaking valves ☑ Cover for pressure relief valve <p>Mobile Construction Standard - Road Cylinders / Spheres / Tubes</p> <ul style="list-style-type: none"> ■ CSA B339 or 49-CFR for cylinders ■ CSA B340 & CSA B341 ■ CGSB – 43.123 for Class 2.1 & 2.2 ■ CSA B342 (for UN cylinders) <p><i>Highway tanks</i></p> <ul style="list-style-type: none"> ■ CSA B620 & CSA B622 <p><i>Portable tanks</i></p> <ul style="list-style-type: none"> ■ CSA B622 & CSA B625 <p>Mobile Cylinder: Maintenance</p> <ul style="list-style-type: none"> ☑ Assess for leaks and damage ☑ Cylinder retesting (date stamp on collar of tank) <ul style="list-style-type: none"> • Aluminum/ Steel: 10yrs • Fiberglass: 5yrs • Composite: 15yrs (max life) 	<p>Storage - Stationary Propane Tanks</p> <ul style="list-style-type: none"> ■ Protect against mechanical damage ■ Valid Operating Permit for BC required ■ Compliance with CSA B149.2 Propane Storage & Handling Code ■ Do not store within a secondary containment berm ■ Separate storage area and LPG tanks from other dangerous goods by 6m ■ Separate LPG cylinders and AST fuel tanks by 3m <p>Tank Condition</p> <ul style="list-style-type: none"> ☑ Paint coating provides full protection ☑ Not rusting and no visible corrosion ☑ Not damaged, dented or bulging ☑ No fire damage or leaks <p>Pressure Relief Valve</p> <ul style="list-style-type: none"> ☑ Present and serviceable <p>Tank Openings & Valves</p> <ul style="list-style-type: none"> ☑ Service Valve ☑ Fill Valve ☑ Liquid Transfer Valve ☑ Relief Valve <p>Filling</p> <ul style="list-style-type: none"> ☑ Supplier refills on-site ☑ Easy access with collision protection <p>Position</p> <ul style="list-style-type: none"> ☑ Solid level base made from non-combustible materials <p>Location</p> <ul style="list-style-type: none"> ☑ Adequate clearances to buildings, structures & roadways ☑ Clear of vegetative overgrowth 10m ☑ Clear of all surrounding ignition sources <p>Labeling</p> <ul style="list-style-type: none"> ■ WHMIS labels (supplier or workplace) are required on all storage tanks 	<p>General</p> <ul style="list-style-type: none"> ☐ Don't require an Operating Permit ☐ Don't have a Canadian Registration Number ☐ Does have a TC Number with date stamp on collar of tank <p>Transportation Exemptions</p> <ul style="list-style-type: none"> ■ General Exemption: TDG Part 3 & 6 do not apply to transportation on road provided: <ul style="list-style-type: none"> • Total mass of compressed gas in one or more cylinders is ≤ 500kg • Labels can be seen from outside the vehicle • Transport no more than five (5) small means of containment ■ 150kg (gross mass) Exemption: TDG Parts 3, 4, 5, 6 & 8 do not apply to the handling or transport on road provided: <ul style="list-style-type: none"> • Max capacity of each cylinder ≤ 46L • Total gross mass of compressed gas and cylinders is ≤ 150kg ■ 500kg Exemption: TDG Parts 3, 4 & 5 do not apply to the handling or transport on road provided: <ul style="list-style-type: none"> • Total mass ≤ 500kg of compressed gas is in one or more small means of containment that conforms to one of the Construction Standards <p>Tank Condition</p> <ul style="list-style-type: none"> ☑ Paint coating provides full protection ☑ Not rusting and no visible corrosion ☑ Not damaged, dented or bulging ☑ No fire damage or leaks <p>Secure for Transportation</p> <ul style="list-style-type: none"> ■ Tanks must be appropriately secured to prevent shifting, swaying, damage or escape 	<p>Store & Protect</p> <ul style="list-style-type: none"> ☑ Secured & protected against falling and mechanical or valve damage and storage must not interfere with operation of valve assembly ☑ Valves must remain closed when cylinder is empty or not in use ☑ Maintain 6m radius from other <i>dangerous goods</i> ☑ No propane 7.5m from exits. ☑ Do not store propane indoors unless storage room complies with Fire Code S3.2.8.2. <p>Training</p> <ul style="list-style-type: none"> ■ Report & respond to all gas leaks of 10kg or greater (Class 2.1 & 2.2) ☐ Training Requirements: <ul style="list-style-type: none"> • Emergency Response Procedures & Evacuation Procedures • Propane Handling & Storage. • Take precautions to prevent leaks and proper PPE <p>Fire Control and Response</p> <ul style="list-style-type: none"> ■ Post "No Smoking" signs ☑ Conduct Fire Response Training and maintain a Fire Response Plan ☑ Maintain two or more 80-BC fire extinguishers to handle the risks ☐ Post Fire & Spill Response procedures at all storage & dispensing facilities

