



Ministry of
Environment

Environmental Protection
Division
Kootenay-Boundary and
Okanagan Regions

MEMORANDUM

To: Kandis Lipsett, EERO

Date: July 27, 2013

Re: Assessment of Water Quality and Environmental Impacts Following Lemon Creek Jet Fuel Spill, July 26, 2013

1. **BACKGROUND**

On July 27, 2013, assistance from Environmental Quality (EQ) staff was requested to help in the response to a spill of A1 Jet fuel (Attachment A – MSDS). A1 Jet fuel is primarily made of kerosene, with a very small fraction of naphthalene, ethylbenzene, trimethylbenzene. The spill is understood to have occurred around 4:00 pm on July 26, 2013 following an incident with a tanker truck operated by Executive Centre Flight Fuel Services Ltd. (ECFFS) on the Lemon Creek forest service road. Initial reports indicated a total of 35 000 litres of fuel may have been discharged to Lemon Creek, which drains to the Slocan River south of Slocan City. The Slocan River drains to the Kootenay, which passes by the Brilliant Dam before it joins the Columbia River near Castlegar (Attachment B – map of Slocan Valley and downstream watercourse). It is understood that a large volume of the highly volatile fuel is being contained upstream of the Brilliant dam (Kootenay River).

2. **PRELIMINARY WATER SAMPLING PROGRAM**

The Slocan River contains numerous water intakes for domestic consumption and irrigation use and is also a highly used recreational area for primary (swimming) and secondary contact (boating) recreation. During the hot summer months (and likely on weekends), the river is frequently used by the public for floating and swimming. Protecting the community from exposure to this substance through domestic water intakes, inhalation, and dermal contact with impacted water is a high priority.

Qualified Professional

To assess water quality impacts related to this incident, ECFFS should contact a qualified professional (QP) to initiate a sampling program immediately to determine magnitude and extent of the impact. All recommendations for monitoring provided in this memo should be reviewed by the QP. The QP should be qualified in water quality sampling and assessment and

environmental impact assessments with experience in sampling hydrocarbons. The QP requires adequate access to resources, including sampling gear and supplies, boat, safety equipment, and contract laboratory.

Over the longer-term, the qualified professional hired needs to be qualified in water quality assessments, environmental impact assessments (detailed in the following section) and the remediation of oil spills. The QP should have specific experience in oil spills to the aquatic environment. The QP is likely to consist of a team of professionals with a variety of expertise including water quality biology, environmental impact assessment, aquatic ecology, and spill remediation.

Sampling Parameters and Methods

Initial sampling to determine magnitude and extent of the spill should include: LEPH, VPH, BTEX.

The following information is from Maxxam Analytics (Burnaby) (Note: The responsible party should confirm all details with their contract laboratory):

- LEPHw (light extractable petroleum hydrocarbons in water) sample requires 2 @ 250 ml amber glass containers. LEPH analysis is a calculation of EPH minus select PAH. LEPH has a hold time of 7 days.
- VPHw (volatile petroleum hydrocarbons in water). Specific information was not obtained from the lab.
- BTEX sample requires 3 amber glass septum vials. BTEX has a hold time of 14 days.
- Samples are collected with no headspace or air bubbles. Samples should be shipped at 4°C. For “RUSH” samples received Monday morning, EPH and BTEX results could be available by end of day on Monday and PAH results would be available Tuesday morning.
- Contact the contract laboratory asap and confirm methods, sampling containers, logistics, and to order required supplies.
- MoE has some sampling containers that can be provided to facilitate prompt sampling (contact Carrie Morita or Jolene Raggett on cell 250-551-0808). Ensure sampling results are submitted as “RUSH”. Ensure results are reported back to officials, including MoE, as soon as possible.

Sampling Locations

- At a minimum, the QP should sample LEPH, VPH and BTEX at near field and far field site locations.
- Sampling should be initiated immediately, and continue 2x/day until results start to come in and have been reviewed to assess impacts.

- Sampling depth should include surface and mid-column, and near bottom of water column.
- Sampling sites should include Lemon Creek us/ds spill, Slocan River us/ds confluence with LC and other known recreational use or dw intake areas, Kootenay River (us confluence, us/ds dam), Columbia River below confluence with Kootenay, and farther field. Recreational areas should include the Crescent Valley beach and Shoreacres beach.
- There is a significant backwater/eddy located on the west side of the Slocan River a few kms upstream of Vallican and downstream of Winlaw. It is located near some bluffs which come down to the river and should be visible on Google Earth.
- The QP should review all site locations to ensure appropriate coverage.

