

Progressive Stewardship of Mountain Ecosystems: Next Practices for Sustainability

September 30, 2018

Fuel Storage & Handling Focus Area

Prepared in partnership with B836 Solutions Ltd. and Kala Geosciences

The Vision

The vision for fuel storage and handling is to provide guidance for helicat operations to develop maintenance and operating procedures that prevent spillage of fossil fuels, and a spill response plan. This document strives to highlight operational areas where the potential for environmental contamination exists and where there are opportunities to conserve fuel.

Background Information

The helicat industry relies on remote locations, land tenures, winter climates and pristine environments to provide mountain experiences to their guests. Currently, an integral part of these operations is the use of fossil fuels to provide the energy needed to transport guests to the operations up in the mountains and to support accommodation services in the backcountry.

Technology is promising future developments to allow increased use of alternative fuels, but currently the use of fossil fuels is ubiquitous within the helicat industry. If not managed properly, these fuels can endanger the environment. Petroleum products are composed of volatile organic compounds (VOCs) and can contaminate soil and drinking water supplies. Even a small spill can have a serious impact; a single pint of oil released into water can cover one acre of water surface area and seriously damage an aquatic habitat. A spill of just one gallon of oil can contaminate one million gallons of water.¹

The presence of fuel also increases the risk of starting a wildfire in these sensitive environments. Forest fires have serious environmental consequences such as loss of wildlife

¹ United States Environmental Protection Agency. (2001). Managing Above Ground Storage Tanks to Prevent Contamination of Drinking Water, Source Water Protection Practices Bulletin.

http://www.oregon.gov/deg/FilterDocs/EPASWPPPracticesBulletin_ASTs.pdf

and vegetation, destruction of habitat, air pollution, and changing the terrain through loss of forests. Wildfire can directly threaten an operation's infrastructure and also change skiing terrain and avalanche management considerations through loss of trees and vegetation.

The first consequence of non-compliance with fuel standards and regulations is the risk placed on the natural environment. For the operations, violations of certain acts and regulations can carry a significant penalty and/or an associated jail sentence. Fines of up to \$1,000,000 and/or 36 months in prison are possible.² If a spill or leak occurs, in addition to these fines, the business will be responsible for the significant costs involved in site remediation. If even a small spill is allowed to migrate through the snowpack it can spread far and wide, creating a very large area to remediate. This process can be both costly and time-consuming, particularly for remote sites complicated by difficult access, rugged topography, deep snowpack, and near surface bedrock.

Fortunately, there are very prescriptive regulations and standards in place to guide operations in the storage and handling of fuels and the response expected when dealing with fuel spills, which mitigate the risk to the environment. By following these and recommended best practice, the industry can aim towards safeguarding the environment when storing and handling fuel.

An additional aspect of sustainability and fuel management is consciously looking for ways to reduce consumption. Planning, implementation, monitoring progress and evaluation are all important steps in understanding what impact a change has on the system. This topic is addressed in detail in the Energy Use focus area.

Sustainability Standards

Fuel management is a complex regulatory topic in which several different regulations cover different aspects. To simplify, we have separated the fuel section into different topics, with the applicable regulations.

Waste Management Act

B.C. Ministry of Environment

Mandatory actions:

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

² Section 120.6 of the B.C. Environmental Management Act (SBC 2003) Chapter 53
http://www.bclaws.ca/civix/document/id/complete/statreg/03053_11#section120

\$1,000,000 and/or up to six months imprisonment (Section 12, Spill Prevention and Reporting, Section 54.2, 12 Offences and penalties)

Resources:

Waste Management Act Section 12

http://www.bclaws.ca/civix/document/id/rs/rs/96482_01#section003

Fisheries Act

Fisheries and Oceans Canada

Mandatory actions:

- No person shall carry on any work or undertaking that results in the harmful alteration, disruption or destruction of fish habitat (Section 35(1)).
- Every person who contravenes the above is guilty of (Section 40 (1)):
 - an offence punishable on summary conviction and liable, for a first offence, to a fine not exceeding three hundred thousand dollars and, for any subsequent offence, to a fine not exceeding three hundred thousand dollars or to imprisonment for a term not exceeding six months, or to both; or
 - an indictable offence and liable, for a first offence, to a fine not exceeding one million dollars and, for any subsequent offence, to a fine not exceeding one million dollars or to imprisonment for a term not exceeding three years, or to both.