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
- F** BMPs: Generators, Sea-Cans & Shops

2021 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					
Site Accessibility	Requires helicopter or boat & may be weather dependent	More than a day to respond with additional equipment	Same day response time with additional equipment		
Spill Control and Additional Control Measures Implemented	No <i>spill control</i> & No additional <i>Control Measures</i> for the storage area or the dispensing area	<i>Spill control</i> implemented but no additional <i>Control Measures</i> for the storage area or the dispensing area	<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 or has a valid <i>Spill Response Training</i> or <i>Fuel Management Training Certificate</i>	Only Supervisors have <i>Spill Response Training & Fuel Management Training Certificates</i>	Everyone handling fuel has a valid <i>Spill Response Certificate & Fuel Management Certificate</i>		
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

Additional Control Measures	Additional Control Measures to consider for Small Containers: <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 a valid <i>Fuel Management</i> training Certificate & <i>Spill Response</i> training Certificate; - 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. 	Additional Control Measure to consider for Portable and/or Stationary Tanks: <ul style="list-style-type: none"> - Have a current Fuel Management Plan - 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.
Fire Safety	Equipment: <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. 	Fire Control and Response Plan: <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.
Spill Control	Spill Control for Small Containers: <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; 	Spill Control for ULC Stationary Tanks <80,000L: <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.
Training	<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 & TDG-Class 3 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.fueltraining.ca (now available)

Continued...

Risk Management: Prevention, Preparedness & Due Diligence

Appendix B

Spill Preparedness

- Risk Based Assessment
- Each spill kit should reflect the risk and the potential response. Therefore, no spill kit will be the exact same
- *Example of Equipment List for ≤ 1000L Diesel Storage for Land-based Operation*

- ◆ SPILL PLAN or Emergency Response Procedures must be with each kit or within easy access to the spill kit
- ◆ CONTAINMENT:
 - Tarp Containment™
 - Large tarp for containment
 - 2x4 lumber or equivalent to use as a crossbeam
 - Culvert Block Containment™:
 - Plywood or equivalent for blocking a culvert
 - Small tarp for sealing culvert block
 - Underflow Containment™:
 - Sandbags for diversion or containment dam
 - PVC Pipes for underflow construction
 - Patch & Plug
 - Bentonite clay material or equivalent
 - Wooden dowels & wedges or equivalent
- ◆ ADVANCED WATER RESPONSE EQUIPMENT
 - Watergate® (MegaSecure Dam)
 - Water Barrier® (AquaDam)

MOP-UP & TREATMENT

- 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

- Fire extinguisher (BC type)
- Traffic Control where required
- ◆ PPE (personal protective safety gear)
 - 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)
 - Respirators
 - Gas Meter (or Vapour Monitor)
 - Decontamination Unit

Due Diligence

- ◆ **Prevention:**
 - *Due diligence is a legal argument that reasonable measures were taken to **prevent an incident** from occurring.*
 - This may include:
 - 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.

Response

- *Due diligence is a legal argument that reasonable measures were taken to **minimize the impact** of the incident on the environment.*
- This may include:
 - 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

Fire Code: Defining Secondary Containment & Spill Control	Secondary Containment Definitions: <p>Under the National and Provincial Fire Codes, 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.</p> <p><i>Note:</i> A storage tank is defined as a tank that has a volumetric capacity of more than (>) 230L.</p>	Spill Control Requirements: <p>Under the National and Provincial Fire Codes 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:</p> <ul style="list-style-type: none"> (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.
Discussion: Complying with Secondary Containment & Spill Control	<p>QUESTION: Does a CAN/ULC-S601 double walled tank with a capacity of less than (<) 80,000L require additional Spill Control?</p> <p>The National and Provincial Fire Codes (FC) outline the following:</p> <p>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).</p> <p>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.</p> <p>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...</p> <p>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).</p> <p>FC Sentence 4.3.7.4(2) states: The storage tank has a capacity of not more than (\leq) 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.</p> <p>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>	
Fire Code: Defining Spill Control at Dispensing & Fuel Transfer Areas	Dispensing & Fuel Transfer Areas: <p>The National and Provincial Fire Codes 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);</p> <p>4.6.7.1 (1) Areas where <i>flammable liquids</i> or <i>combustible liquids</i> are dispensed shall be designed to:</p> <ul style="list-style-type: none"> (a) be able to handle accidental spillage in conformance with subsection 4.1.6 and (b) control a spill of not less than 1000L. 	