Water Quality Guidelines

The QP should review and ensure they are aware of all relevant water quality guidelines (WQGs) to protect all known water uses in the impacted area (e.g., drinking water, irrigation, freshwater aquatic life, etc...). According to the MSDS (Attachment A), Jet Fuel is comprised of kerosene (main component), naphthalene, ethylbenzene, and trimethylbenzene. A quick assessment by MoE found that there are no BC and CCME WQGs for kerosene or trimethylbenzene, although WQGs do exist for ethylbenzene and naphthalene.

- The BC Contaminated Sites Regulations (CSR) provides guidance for aquatic life and drinking water standards for ethylbenzene, VPH and LEPH.
- The CSR standard¹ for VPH and LEPH to protect aquatic life are 1 500 and 500 ug/L, respectively. The CSR standards for ethylbenzene are 2 000 (aquatic life) and 2.4 ug/L (drinking water).
- BC WQGs for ethyl benzene are summarized in the table below². The CCME WQG to protect aquatic life is 90 ug/L and for irrigation is 2.4 ug/L.
- The BC WQG for naphthalene to protect freshwater aquatic life is 1 µg/L³
- A relevant document was located with details regarding Jet Fuel on the US Environmental Protection Agency's website⁴. This document "Kerosene/Jet Fuel Category Assessment Document" was submitted to the US EPA and contains detailed information about human health and environmental toxicity of this substance. The QP should refer to this and other available information to help determine safe levels of these substances.

1 http://www.env.gov.bc.ca/epd/remediation/policy_procedure_protocol/protocols/pdf/protocol_7.pdf

2 <http://www.env.gov.bc.ca/wat/wq/BCguidelines/ethylbenzene.html>

3 http://www.env.gov.bc.ca/wat/wq/BCguidelines/naphthalene/naphthalene_overview.pdf

4 <http://www.epa.gov/hpv/pubs/summaries/kerjetfc/c15020ad2.pdf>

Tables

Table 1: Summary Table of Recommended Guidelines for Ethylbenzene

Water Use	Guideline (mg/L ethylbenzene)
Raw Drinking Water (aesthetics)	0.0024 mg/L
Fresh Water Aquatic Life	0.20* mg/L
Marine Aquatic Life	0.25* mg/L
Recreation	0.0024 mg/L
Crop Irrigation	insufficient data
Livestock Watering	insufficient data

***1. Revised interim BC guidelines based on review of CCME Water Quality Guidelines for Ethylbenzene**
2. All guidelines are maximum values.

3. ENVIRONMENTAL IMPACT ASSESSMENT

Lemon Creek and downstream water bodies support a variety of aquatic life that may be affected by this incident (bull trout may use Lemon Creek for spawning). Once immediate concerns related to human health risk related to drinking water and recreational use have been resolved within the impacted area, Executive Centre Flight Fuel Services must retain a QP with demonstrated experience in environmental impact assessment in aquatic environments to complete an environmental impact assessment (EIA) report. The QP should have experience monitoring for hydrocarbons in water, sediment, and biota. The level of detail required for the EIA report will be determined following a review of preliminary water sampling results to determine the potential extent and magnitude of effects. At a minimum, the EIA report should include all information listed in the attached EIA checklist (Attachment C).

Note, there is an active streamkeeper group doing on the Slocan River (<http://www.slocanriverstreamkeepers.com/>) that may be able to provide some baseline data to assist with the assessment of impacts.

4. **RECOMMENDATIONS**

- MoE is assuming that the emergency management team has notified all drinking water users in downstream affected areas and has ensured appropriate notification of recreational users.
- The monitoring and sampling program should include a QA/QC component.
- The BC Environmental Laboratory Manual can be consulted for detailed information on analytical methods, including QA/QC (<http://www.env.gov.bc.ca/epd/wamr/labsys/lab-man-09/index.htm>).
- The British Columbia Field Sampling Manual: 2003 — For Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment and Biological Samples can be consulted for detailed information on sampling methods, including QA/QC (http://www.env.gov.bc.ca/epd/wamr/labsys/field_man_03.html).
- Regional BC MoE impact assessment biologists can be contacted for further information on local site knowledge (Jolene Raggett 250-354-6357 jolene.raggett@gov.bc.ca; Carrie Morita 250-354-6106 carrie.morita@gov.bc.ca)

Please contact us if you have any questions

Jolene Raggett
Impact Assessment Biologist

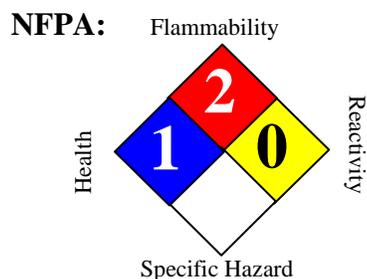
Carrie Morita
Impact Assessment Biologist

cc: Robyn Roome, Regional Director, MoE
Jennifer McGuire, Executive Director, MoE, Nelson