Resources:

Fisheries Act, Section 35(1), 40 (1)

<http://laws-lois.justice.gc.ca/eng/acts/f-14/FullText.html>

Complying with the Fisheries Act. Fish Habitat Protection and Pollution Prevention Law. Fisheries and Oceans Canada. Part B, Pg 4.

<http://www.dfo-mpo.gc.ca/Library/272909.pdf>

B.C. Wildfire Act

B.C. Ministry of Forest, Lands and Natural Resource Operations

Fuel operations in forested areas elevate the risk of starting a wildfire. While ski operations occur in the winter when forest fires are less of a risk, fuel caches and services are often used for summer operations when this risk can be quite serious.

Mandatory actions:

- Section 25 (2)

Subject to subsection (3), the minister, except in prescribed circumstances, by order may require a person to pay to the government the amounts determined under subsection (1) (a) and (b) and the costs determined under subsection (1) (c), subject to any prescribed limits, if the person:

- is a holder of a leasehold interest, under a lease in a prescribed category of leases from the government, of the Crown land on which a fire referred to in subsection (1) originated,
- is an occupier of Crown land that is subject to a lease referred to in paragraph (a) who occupies the Crown land with the permission of the holder of the lease, or
- is an owner of the private land on which a fire referred to in subsection (1) originated or is a holder of a leasehold interest in that private land, or is an occupier of that private land with the permission of the owner or holder.

Resources:

B.C. Wildfire Act Sections 25 to 27

http://www.bclaws.ca/civix/document/id/complete/statreg/04031_01#section25

Fuel Handling

Workplace Hazardous Material Information Systems (WHMIS)

Mandatory actions:

- All staff must receive appropriate training in WHMIS.
- Where appropriate, WHMIS labels are adhered to containers and associated Safety Data Sheets are readily available on site as required.

Resources:

Workplace Hazardous Materials Information System (WHMIS)

<https://www.worksafebc.com/en/health-safety/hazards-exposures/whmis/whmis-2015>

Fuel Loading

The following resources apply to the remainder of the fuel section topics and are referenced where applicable:

- B836-14 Aviation Fuel Handling and Quality Control³
- British Columbia *Fire Code* 1998, and Office of the Fire Commissioner – Interpretation Bulletins, Interpretation Bulletin No. IB 016 Pumps for Transferring Flammable or Combustible Liquids

³ While this resource and regulations are specific to aerodromes, the standards required are suitable practice for use in fueling facilities for snowcats as well.

Mandatory actions:

- All personnel operating the loading and dispensing equipment must be trained in fire, spill, and other emergency procedures. (B.C. Fire Code 4.4.11.2.)
- When transferring bulk flammable or combustible liquids into a metal tank, vehicle, or vessel, appropriate bonding, grounding, and isolation components must be provided and used for protection against static charges. (B.C. Fire Code 4.11.3.2. and 4.1.8.2. Appendix A-4.1.8.2.(1)(b))
- There must be no leaks from the valve or pipe system to the pump. Draw-off valves must be threaded at the discharge end or otherwise designed to provide a liquid-tight connection to the delivery hose. (B.C. Fire Code 4.4.5.)
- During loading and unloading bulk fuel from a tank vehicle, precautionary measures must be taken to prevent static electrical charges. (B.C. Fire Code 4.11.3.2.)

Next practice guidelines:

- Any valves leaving the main body of the tank should be shear valves. These valves shut from the inside of the tank in the event that the exterior portion of the valve is knocked off the tank.
- All transfer of bulk fuel should be done at a central fueling facility where appropriate containment and spill response capabilities are available.
- Fuel loading procedures should be posted at the fueling site, and should be reviewed with all personnel handling fuel annually.

Fuel Dispensing

Mandatory actions:

- Smoking is prohibited during dispensing operation. “No Smoking” signs must be placed in view of every driver approaching the area where flammable products are dispensed. (B.C. Fire Code 4.5.8.8.)
- A storage tank shall be prevented from being overfilled by providing one or both of the following: either continuous supervision of the filling operations by personnel qualified to supervise such operations (B.C. Fire Code 4.3.1.8.) or an overfill protection device that meets the intent of ULC/ORD-C58.15, “Overfill protection Devices for Flammable Liquid Storage Tanks”.
- Fuel dispensing hose length must not exceed 4.5 meters, or 6 meters if a retracting system is used. (B.C. Fire Code 4.5.5.1.(2)(3))
- Fixed dispensers must be protected against collision damage by either: a concrete island not less than 100 millimeters high, or guard rails. (B.C. Fire Code 4.5.3.3.)
- An automatic shut-off nozzle must be used when using an integral hold-open device. (B.C. Fire Code 4.5.5.2.)
- Do not use any object or device to maintain the flow of fuel that is not an integral part of the hose nozzle valve assembly. (B.C. Fire Code 4.5.8.6.)
- Hose nozzle valves must conform to CAN/ULC-S620-M, “Hose Nozzle Valves for Flammable and Combustible Liquids” (B.C. Fire Code 4.5.5.2.)
- All personnel operating the loading and dispensing equipment must also be trained