Small Container Inspection Matrix					Appendix D
Small Containers	External Inspection	Internal Inspection	Leak Testing	Pressure, Hydro or Pneumatic	General Information
<p>Jerry Cans: CGSB 43.150-2020 (replaces TP14850 Standard) ≤60L 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). 	Container shows no sign of cracking, crazing, swelling, gouging, permanent deformation, degradation or compromised integrity	Not required	Not required	Not required	<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 CGSB 43.150 Standard 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: CGSB 43.150-2020 (replaces TP14850 Standard) ≤450L 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"> the single packaging, the inner packaging or the inner receptacle is compatible with the dangerous goods; 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; the steel or plastic drum has been reconditioned in accordance with CGSB-43.126 before reuse. 	Reconditioning, remanufacturing and repair of drums for TDG as per CGSB 43.126-2008 (R.2014) Section 6.2.3	Reconditioning, remanufacturing and repair of drums for TDG as per CGSB 43.126-2008 (R.2014) Section 6.2.2	Reconditioning, remanufacturing and repair of drums for TDG as per CGSB 43.126-2008 (R.2014) Section 6.2.4	Reconditioning, remanufacturing and repair of drums for TDG as per CGSB 43.126-2008 (R.2014) Section 6.2.4.3	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.

IBC, Portable Containers & Mobile Tank Inspection Matrix					Appendix D
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 as a Mobile IBC (IBC ≤3000L) Standard: CGSB 43.146 Example: UN31A (truck box fuel tank)	60-months (5-yr) from date of manufacture	Not required	60-months (5-yr) from date of manufacture	Not required	A Mobile IBC is intended to be loaded, stored & unloaded on a means of transport. All the openings of these IBCs are within the vapour space only. <u>Primary Markings</u> : "Do not lift when loaded with product"
Intermediate Bulk Containers other than Mobile IBCs (IBC ≤3000L) Standard: CGSB 43.146 Example: UN31H1 (rigid plastic tote)	30-months from date of manufacture	Not required	30-months from date of manufacture	Not required	These IBCs are not "permanently" mounted on a transport unit. These IBCs are transported to a facility and off-loaded for use & storage. The bottom discharge for liquids must have a secondary means of closing.
TC 44, TC 56 & TC 57 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

Container & Tank Inspection Matrix				Appendix D
Stationary Tanks	Daily & Weekly Inspections:	Annual Inspections:	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	Daily visual in-service pre-work inspection each day the facility is in operation: ✓ Check for leaks, drips and spills: ☑ Fuel hoses and fittings; ☑ Pipe connections & flanges; ☑ Pumps & nozzles; ☑ Tank & valves. Weekly in-service visual inspections: ✓ Check vacuum monitor gauge is okay: ☑ Secondary Containment; ✓ Check for product or water accumulation in: ☑ Spill control tray & containment systems.	Visual in-service leak-detection & monitoring will ensure the following (Document Annual Inspection): ✓ 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; ✓ Overfill protection devices.	BC Fire Code: S. 4.4 Leak Detection Double-walled storage tanks, which have an interstitial space that allows for monitoring using high-tech or low-tech methods. Note: If a leak is suspected, the AST inspection and performance testing need to be performed by a Qualified Professional	
Stationary Bladder Tanks CAN/CSA-B837-14	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:
 - Non-reportable spills to land including: Class 3 *Spills* less than (<)100L / Leaks / Drips / Hydrocarbon Stains
 - 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:
 - The depth of contamination does not exceed 0.5m below surface grade
 - The surface staining is less than 3m in diameter
 - 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 uncovered 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 *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	In-situ Bioremediation Dry Product ¹	In-situ Bioremediation Liquid Product ²	Ex-situ 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 & ²Micro-Blaze[®] or equivalent

***Acknowledgement:** NWR thanks the BC Ministry of Environment for providing continual feedback on the legislative interpretation and confirming this SOP as a *Best Management Practice*. NWR also thanks West Fraser Mills Ltd. Co. for financial support in developing this SOP.

