

STEP 3.

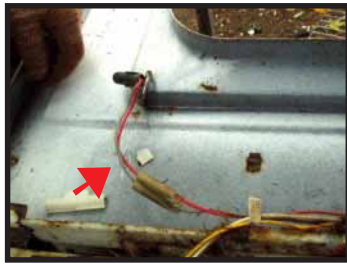
On the underside of the lid, attached to the lid mounting rod, is an encapsulated mercury switch.

**STEP 4.**

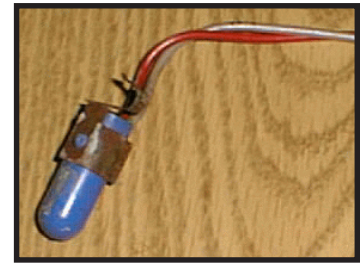
Remove the switch from the bracket.

**STEP 5.**

Cut or remove any attached wires.

**STEP 6.**

Properly dispose of the entire washing machine mercury switch.



Another use for mercury switches in washing machines was in the dynamic stabilizing system to prevent a severe out-of-balance condition (only on certain models). Only through removal can you distinguish between a manual switch and a mercury switch. The mercury will be visible.

SEVERE OUT-OF-BALANCE SWITCH REMOVAL

**ESTIMATED REMOVAL
TIME: 5-10 MINUTES**

**STEP 1.**

Locate the dynamic stabilizing switch on the back of the washing machine.

**STEP 2.**

Remove the fastening bolts.

**STEP 3.**

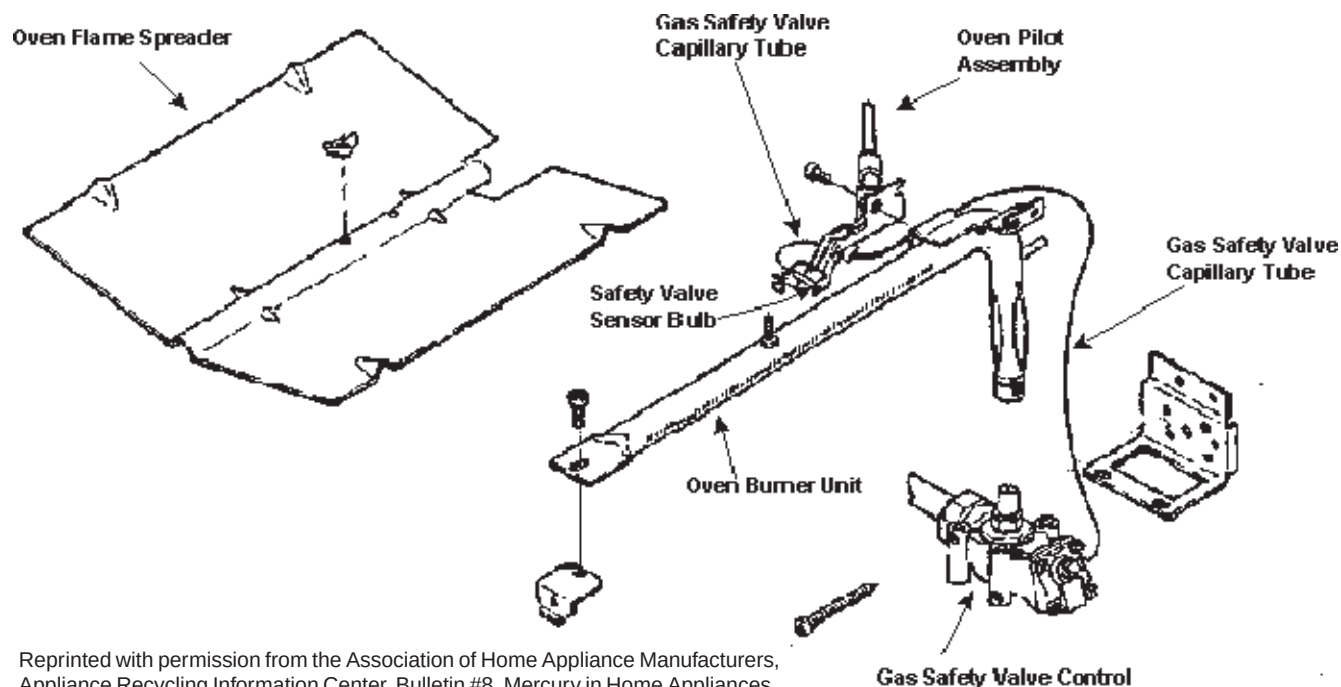
Disconnect the attached wires and properly dispose of the switch.