Attachment A. MSDS for Jet Fuel

Safety Data Sheet

Jet Fuel



SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Jet Fuel			
Synonyms	:	Jet Fuel - A, B, A-I, A-50, High Sulfur, Military, Jet A & B Aviation Turbine Fuel, Jet A-I, Jet A; Avjet For Blending; Jet Q Turbine Fuel, Aviation Fuel; Turbine Fuel; JP-4; JP-5; JP-8, Av-Jet, 888100004452			
SDS Number	:	888100004452	Version	:	2.15
Product Use Description	:	Fuel			
Company	:	For: Tesoro Refining & Marketing Co. 19100 Ridgewood Parkway, San Antonio, TX 78259			
Tesoro Call Center	:	(877) 783-7676	Chemtrec (Emergency Contact)	:	(800) 424-9300

SECTION 2. HAZARDS IDENTIFICATION

Classifications	:	Flammable Liquid – Category 3 Aspiration Hazard – Category 1 Skin Irritation – Category 2 Specific Target Organ Toxicity (Single Exposure) – Category 3 Chronic Aquatic Toxicity – Category 2
Pictograms	:	
Signal Word	:	Danger
Hazard Statements	:	Flammable liquid and vapor. May be fatal if swallowed and enters airways – do not siphon by mouth. Causes skin irritation. Repeated or prolonged skin contact can cause skin irritation and dermatitis. May cause drowsiness or dizziness by inhalation. May cause irritation of respiratory system. Toxic to aquatic life with long lasting effects.
Precautionary statements	:	

Prevention	<p>Keep away from heat, sparks, open flames, welding and hot surfaces. No smoking. Keep container tightly closed. Ground and/or bond container and receiving equipment. Use explosion-proof electrical equipment. Use only non-sparking tools if tools are used in flammable atmosphere. Take precautionary measures against static discharge. Wear gloves, eye protection and face protection as needed to prevent skin and eye contact with liquid. Wash hands or liquid-contacted skin thoroughly after handling. Do not eat, drink or smoke when using this product. Do not breathe vapors or mists. Use only outdoors or in a well-ventilated area.</p>
Response	<p>In case of fire: Use dry chemical, CO2, water spray or fire fighting foam to extinguish. If swallowed: Immediately call a poison center, doctor, hospital emergency room, medical clinic or 911. Do NOT induce vomiting. Rinse mouth. If skin irritation persists, get medical attention. If inhaled: Remove person to fresh air and keep comfortable for breathing. Get medical attention if you feel unwell.</p>
Storage	<p>Store in a well ventilated place. Keep cool. Store locked up. Keep container tightly closed . Use only approved containers.</p>
Disposal	<p>Dispose of contents/containers to approved disposal site in accordance with local, regional, national, and/or international regulations.</p>

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	CAS-No.	Weight %
Kerosene (petroleum)	8008-20-6	100%
Naphthalene	91-20-3	0 to 3%
Ethyl Benzene	100-41-4	0 to 1%
Trimethy Benzene	95-63-6	0 to 1%
Ethyl Benzene	100-41-4	0 to 1%

SECTION 4. FIRST AID MEASURES

Inhalation	: If inhaled, remove to fresh air. If not breathing, give artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.
Skin contact	: Take off all contaminated clothing immediately. Wash off immediately with soap and plenty of water. Wash contaminated clothing before re-use. If skin irritation persists, seek medical attention.
Eye contact	: In case of eye contact, remove contact lens and rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Seek medical attention

	immediately.
Ingestion	: Do NOT induce vomiting. Do not give liquids. Seek medical attention immediately. If vomiting does occur naturally, keep head below the hips to reduce the risks of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.
Notes to physician	: Symptoms: Aspiration may cause pulmonary edema and pneumonitis. Treatment: Do not induce vomiting, use gastric lavage only. Remove from further exposure and treat symptomatically.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	: Carbon dioxide (CO ₂), Water spray, Dry chemical, Foam, Keep containers and surroundings cool with water spray., Do not use a solid water stream as it may scatter and spread fire., Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.
Specific hazards during fire fighting	: Fire Hazard. Do not use a solid water stream as it may scatter and spread fire. Cool closed containers exposed to fire with water spray. Sealed containers may rupture when heated. Above the flash point, explosive vapor-air mixtures may be formed. Vapors can flow along surfaces to distant ignition source and flash back.
Special protective equipment for fire-fighters	: Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing.
Further information	: Exposure to decomposition products may be a hazard to health. Standard procedure for chemical fires.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions	: ACTIVATE FACILITY'S SPILL CONTINGENCY OR EMERGENCY RESPONSE PLAN if applicable. Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to contain spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.
Environmental precautions	: Carefully contain and stop the source of the spill, if safe to do so. Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.
Methods for cleaning up	: Take up with sand or oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal - caution, flammable vapors may accumulate in closed containers. Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

SECTION 7. HANDLING AND STORAGE

Precautions for safe handling	: Keep away from fire, sparks and heated surfaces. No smoking near areas where
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material is stored or handled. The product should only be stored and handled in areas with intrinsically safe electrical classification.