in fire, spill, and other emergency procedures. (B.C. Fire Code 4.4.11.2.)

Next practice guidelines:

- Ensure that all operators stay with the fuel nozzle while refueling.
- Any delivery hose that has the potential to cause a spill, if it were pulled from the delivery pump or valve, should be fitted with a breakaway valve.
- The fuel dispensing hose should be stored inside the containment berm where applicable.
- The use of automatic shut-off nozzles with an integrated hold-open device is recommended to discourage the use of devices or objects to hold the nozzle valve assembly open while refueling.
- Keep hoses off the ground and valves closed and locked when not in use.
- All pumps used to transfer fuel should conform to manufacturers' specification.
- Use automatic shut-off nozzles. Nozzles should be equipped with some means of drip containment.
- An electrically operated solenoid valve, designed to open only when the apparatus is being operated, should be used when dispensing from an aboveground storage tank.
- A regularly maintained and inspected emergency shut-off valve should be present on all automatic fuel dispensing units.
- Overflow protection devices should be installed on all tanks.
- Do not use gravity-fed systems due to the high risk of accidental tank drainage.

Aboveground Fuel Storage Tanks

Mandatory actions:

- Storage tanks shall be designed and constructed in accordance with the National Fire Code of Canada and the CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum Products. (B836-14, 4.3.1).
- All storage tanks for combustible and flammable liquids must be built and maintained in accordance with Underwriters Laboratories of Canada (ULC) tank specifications and bear a current ULC certification plate or label. (B.C. Fire Code 4.3.1.2.)
- Carbon steel fuel storage tanks shall have epoxy-coated internal surfaces. Surface preparation shall be adequate to ensure bonding of the epoxy coating to the steel. (B836-14, 4.3.2)
- Establish proper bonding, grounding and isolation components for protection against static charges during loading of tank vehicles when transferring flammable liquids or combustible liquids. (B.C. Fire Code 4.6.4.5.)
- Containers must not be filled beyond their safe filling level, approximately 90% capacity. (B.C. Fire Code 4.5.2.7.)
- Dispensing devices that are installed directly into the tank assembly shall conform to the requirements of subsection 4.5.3 of the B.C. Fire Code. This subsection refers to CSA-B346, "Power-Operated Dispensing Devices for Flammable Liquids". All storage

- tanks that are filled from a tank opening on the top of the tank shall have drop tubes installed to within 15 centimeters (6 inches) of the bottom of the tank. (B836-14, 4.3.3)
- Low point drains, high point vents, flanges, piping isolation valves, and other pipes and components requiring access for maintenance shall be located in pits in accordance with Clause 4.5.2.3 of the B.C. Fire Code. All pits shall have weather-tight access covers to prevent water accumulation.
 - All aboveground storage tanks must be installed on firm foundations designed to minimize uneven settling and corrosion, and to prevent the design stress of the tank from being exceeded. (B.C. Fire Code 4.3.3.1.)
 - Multiple tanks must have a minimum 1 meter separation between them. (B.C. Fire Code 4.3.2.2.)
 - Hose nozzle valves must conform to CAN/ULC-S620-M, "Hose Nozzle Valves for Flammable and Combustible Liquids" (B.C. Fire Code 4.5.5.2.)
 - When a hose nozzle valve with a hold-open device is used, a breakaway coupling conforming to CAN/ULCS644-M, "Emergency Break-away Fittings for Flammable and Combustible Liquids" shall be provided. (B.C. Fire Code 4.5.5.2.)
 - Valves at the storage tank must be constructed of steel according to the Fire Code. (B.C. Fire Code 4.3.6.2.(1))
 - At least two portable 20-B:C rated fire extinguishers must be available within 9 meters of the work area. (B.C. Fire Code 4.6.5.1 & 6.2.3.5.)
 - Ensure fuel storage tank is physically protected against collisions. (B.C. Fire Code 4.5.2.1.(3))
 - Signs indicating that the ignition must be turned off, smoking is not permitted while the vehicle is being refueled, and any other fueling procedure, must be visible to every driver approaching the dispenser. (B.C. Fire Code 4.5.8.8)