3.3 Gas Ranges

Gas ranges are ignited using either an electronic ignition system or a pilot-light. Pilot-light ranges require a mechanical safety device to detect whether the pilot-light is on and shut off the supply of gas to the burner when the pilot-light is not burning. Otherwise, the potential exists for a dangerous quantity of gas to build up in the oven. The diagram on the following page depicts the mercury containing control device on the gas burner assembly.

Gas safety valve (flame sensor) assembly.



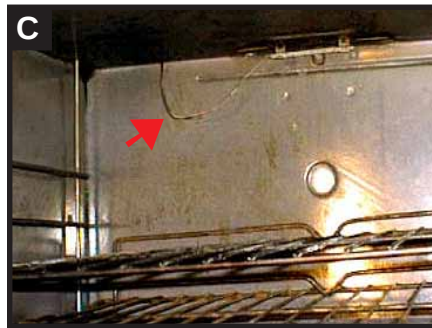
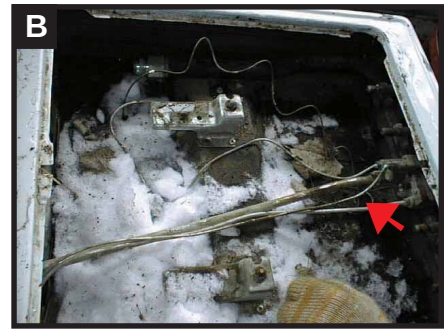
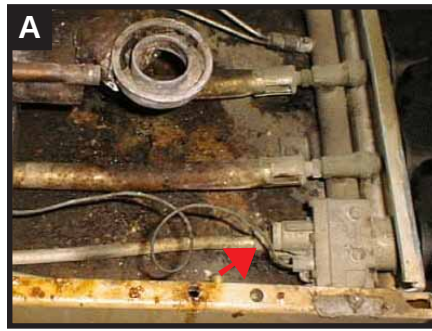
The gas burner is located beneath the oven cavity in the broiler pan. (*Note: All appliances manufactured after March 1, 2000 should be labeled if they incorporate a mercury-containing device.*) Gas ranges contain many temperature sensing probes and switches. The following procedure shows you how to distinguish the non-mercury probes and switches from the mercury switches (many times within the same appliance). Many of your stainless steel safety valve capillary tubes and sensor bulbs are mercury-containing devices while copper safety valve capillary tubes and sensor bulbs are non-mercury containing devices. **As a general rule, magnetic metals are mercury-containing probes while non-magnetic metals are non-mercury containing probes.** This may be difficult to distinguish with baked on food. What may appear copper maybe stainless steel coated with baked on food. Removal of any baked on food maybe necessary prior to determining metal type.

Temperature capillary tubes and bulbs found within ovens or below upper burners are usually copper probes. A copper probe is good indication of a non-mercury containing device. These capillary tubes and bulbs are instead filled with an oil or sodium-potassium mixture. Photos A thru D on the following page show some examples of non-mercury probes.

NON-MERCURY TEMPERATURE PROBES

These photos are examples of non-mercury temperature probes in a gas range and oven. Photos A and B show the top view of a gas range after the burner surface has been removed. **Note that these capillary tubes and bulbs start at the temperature control knob.**

Photos C and D show the oven control temperature capillary tubes and bulbs (top of the oven cavity) which continue from the oven control knob into the oven cavity.



If you have determined that the gas oven capillary tubes and bulbs are mercury containing, the following procedure can be used to identify and remove the mercury gas safety valve control assembly.

GAS RANGE MERCURY GAS SAFETY VALVE CONTROL ASSEMBLY REMOVAL PROCEDURE

ESTIMATED REMOVAL
TIME: 15-20 MINUTES



STEP 1.

Remove the broiler pan drawer.



STEP 2.

Once the drawer is removed you can view the burner assembly inside.