- : Hydrocarbon liquids including this product can act as a non-conductive flammable liquid (or static accumulators), and may form ignitable vapor-air mixtures in storage tanks or other containers. Precautions to prevent static-initated fire or explosion during transfer, storage or handling, include but are not limited to these examples:
 - (1) Ground and bond containers during product transfers. Grounding and bonding may not be adequate protection to prevent ignition or explosion of hydrocarbon liquids and vapors that are static accumulators.
 - (2) Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when higher flash point material (such as fuel oil or diesel) is loaded into tanks previously containing low flash point products (such as gasoline or naphtha).
 - (3) Storage tank level floats must be effectively bonded.

For more information on precautions to prevent static-initated fire or explosion, see NFPA 77, Recommended Practice on Static Electricity (2007), and API Recommended Practice 2003, Protection Against Ignitions Arising Out of Static, Lightning, and Stray Currents (2008).

Conditions for safe storage, including incompatibilities

- : Keep away from flame, sparks, excessive temperatures and open flame. Use approved containers. Keep containers closed and clearly labeled. Empty or partially full product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose containers to sources of ignition. Store in a well-ventilated area. The storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks".
- : Keep away from food, drink and animal feed. Incompatible with oxidizing agents. Incompatible with acids.
- : Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure.

SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Exposure Guidelines

List	Components	CAS-No.	Type:	Value
OSHA Z1	Naphthalene	91-20-3	PEL	10 ppm 50 mg/m3
	Ethyl Benzene	100-41-4	PEL	100 ppm 435 mg/m3
ACGIH	Naphthalene	91-20-3	TWA	10 ppm
		91-20-3	STEL	15 ppm
	Kerosene (petroleum)	8008-20-6	TWA	200 mg/m3
	Ethyl Benzene	100-41-4	TWA	100 ppm 434 mg/m3
			STEL	125 ppm 543 mg/m3

Protective measures : Keep out of reach of children.

Engineering measures : Use only intrinsically safe electrical equipment approved for use in classified areas. Emergency eye wash capability should be available in the vicinity of any potential

	splash exposure.
Eye protection	: Goggles and face shield as needed to prevent eye and face contact.
Hand protection	: Gloves constructed of nitrile, neoprene, or PVC are recommended.
Skin and body protection	: Chemical protective clothing such as DuPont TyChem®, Barricade or equivalent, recommended based on degree of exposure. Consult manufacturer specifications for further information.
Respiratory protection	: NIOSH/MSHA approved positive-pressure self-contained breathing apparatus (SCBA) or Type C positive-pressure supplied air with escape bottle must be used for gas concentrations above occupational exposure limits, for potential of uncontrolled release, if exposure levels are not known, or in an oxygen-deficient atmosphere.
Work / Hygiene practices	: Emergency eye wash capability should be available in the near proximity to operations presenting a potential splash exposure. Use good personal hygiene practices. Avoid repeated and/or prolonged skin exposure. Wash hands before eating, drinking, smoking, or using toilet facilities. Do not use as a cleaning solvent on the skin. Do not use solvents or harsh abrasive skin cleaners for washing this product from exposed skin areas. Waterless hand cleaners are effective. Promptly remove contaminated clothing and launder before reuse. Use care when laundering to prevent the formation of flammable vapors which could ignite via washer or dryer. Consider the need to discard contaminated leather shoes and gloves.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	: Clear to straw colored liquid
Odor	Characteristic petroleum or kerosene-like odor
Odor threshold	0.1 - 1 ppm typically reported
pH	Not applicable
Melting point/freezing point	Gel point can be about -15°F; freezing requires laboratory conditions
Initial boiling point & range	154 - 372 °C (310° - 702 °F)
Flash point	38°C (100°F) Minimum
Evaporation rate	Higher initially and declining as lighter components evaporate
Flammability (solid, gas)	Flammable vapor released by liquid
Upper explosive limit	5.0 %(V)
Lower explosive limit	0.7 %(V)
Vapor pressure	< 2 mm Hg at 20 °C
Vapor density (air = 1)	> 4.5 0.8 g/mL
Relative density (water = 1)	0.0005 g/100 mL
Solubility (in water)	3.3 to 6 as log Pow