BMPs: GENERATORS, SEA-CANS & SHOPS			Appendix F
Diesel Powered Generators	Intermodal Shipping Containers (Sea-Cans)	Fuel Storage & Dispensing Inside Shops ¹	
<p>Best Management Practices:</p> <p>Sources and Areas of Concern</p> <ul style="list-style-type: none"> Fuel filter on diesel powered generators have been the cause of some major spills: <ul style="list-style-type: none"> Faulty filter base caused ongoing leak. Over-tightened filter caused base to leak. Connections are not ULC approved or leaking. <p>Spill Control</p> <ul style="list-style-type: none"> The spill control under the diesel generator should have a containment volume equal to the day fuel supply tank or equal to a credible spill volume of the main fuel tank. Ensure that the generator facility has a containment tray or an internal perimeter lip to prevent a spill from exiting the facility. Install a hydrocarbon sensor(s) with emergency light and/or siren to alert camp maintenance staff of a potential leak within the generator unit (prior to overflowing the spill containment system) <p>Checklist</p> <ul style="list-style-type: none"> Conduct daily visual assessment and look for visual staining, leaks, drips and spills around: <ul style="list-style-type: none"> Spill control containment under gen-set, Secondary containment tray of facility, All fuel connections located inside and outside of the generator unit, Fuel filters and fuel lines inside and outside of the generator facility. If a wooden dip stick is used to check fuel levels (instead of a continual volume monitor), make sure the stick is always dried with an absorbent pad prior to storage. Do not keep waste absorbents outside. 	<p>Best Management Practices:</p> <p>Safety Concern</p> <ul style="list-style-type: none"> Storage of <i>flammable</i> and <i>combustible</i> liquids were in canisters that were not ULC approved or left open (i.e. open jars and open jerry-cans with spout attached). Sea-Cans were not properly vented and vapour accumulation inside reached lower-explosive-levels which ignited. <p>Best Management Practices</p> <ul style="list-style-type: none"> Review OH&S Hazard Alert 2012-04 for background on the risks and potential deadly scenario of not addressing the safety concerns. Intermodal Shipping Containers used to transport dangerous goods must conform to storage and separation requirements as outlined in National and Provincial Fire Codes (FC S3.3.4.8) Intermodal Shipping Containers (Sea-Cans) used to store <i>dangerous goods</i> <u>must</u> be vented in accordance with Occupational Health & Safety Recommendations <ul style="list-style-type: none"> Install one or more Powerless Turbo Roof Vent(s) (top of Sea-Can) with four open vents (air intake) at bottom corners of Sea-Can (or equivalent venting system). <p>Spill Control</p> <ul style="list-style-type: none"> Ensure that spill control is established for the storage of <i>flammable</i> and <i>combustible</i> liquids. The volume should be equal to the largest cannister or based on a credible spill scenario if multiple cannisters are stored in the same area. Install a containment tray or “lip” inside the Sea-Can floor to contain a spill from the storage cannisters within the unit. 	<p>Fire Code Requirements & BMPs:</p> <p>Storing & dispensing <i>flammable</i> & <i>combustible</i> liquids</p> <ul style="list-style-type: none"> When storing and dispensing up to 1500L: <ul style="list-style-type: none"> Requires a 1hr Fire Separation around the room Requires an average storage density of 100L/m² When storing and dispensing up to 10,000L: <ul style="list-style-type: none"> Requires a 2hr Fire Separation around the room Requires an average storage density of 200L/m² For maximum indoor storage quantities of <i>flammable</i> & <i>combustible</i> liquids see National or Provincial Fire Codes S4.2.7.5 Storage rooms shall be liquid-tight where the walls join the floor. (FC S4.2.9.1) Dispensing of <i>flammable</i> or <i>combustible</i> liquids from containers having a capacity of more than 30 L shall be by pumps or through self-closing valves, designed in conformance with good engineering practice. Store fuel canisters in approved ULC storage cabinets with 2hr fire resistant rating, professionally installed and vented to outdoor area. (FC 3.2.7.9) (FC 4.2.7.3) (FC 4.2.10) For indoor incidental use (<i>example: inside shop with no fire suppression system</i>), the max volume of <i>flammable</i> and <i>combustible</i> liquids allowed outside a storage cabinet is 600L of which not more than 100L shall be Class IA (gasoline). <p>Recommendations</p> <ul style="list-style-type: none"> Install hydrocarbon sensor(s) with emergency light and/or siren to alert shop maintenance staff of a potential leak within the shop or storage room. <p>¹Fire Code Requirements. See National and Provincial Fire Code Section 4.2.7 Industrial Occupancy & Section 4.2.9 Rooms for Container Storage and Dispensing</p>	

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