STEP 3.

When viewing the burner assembly, the small capillary tube (pointed out) is indicative of a mercury sensor switch.



STEP 3A.

Burner assemblies without a capillary tube but instead with an electronic pilot flame sensor (identifiable by the two wires) are **non-mercury**.



STEP 3B.

For gas ranges with a bracket covering the pilot, simply bend the bracket out of the way to view the wires indicating an electronic pilot sensor (non-mercury sensor).



Ranges without a capillary tube can be sent to scrap metal after making sure there is no fluorescent backlighting (see STEP 16) or PCBs.

For ranges with a capillary tube, **proceed to STEP 4.**

STEP 4.

If you have a capillary tube (like the one in the photo), you will now have to remove the burner assembly, valve and all attached gas fittings.



STEP 5.

Start by removing the key (sometimes a screw or a pressure fit) holding the burner assembly in.



STEP 6.

With the burner assembly loose, **proceed to STEP 7.**



STEP 7.

Disconnect the gas feed line by loosening the fitting or cutting the gas line.



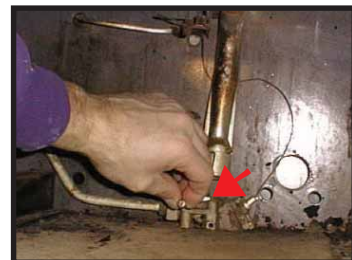
STEP 8.

Disconnect the pilot gas feed line by loosening or cutting (there may sometimes be two feed lines).



STEP 9.

Remove the two screws holding the gas safety valve control in place.



STEP 10.

The entire burner assembly and valve are now ready to be removed. Note there is no screw or pin holding the oven burner unit, this is an example of a pressure fitting oven burner unit.



STEP 11.

Gas range with the oven burner unit and gas safety valve control removed.



STEP 12.

The removed oven burner unit and gas safety valve control.



STEP 13.

Remove the screw holding the gas safety valve control and gas safety valve capillary tube and bulb to the oven pilot assembly.

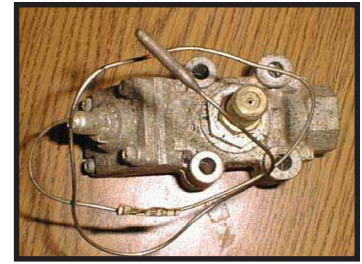


STEP 14.

Carefully pull the gas safety valve capillary tube and safety valve sensor bulb back through the bracket.

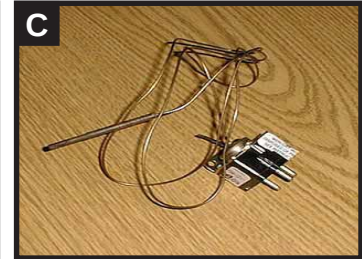
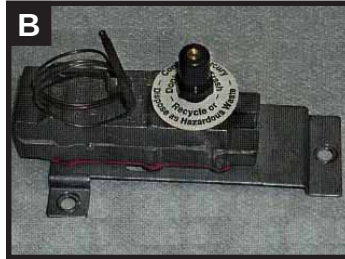
**STEP 15.**

The entire gas safety valve control, gas safety valve capillary tube and safety valve sensor bulb are now ready for proper disposal. **Proceed to STEP 16.**



EXAMPLES OF SOME MERCURY GAS SAFETY VALVE CONTROLS, CAPILLARIES AND BULBS

Photos A & B show complete mercury gas safety valve control, capillary and bulb. Photo C shows a gas auto pilot probe.



GAS RANGE FLUORESCENT BACKLIGHTING REMOVAL

ESTIMATED REMOVAL TIME: 1-2 MINUTES

**STEP 16.**

Prior to disposal, all stoves should be inspected to make sure that there is no fluorescent backlighting or PCBs. Some backlighting contains fluorescents and PCBs that come in various shapes and sizes (in addition to the one shown in the photos) and should be carefully removed and disposed of properly.



3.4 Gas Hot Water Heaters

Although all the current literature states that mercury was not used in residential hot-water heaters, the following procedure has been included to help prevent any mercury-added thermocouples from entering the waste stream and eventually the environment. Use the following procedure to properly identify and remove any mercury-containing thermocouples (usually commercial hot-water heaters of 100 gallons or more).