Partition coefficient (n-octanol/water)	210 °C (410°F)	
Auto-ignition temperature	Will evaporate or boil and possibly ignite before decomposition occurs.	
Decomposition temperature	1.6 mm ² /s at 40°C	
Kinematic viscosity		
Conductivity (conductivity can be reduced by environmental factors such as a decrease in temperature)	Diesel Fuel Oils at terminal load rack:	At least 25 pS/m
	Ultra Low Sulfur Diesel (ULSD) without conductivity additive:	0 pS/m to 5 pS/m
	ULSD at terminal load rack with conductivity additive:	At least 50 pS/m
	JP-8 at terminal load rack:	150 pS/m to 600 pS/m

SECTION 10. STABILITY AND REACTIVITY

Reactivity	: Vapors may form explosive mixture with air. Hazardous polymerization does not occur.
Chemical stability	: Stable under normal conditions.
Possibility of hazardous reactions	Can react with strong oxidizing agents, peroxides, acids and alkalies.
Conditions to avoid	: Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources. Avoid static charge accumulation and discharge (see Section 7).
Hazardous decomposition products	: Ignition and burning can release carbon monoxide, carbon dioxide, non-combusted hydrocarbons (smoke) and, depending on formulation, trace amounts of sulfur dioxide. Diesel exhaust particulates may be a lung hazard (see Section 11).

SECTION 11. TOXICOLOGICAL INFORMATION

Skin irritation	: Irritating to skin. Repeated or prolonged contact can cause dryness, cracking and dermatitis. Liquid may be absorbed through skin in toxic amounts if large areas of the skin are repeatedly exposed.
Eye irritation	: May cause eye irritation.
Inhalation	Inhalation of vapors or mist may result in respiratory tract irritation and central nervous system effects including headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure and death.
Chronic Exposure	Similar products produced skin cancer and systemic toxicity in laboratory animals following repeated applications. The significance of these results to human exposure has not been determined.
Further information	: Kerosene does not have a measurable effect on human reproduction or development. Kerosene is not listed as carcinogenic by NTP, OSHA, and ACGIH. IARC has listed kerosene as a probable human carcinogen. Some petroleum distillates have been found to cause adverse reproductive effects in laboratory animals. Acute and chronic exposure to kerosene may result in CNS effects including irritability, restlessness, ataxia, drowsiness, convulsions, coma and death. The most common health effect associated with chronic kerosene exposure is dermatitis.

Component:

Kerosene (petroleum)	8008-20-6	<u>Acute oral toxicity:</u> LD50 rat 4 hour Dose: >5,000 mg/kg <u>Acute dermal toxicity:</u> LD50 rabbit Dose: >2,001 mg/kg <u>Acute inhalation toxicity:</u> LC50 rat Dose: >5,000 mg/l Exposure time: 4 h <u>Skin irritation:</u> Classification: Irritating to skin. Result: Skin irritation
Naphthalene	91-20-3	<u>Acute oral toxicity:</u> LD50 rat Dose: 2,001 mg/kg <u>Acute dermal toxicity:</u> LD50 rat Dose: 2,501 mg/kg <u>Acute inhalation toxicity:</u> LC50 rat Dose: 101 mg/l Exposure time: 4 h <u>Skin irritation:</u> Classification: Irritating to skin. Result: Mild skin irritation <u>Eye irritation:</u> Classification: Irritating to eyes. Result: Mild eye irritation <u>Carcinogenicity:</u> N11.00422130

Carcinogenicity

NTP	Naphthalene (CAS-No.: 91-20-3)
IARC	Kerosene is not listed as carcinogenic by NTP, OSHA, and ACGIH. IARC has listed kerosene as a probable human carcinogen. naphthalene (CAS-No.: 91-20-3) Kerosene (petroleum) (CAS-No.: 8008-20-6)
CA Prop 65	WARNING! This product contains a chemical known to the State of California to cause cancer. Naphthalene (CAS-No.: 91-20-3)

SECTION 12. ECOLOGICAL INFORMATION

Additional ecological information : Release of this product should be prevented from contaminating soil and water and from entering drainage and sewer systems. U.S.A. regulations require reporting spills of this material that could reach any surface waters. The toll free number for the U.S. Coast Guard National Response Center is (800) 424-8802. Naphthalene (91-20-3) one of the ingredients in this mixture is classified as a Marine Pollutant.