Next practice guidelines:

- Annual risk assessments should be conducted on all gravity-feed systems currently in operation and control measures implemented to reduce and manage the risk(s).
- Additional control measures should be implemented to ensure:
 - The bottom-of-tank valve is protected
 - The dispensing hose at the bottom of the tank requires a break-away valve
 - Additional collision protection is installed to prevent accidental contact with the tank
 - The tank is not overfilled
 - Access to the top of the tank meets legal safety requirements
 - Volumes of fuel are recorded through a meter system
 - A record of daily inspections and recorded volumes
- All double-walled tanks that operate as service stations or bulk plants should have some form of secondary containment capable of containing an accidental spill from the tank, piping or transfer systems.

Remote Fueling

Mandatory Actions:

- Containers = 230L, used to store flammable or combustible liquids (e.g., gasoline & diesel fuel), must meet the appropriate design specification. (B.C. Fire Code 4.2.3.1.)
- Spill control is required for small containers of flammable and combustible liquids that have the potential to spill. (B.C. Fire Code 4.1.6.)
- All fuel containers must be labelled in accordance with the Workplace Hazardous Materials Information System (WHMIS), and according to the Fire Code. (B.C. Fire Code 4.2.3.2.)
- Containers must not be filled beyond their safe filling level, approximately 90% capacity. (B.C. Fire Code 4.5.2.7.)

Next practices guidelines:

- Refer to a qualified environmental professional (QEP) when choosing an appropriate site for remote fuel tanks to ensure they are a suitable distance from riparian areas.
- Ensure that dispensing procedures are clearly outlined and included in remote operating procedures.
- Assess and manage the risk potential at all remote fuel cache locations.
- Ensure all empty containers are removed from remote locations and returned for refilling or recycling.
- Ensure appropriate spill kit is available if remotely fueling.

Resources:

B.C. Fuel Guidelines

This condensed outline provides an easy reference to the regulations governing fuel storage and transportation in different volumes

http://www.bbfd.ca/uploads/2014_bc_fuel_guidelines_6th_edition.pdf

Fuel Handling Guidelines

This document is an expanded version of the above document with in-depth details

https://www2.gov.bc.ca/assets/gov/environment/waste-management/industrial-waste/industrial-waste/oilandgas/fuel_handle_guide.pdf

B836-14 Aviation Fuel Handling and Quality Control

This is the minimum standard for fuel handling at aircraft landing sites

<http://shop.csa.ca/en/canada/fuels-and-appliances/b836-14/invt/27009142014>

British Columbia Fire Code 1998, and Office of the Fire Commissioner

Interpretation Bulletins, Interpretation Bulletin No. IB 016 Pumps for Transferring Flammable or Combustible Liquids. – The B.C. Fire Code provides guidance on the specifications of fueling pumps and tanks

http://www.bccodes.ca/fire-code.aspx?vid=QPLEGALIZE:bccodes_2012_view

West Coast Spill Supplies

This B.C. company provides spill response kits designed to meet the provincial spill response standards

http://www.spillsupply.com/spill_kit_regulations.html#bottom

Maintenance of Fueling Facilities

Mandatory Actions:

- A maintenance program shall be established for fuel facilities and aircraft fueling equipment. Maintenance procedures and frequency of maintenance shall be as recommended by the equipment manufacturer. They shall also be based on frequency of use, type of use, and climatic conditions. (B836-14, 5.4.1)
- Visual inspections must be made daily and during each shift of the piping system, pumps and ancillary equipment for leaks spills and obvious abnormal conditions. Any leakage must be repaired immediately. (B.C. Fire Code 4.4.11.5.)
- Periodic testing of fuel quality for aviation turbine fuel that is in static storage for six months, a composite tank sample shall be obtained and the short tests specified in Table 2 shall be conducted on each tank to verify that the aviation fuel continues to conform to its specifications. The results shall be recorded. (B836-14, 5.11.2) Static storage means long-term stored fuel to which less than 50% additional product by volume has been added.
- Maintenance records for fuel facilities and aircraft fueling equipment shall be retained during the required time interval between inspections, maintenance procedures, or tests, or for two years, whichever is greater. The records shall be filed and shall document that corrective action has been taken when necessary (B836-14, 5.16.2)
- Storage tanks shall be inspected every five years for buildup of sediment and evidence of microbial growth. Where inspection reveals microbial growth or buildup of sediment exceeding one-tenth of the area of the tank bottom surface, the tank shall be cleaned as specified in Clause 5.21.3. (B836-14, 5.21.2)