GAS HOT WATER HEATER MERCURY THERMOCOUPLE REMOVAL

ESTIMATED REMOVAL
TIME: 5-10 MINUTES



STEP 1.

Locate the temperature control unit.



STEP 2.

Determine if there is an electronic flame sensor (determined by the presence of wires) or if there is a mercury thermocouple.



STEP 3.

Use a magnet to determine if it is indeed a mercury probe (non-magnetic probes are non-mercury).



STEP 4.

If the probe is mercury, simply remove the bottom of the heater and loosen the nut attaching the probe. Then properly dispose of the mercury thermocouple.



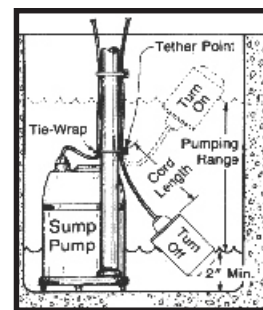
PHOTO A.

A non-mercury temperature probe. Notice that this probe is copper, which is a good indication of a non-mercury containing device.



3.5 Sump and Bilge Pumps

Another use for mercury was as a switch in sump and bilge pumps. This switch, which functioned very reliably in the high moisture environment, turned on and off based on the corresponding water level (see sump pump diagram at right). As the water level rises, so does the float ball and wire (a wire attached to the float is a good indication of a mercury sump pump) which would then tilt the mercury switch, completing the electrical circuit that turns on the pump. As the water level receded the electrical circuit would then be broken and the pump would turn off.



Basic sump pump operation (mercury switch). Reprinted with permission from Purdue University.

SUMP PUMP MERCURY REMOVAL

**ESTIMATED REMOVAL
TIME: 1-2 MINUTES**



A mercury-free sump pump. Notice the metal guide and no attached wires.

The sump pump on the left is an example of a mechanical sump pump. This pump works on the same principle that as the float ball rises up with the water it would turn on the pump (mechanical switch) and when the water recedes it would sink down with the water and shut the pump off. As can be seen in the photo on the left, a metal guide is used instead of a wire. This is a good indication of a non-mercury sump pump.



Sump pump float containing mercury.

Once you have determined whether or not it is a mercury sump pump, the wire attaching the float can simply be cut and the whole float properly disposed of (see photo at right).

BILGE PUMP MERCURY REMOVAL

**ESTIMATED REMOVAL
TIME: 1-2 MINUTES**



Bilge pump containing mercury.

Bilge pumps work on the same principle as a sump pump. By rotating on a stationary point (see drawing on right) with the fluctuations in water level either up or down, the bilge pump would turn on or off. Several of the newer models use this method with a rolling steel ball instead of mercury to complete the electrical circuit. This can be determined by simply shaking the bilge pump. A steel ball bearing will be easily discerned from liquid mercury.



Automatic switch bilge pump.

Once you have determined it is a mercury bilge pump, you can simply remove the entire pump and properly dispose of.

4.0 MERCURY HANDLING, STORAGE AND DISPOSAL

Once mercury devices are removed, they should be properly handled, stored and disposed of. The handling, storage and disposal protocols covered below are a best management strategy for individuals or businesses (non-profit and for profit) that generate less than 11,000 pounds of universal waste at anytime (all universal wastes combined). Individuals or businesses who will be generating more than 11,000 pounds should refer to Subchapter 9, the Universal Waste Management Standards in the State of Vermont Hazardous Waste Management Regulations.

Included for your convenience are two fact sheets, **Appendix E - Waste Mercury Containing Switches and Devices** and **Appendix F - Fluorescent Lamps**, which summarize handling, storage and disposal requirements for these products.

4.1 Handling

A mercury-containing switch or product should always be handled in a way that will prevent breakage. Also when removing mercury or mercury-added components from a product do so only over or in a containment device that will collect and contain any mercury released in the event of a mercury-added product breaking. Be sure to keep spill clean-up kits (See Section 5, Mercury Spill Clean-up) and equipment readily available and always ensure that there is adequate ventilation. ***Any spilled mercury or any contaminated clean-up materials must be handled as a hazardous waste. For large spill clean-ups (more than 1 or 2 tablespoons) a firm specializing in mercury clean-up should be acquired (see Appendix B).*** Anyone handling mercury or mercury-added products should use proper personal protective equipment (latex gloves, tyvek suit, safety glasses and a respirator with mercury cartridges if cleaning up a mercury spill) and be thoroughly familiar with proper mercury handling and emergency procedures (See Appendix E - Waste Mercury Containing Switches and Devices Factsheet).