Component:

Naphthalene	91-20-3	<u>Toxicity to algae:</u> EC50 Species: Dose: 33 mg/l Exposure time: 24 h
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SECTION 13. DISPOSAL CONSIDERATIONS

Disposal : Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

SECTION 14. TRANSPORT INFORMATION

CFR

Proper shipping name : Fuel, aviation, turbine engine
 UN-No. : 1863
 Class : 3
 Packing group : III

TDG

Proper shipping name : Fuel, aviation, turbine engine
 UN-No. : UN1863
 Class : 3
 Packing group : III

IATA Cargo Transport

UN UN-No. : UN1863
 Description of the goods : Fuel, aviation, turbine engine
 Class : 3
 Packaging group : III
 ICAO-Labels : 3
 Packing instruction (cargo aircraft) : 366
 Packing instruction (cargo aircraft) : Y344

IATA Passenger Transport

UN UN-No. : UN1863
 Description of the goods : Fuel, aviation, turbine engine
 Class : 3
 Packaging group : III
 ICAO-Labels : 3
 Packing instruction (passenger aircraft) : 355
 Packing instruction (passenger aircraft) : Y344

IMDG-Code

UN-No. : UN 1863
 Description of the goods : Fuel, aviation, turbine engine
 Class : 3
 Packaging group : III
 IMDG-Labels : 3
 EmS Number : F-E S-E
 Marine pollutant : Yes

SECTION 15. REGULATORY INFORMATION

TSCA Status	: On TSCA Inventory
DSL Status	: All components of this product are on the Canadian DSL list.
SARA 311/312 Hazards	: Acute Health Hazard Chronic Health Hazard Fire Hazard

CERCLA SECTION 103 and SARA SECTION 304 (RELEASE TO THE ENVIROMENT)

The CERCLA definition of hazardous substances contains a "petroleum exclusion" clause which exempts crude oil. Fractions of crude oil, and products (both finished and intermediate) from the crude oil refining process and any indigenous components of such from the CERCLA Section 103 reporting requirements. However, other federal reporting requirements, including SARA Section 304, as well as the Clean Water Act may still apply.

California Prop. 65	: WARNING! This product contains a chemical known to the State of California to cause cancer.
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Naphthalene 91-20-3

SECTION 16. OTHER INFORMATIONFurther information

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

Revision Date : 11/17/2012

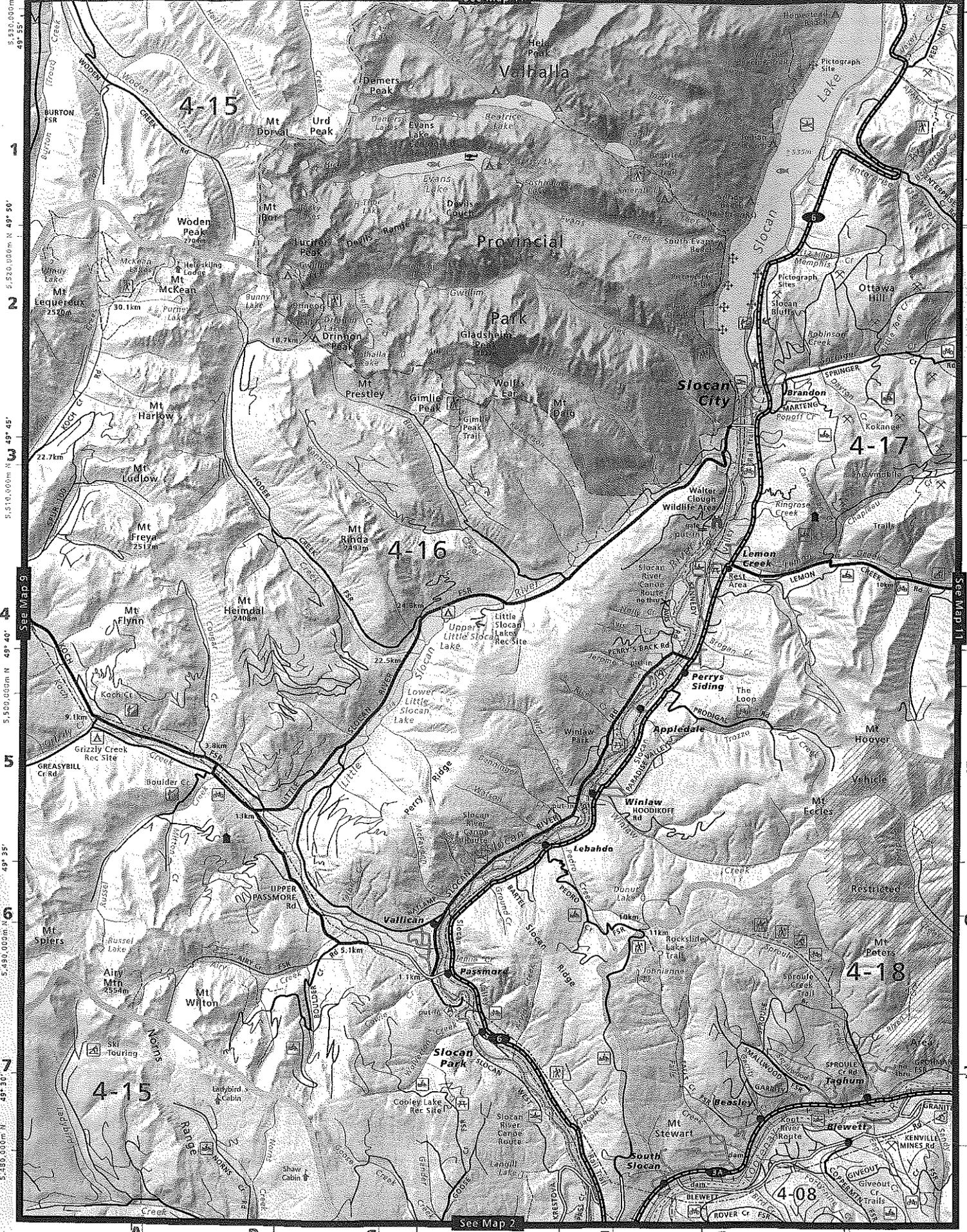
40, 41, 42, 43, 139, 141, 263, 1117, 1333, 1450, 1640