Next Practice guidelines:

- To check for leaks, spills and obvious abnormal conditions, daily visual inspections should be made of the piping system, pumps and ancillary equipment. Any leakage should be repaired as quickly as possible.
- When an aboveground storage tank is out of service:
 - The piping from the tank should be capped or the valves should be closed and securely locked.
 - If the tank contains flammable or combustible liquids, monthly measurements of the contents should be made, recorded, and compared to the previous month's

- measurements for leakage and/or water contamination.
- Any tank that will be out of service for more than 180 days should have:
 - All liquid and vapor removed from the tank and its connected piping
 - Water or snow accumulations removed so that the berm capacity remains at 110% of the volume of fuel being stored
 - Containment areas covered to minimize maintenance
- Where a geotextile membrane is used in the containment berm, ensure that the membrane is always covered with a protective layer of soil.

Fire Protection

Mandatory Actions:

- The extent of fire prevention and control provided for the fuel storage facility shall be determined through an evaluation of the operation, followed by the application of sound fire protection and process engineering principles and consultation with the local authorities. The evaluation shall include but not be limited to (B836-14, 4.2.1):
 - Analysis of fire and explosion hazards of the liquid operations
 - Analysis of local conditions, such as exposure to and from adjacent properties, flood potential, or earthquake potential
 - Fire department or mutual aid response
- The wide range in size, design, and location of fuel storage facilities precludes the inclusion of detailed fire prevention and control systems and methods applicable to all such facilities.
- Portable fire extinguishers shall be prominently and strategically located so that they will be of maximum value in an emergency. Fire extinguishers shall be protected from ice, snow, etc. by canvas covers, enclosed compartments, or other suitable means wherever necessary. Fire extinguishers located in enclosed compartments shall be readily accessible and their location shall be clearly marked in letters at least 50 millimeters (2 inches) high (B836-14, 6.2.1.3).
- Fire extinguishers for aircraft servicing ramps or aprons shall be located at convenient locations on the fuel dispensing area and shall comply with the following requirements (B836-14, 6.2.3.2):
 - Fire extinguishers shall have the indicated rating and quantity based on the open hose discharge capacity of the aircraft fueling system in service, as follows:
 - When capacity does not exceed 760 L/min (200 US gal/min), at least two approved extinguishers with a minimum rating of 20-BC and a minimum 9 kg (20 lb) capacity, preferably Purple K, shall be provided.
- All fire protection equipment shall be properly maintained. Periodic inspections and tests shall be performed in accordance with the National Fire Code of Canada. (B836-14, 5.4.2)

Emergency Response Plan

Mandatory Actions:

- Fueling operators shall conduct a minimum of one communication (desktop) exercise during a 12-month period that includes all aspects of their emergency response plan. This exercise shall involve the aerodrome operator and an exercise performance report shall be forwarded to the aerodrome operator in a timely manner. (B836-14, 6.3.3)
- The testing of an emergency response plan and a review of the findings, followed by appropriate and timely revisions to the plan, if necessary, shall be required in order to improve overall plan effectiveness. Two general types of exercise may be conducted to validate the operation of the emergency response plan (B836-14, 6.3.3.2):
 - Desktop exercises: these include the actual testing of the communications equipment and procedures during a simulated event conducted by the fueling operator. Such exercises are used to verify the list of participants and their telephone numbers and to ensure that all communications and other warning equipment is serviceable and that all necessary documentation, layout maps, priority access routes, etc., are correct and known;
 - Operational exercises such as a specialty, fire drill, minor, or major exercise that may be conducted from time to time by the aerodrome operator to test individual applications or the entire operation emergency response plan.
- For spill report and investigation the fueling operator shall investigate the fuel spill and prepare a report that will be retained in accordance with Clause 5.16.4. The spill report shall include (B836-14, 6.4.2.2)
 - Category of spill
 - Identification of the cause
 - Cleanup actions taken
 - Impacts caused by the spill
 - Actions taken to remedy the impacts
 - Operational and maintenance changes to ensure that the spill does not occur again

Training, Signage and Record Keeping

Mandatory Actions:

All persons, including those using self-serve facilities, shall be trained in:

- Safe operation of the equipment they use (B836-14, 8.1.1.1)
- Training in Maintenance and operating procedures to prevent spills (B.C. Fire Code 4.1.6.3.)

- Shutting off the power to all dispensers in the event of a spill or fire (B.C. Fire Code 4.5.8.5., 4.5.8.6. & 4.4.11.2)
- All fire training being documented by the aircraft fueling operator (B836-14, 8.4)
- Taking appropriate measures to prevent sources of ignition from creating a hazard at the dispensers and taking appropriate action in the event of a spill to reduce the risk (B.C. Fire Code 4.5.8.5., 4.5.8.6. & 4.4.11.2)
- Reviewing fire safety plans annually (B.C. Fire Code 2.8.2.)

In addition:

- Operating instructions should be clearly posted. (B.C. Fire Code 4.5.8.4. & 4.5.8.8.)
- Emergency instructions must be conspicuously posted. (B.C. Fire Code 4.5.8.4.)
- Records of all safety and environmental incidents shall be kept for a minimum of two years and made available for review on request by the operator. (B836-14, 5.16.4).

Next Practice guidelines:

- Procedures should be developed to be followed in the event of a fuel spill or leak and in response to an emergency condition.
- All employees shall receive training related to the fire safety requirements for fuel storage and operations. In addition, employees shall receive customized training to deal with the types of fire emergencies specific to the facility.
- Personnel and self-serve users involved with aircraft refueling shall be familiar with the types and locations of fire extinguishers. Refresher training shall be conducted annually.
- Training records should document who received training, the dates of the training, and the topics covered. These documents should be maintained for a period of at least three years.

Spill Response

Waste Management Act Spill Reporting Regulation

Mandatory actions:

In the event of a spill, call **1-800-663-3456** and report the full and complete details of the spill to the Provincial Emergency Program. Fuel falls into the Class 3 Flammable Liquid type of substance, and all spills greater than 100 litres (22 gallons) must be reported.

In addition to flammable liquids, the Spill Reporting Regulation outlines the types of substances and the volumes of spill that are required to be reported. Operations and staff should be familiar with the spill reporting requirements for any substances that are kept on site.

- In British Columbia call either:
 - Provincial Emergency Program: 1-800-663-3456
 - Environment Canada: 1-604-666-6100

- In Alberta call:
 - Alberta Environment & Local Fire Dept: 1-800-222-6514
 - Environment Canada: 403-499-2432
- A report should include the following details (Spill Reporting Regulation, Section 2):
 - Reporting person's name and telephone number
 - Name and telephone number of the person who caused the spill
 - Location and time of the spill
 - Type and quantity of the substance spilled
 - Cause and effect of the spill
 - Action taken or proposed to comply with section 3
 - Description of the spill location and of the area surrounding the spill
 - Further action contemplated or required
 - Names of agencies on the scene
 - Names of other persons or agencies advised about the spill
- Where a spill occurs, the person who immediately before the spill had possession, charge or control of the spilled substance shall take all reasonable and practical action, having due regard for the safety of the public and of himself or herself, to stop, contain and minimize the effects of the spill. (Spill Reporting Regulation, Section 3)
- A spill response kit capable of containing and absorbing fuel spills must be made available and maintained. (B.C. Fire Code 4.2.6.3)
- Post spill response procedures and maintain an emergency response manual with the *fuel facility*. (B.C. Fire Code 4.5.8.4.)
- Ensure that spills are recovered and that contaminated soil is removed or treated. (B.C. Fire Code 4.1.6.3.)
- All sites that require cleanup of contaminated soil must follow the Waste Management Act Contaminated Sites Regulation. Do not attempt a cleanup or remediation unless you are familiar with this regulation.
- Separator systems must be constructed and maintained so that the effluent discharged from a petroleum storage and distribution facility or any contaminated water or snow complies with section 3 (the total extractable hydrocarbon in the effluent at any time does not exceed 15 milligrams/litre). (Petroleum Storage and Distribution Facilities Storm Water Regulation, Section 4).