Attachment B. Map of Slocan, Kootenay, and Columbia Rivers (Source: Backroad Mapbook: Kootenays, 3rd edition)

See Map 17

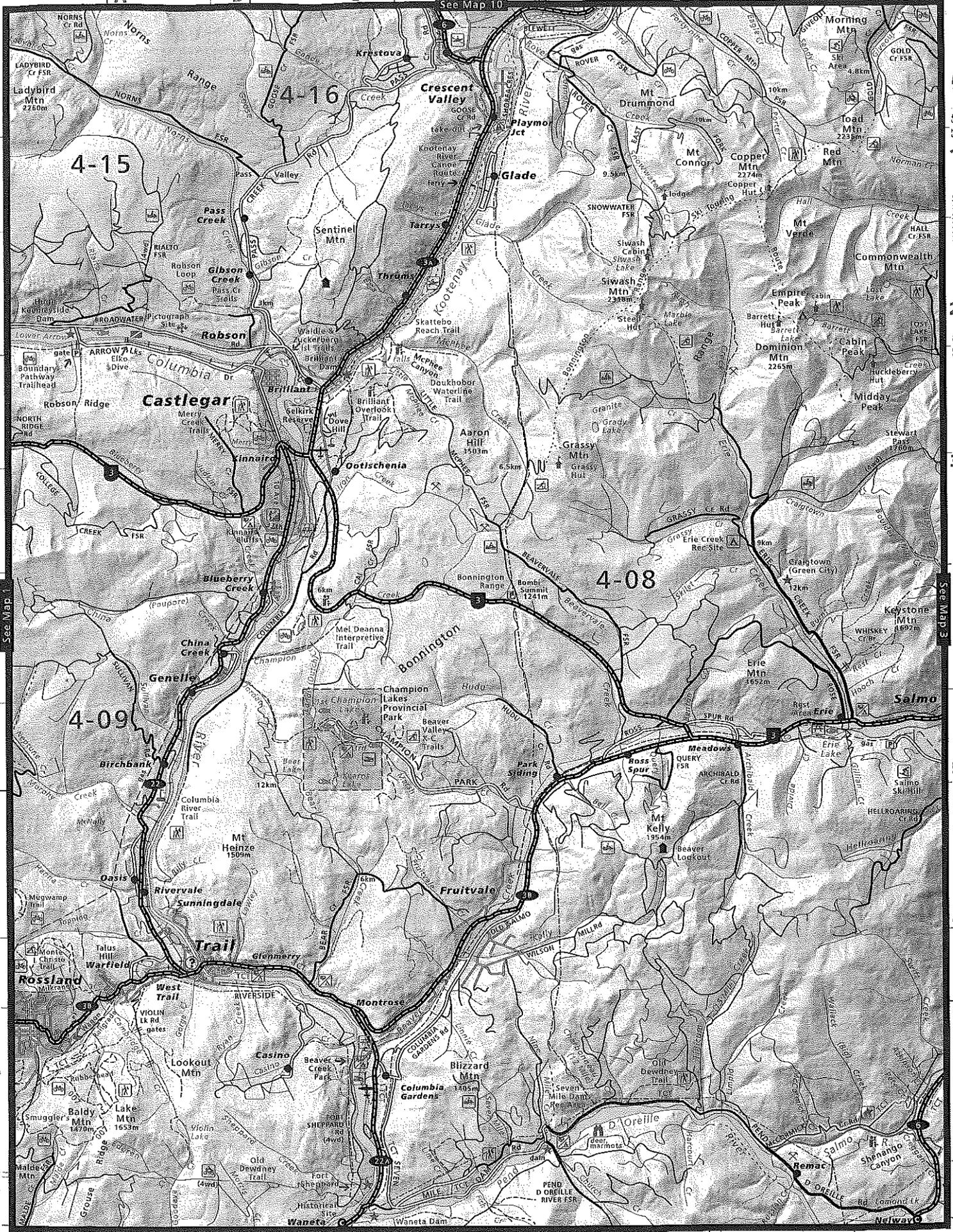
See Map 2

Kootenay Maps



8,930,000m N 49° 55' 1
5,520,000m N 49° 50' 2
5,510,000m N 49° 45' 3
5,500,000m N 49° 40' 4
5,490,000m N 49° 35' 5
5,480,000m N 49° 30' 6
5,470,000m N 49° 25' 7

49° 55' 1
49° 50' 2
49° 45' 3
49° 40' 4
49° 35' 5
49° 30' 6
49° 25' 7



Castlegar-Trail

Kootenay Maps

See Map 3

See Map 10

Attachment C. Spill Environmental Impact Assessment Checklist

ACTION LIST FOLLOWING A REPORTABLE SPILL¹

PART 2 - ENVIRONMENTAL IMPACT ASSESSMENT

- Retain a QP with demonstrated experience in environmental assessment to complete an environmental impact assessment (EIA) report documenting impacts to receiving environment². Minimum requirements should include, but not be limited to, items provided in the following checklist.
- Level of report detail should be relative to scale of incident.
- Information provided should be supported with scientific references, formulas, and explanatory text, as required to support findings or predictions.
- Report must be submitted to Ministry in electronic (MS word or PDF) and hard copy. Unless otherwise approved by Environmental Protection Regional Manager, an interim report should be submitted to the Ministry's Environmental Emergency Response Officer (EERO) and Regional Manager within 15 days and a final report should be submitted to the EERO and Regional Manager within 30 days of the spill event.
- Note that other agencies may have requirements for monitoring, mitigation and/or restoration in addition to those outlined in the checklist (e.g., Fisheries and Oceans Canada). The proponent is responsible for ensuring these requirements are met.

¹ Refer to the Schedule attached to the *Spill Reporting Regulation* for Reportable Levels for Certain Substances: http://www.qp.gov.bc.ca/statreg/reg/E/EnvMgmt/263_90.htm#schedule

² Receiving environment may include, but is not limited to, air, soil, sediment, surface water, and/or ground water.

EIA CHECKLIST:

- Incident summary – background of events leading to spill.