Next Practice guidelines:

- Ensure that appropriately sized spill kits are available wherever fuel is stored and transported.
- Set policies that require staff to respond to spills of any kind and aim to allow no hydrocarbons to enter the environment.
- Consider setting up a location for 'landfarming', where contaminated soils can be remediated at the site using microbial processes within a biocell. Ongoing remediation helps minimize the long-term environmental impacts.

Landfarming: On-site remediation of soils

The photo demonstrates a landfarm operation that would be large enough to remediate other local soil as well. For helicacat operations, one or two 20 meter by 20 meter landfarm cells (if the area of the landfarm is less than 100 m³ there are fewer groundwater monitoring and sampling requirements) would be sufficient to clean up a spill. A landfarm requires construction on a flat surface where



the area is lined with an impermeable membrane. Contaminated soil is dumped in to these cells (to a depth of about 18 inches) as spills happen. Specific microbes are added to the contaminated soil to feed off the contaminants and metabolize them into water or harmless gases. Non-contaminated soils can be added as a dilution factor and for additional natural microbes. Once one cell is full, no more contaminated soil should be added while the remediation process is ongoing, so the second cell is used.

These farms can be left for months or years to remove the contamination. The soil needs to be tilled every six months; aeration is important and a sample can be taken annually to see if the soil has been remediated to Contaminated Sites Regulation standards. When the soil is clean it can be returned to the environment.

See the following link for more information about landfarming.

https://www2.gov.bc.ca/assets/gov/environment/air-land-water/site-remediation/docs/protocols/protocol_15.pdf

Resources:

Waste Management Act

Spill Reporting Regulation

http://www.bclaws.ca/civix/document/id/loo96/loo96/46_263_90

Contaminated Sites Regulation B. C. Reg. 375/96

http://www.bclaws.ca/Recon/document/ID/freeside/375_96_00

Petroleum Storage and Distribution Facilities Storm Water Regulation B. C. Reg. 168/94

http://www.bclaws.ca/civix/document/id/loo90/loo90/38_168_94

Special Waste Regulation B. C. Reg. 63/88 Part 6

http://www.bclaws.ca/civix/document/id/loo83/loo83/63_88_01

Environmental Emergency Program

<https://www2.gov.bc.ca/gov/content/environment/air-land-water/spills-environmental-emergencies/environmental-emergency-program>

Transporting Fuel

Mandatory actions:

Most helicat operators will contract out the transportation of fuel to their storage tank locations. However, it is important to be familiar with fuel transportation regulations to ensure contractors comply with them.

As of October 30, 2017 three new regulations pertaining to the Environmental Management Act were brought into force:

1. Spill Preparedness, Response and Recovery Regulation – developing a plan only pertains to those transporting 10,000 L or more of a listed substance or transporting through a pipeline.
2. Spill Reporting Regulation – Operators can use this information for their spill response plans as it gives reportable amounts and regulations/process regarding reporting
3. Spill Contingency Planning Regulation – Again this regulation is primarily directed at companies who transport either by truck, rail or pipe.

Next Practice guidelines:

- Ensure the safety of fuel transport routes including any forest service roads or bridges by clearing downed trees and alerting transport companies of difficult sections before transporting fuel.
- Consider having staff accompany the fuel transport truck to ensure the correct route is taken and to have staff on hand in case of a spill.

Resources:

Transportation of Dangerous Goods Act and Regulations (TDG)

The TDG Act requires steps to be taken to properly label dangerous goods while in transport.

<http://lois-laws.justice.gc.ca/eng/acts/T-19.01/>

Environmental Management Amendment Act Division 2.1 – Spill Preparedness, Response and Recovery

This bill outlines the amended regulations surrounding fuel transportation.

<https://www.leg.bc.ca/parliamentary-business/legislation-debates-proceedings/40th-parliament/5th-session/bills/first-reading/gov21-1>



Environmental Emergency Program

This website acts a resource for spill response and reporting within British Columbia.

<https://www2.gov.bc.ca/gov/content/environment/air-land-water/spills-environmental-emergencies/spill-preparedness-and-response-bc>

Conclusion

Helicat operators use fuel and hydrocarbons in close proximity to the natural environment and it is important to place high standards on keeping fuel and its effects contained. Fortunately, there are substantial regulations to help an operation create a system of operating procedures that ensure a highly reduced chance of spills and an efficient response procedure that mitigates any effects if a spill does happen. The desired outcome of this fuel management focus area is to ensure that the activities of helicat operations can continue without placing a high risk on the natural environment surrounding them, which ultimately supports their business.