- Details/estimates of spilled material(s), including total volume discharged and volume of product contained/recovered.
- Chemical characterization and environmental fate of spilled material, including break-down products. For effluent, use process information, chemical analysis, flow rate, etc....
- Delineation of potential impact areas, including site maps.
- Extent and duration of impact.
- Characterization of contaminant concentrations in receiving environment, including background levels, predicted, and actual concentration, where possible. Environmental modelling and dilution calculations may be used. For gaseous or vapour losses, assess atmospheric impacts of contaminant plumes (e.g., plume delineation, estimates of maximum concentrations in community and dispersion rates).
- Appropriate Quality Assurance (QA)/Quality Control (QC) protocols³.
- Comparison of monitoring results or predicted concentrations to appropriate guidelines, objectives and standards.
- Short and long-term potential impacts to human health or use of environment (e.g., aesthetic, recreation, drinking water, etc...).
- Short and long-term potential impacts to receiving environment (e.g., bioavailability of contaminants related to the spill, impacts and risks to receptor organisms, such as wildlife and aquatic life, etc...).
- Assessment of effectiveness of clean-up and mitigation.
- Site restoration and compensation activities.
- Long-term monitoring program.
- Conclusions and recommendations. Should include details of preventative action plan to reduce risk of reoccurrence based on results of internal incident investigation.

³ Cavanagh, N., R.N. Nordin, L.W. Pommen and L.G. Swain. 1998. Guidelines for Designing and Implementing a Water Quality Monitoring Program in British Columbia. Prepared for Ministry of Environment, Lands and Parks. May 1998. Field test edition. <http://ilmbwww.gov.bc.ca/risc/pubs/aquatic/design/index.htm>.
Resource Inventory Committee (RIC). 1997. Ambient Fresh Water and Effluent Sampling Manual. Produced for the Province of British Columbia. <http://ilmbwww.gov.bc.ca/risc/pubs/aquatic/ambient/index.htm>