4.2 Storage

All mercury-containing switches or products must be stored in containers that will prevent any breakage or leakage. These containers must be closed, structurally sound and compatible with the mercury-added products being stored. All containers of mercury-added products must be properly labeled with one of the following; “Universal Waste- Mercury-added Product(s)”, or “Waste Mercury-added product(s)” or “Used Mercury-added products” and stored for no more than one year.

4.3 Disposal

Properly contained and labeled mercury-added products can be disposed of in three possible disposal routes. These are:

- Disposal through a local Solid Waste District, Alliance or Municipality. This is usually done through Household Hazardous Waste Collection events or facilities (see Appendix A for a list of Solid Waste Districts, Alliances and Municipalities).
- Disposal through a hazardous waste transporter (see Appendix C).
- Disposal through a mercury recycler (see Appendix D).

5.0 MERCURY SPILL CLEAN-UP

MERCURY SPILL KIT

At a minimum you should have the following supplies in the event of a mercury spill. Those removing and collecting mercury on a continued basis should consider adding a commercially available spill kit to these items.

- index cards
- respirator with mercury vapor cartridges
- sulfur powder
- flashlight
- rubber squeegee
- zinc or copper flakes
- tape
- Ziploc plastic bags
- paper towels
- plastic dust pan
- wide mouth plastic container with cover
- plastic trash bags
- latex gloves

Note: Most spill/safety equipment suppliers have complete spill kits for purchase. Contact the Agency of Natural Resources for purchasing information.

EMERGENCY MERCURY SPILL CLEAN-UP PROCEDURE

This clean-up procedure is only intended for small mercury spills. If the spill involves more than one or two tablespoons of free mercury or the material has splattered over a sizeable area, is in cracks and crevices or other difficult to clean places, or is on a non-disposable porous item such as wall to wall carpeting or upholstery, ***we recommend you retain an environmental firm with the equipment and expertise to perform the cleanup (see Appendix B) and call the Vermont Spills Hotline at 1-800-641-5005.***

- A) Wear latex gloves to prevent skin contact. Keep your hands away from your face-especially your eyes, nose and mouth. ***Before beginning any spill clean-up make sure that the area is adequately ventilated or you have a respirator with mercury vapor cartridges.***
- B) Carefully pick up any broken pieces of glass (***NEVER SWEEP OR VACUUM MERCURY***). Place them on a paper towel or tissue. Wrap or fold the paper towel, and place into a leak-tight plastic bag or sealable plastic container.
- C) Sprinkle sulfur powder on the spill area to control mercury vapors. Then, working from the outside of the spill area toward the center, push small mercury beads together with a card, stiff paper, or squeegee to form larger droplets. Put droplets into a leak-tight plastic bag or plastic container.

- D) Use the sticky side of a two-inch (or wider) duct or masking tape to pick up any remaining glass or mercury beads. Pay special attention to cracks and crevices. Place tape and debris in a leak-tight plastic bag or sealable plastic container.
- E) Use a flashlight to look all around the spill area. The light will reflect off the shiny mercury beads and make it easier to see them.
- F) Sprinkle sulfur powder on the spill area after cleaning up beads of mercury; a color change from yellow to brown indicates that mercury is still present and more cleanup is needed.
- G) Sprinkle zinc flakes or copper flakes (available at hardware stores) to amalgamate any small amounts of mercury which remain.
- H) When finished, carefully remove latex gloves and place them in a leak-tight plastic bag or sealable plastic container. Do not touch the glove fingertips or parts that may have come in contact with mercury. Place all the closed containers in a double plastic bag and tie the opening. Properly dispose through a hazardous waste transporter, mercury recycler (see Appendix C) or call your Solid Waste District, Alliance or Municipality (see Appendix A).
- I) Thoroughly clean your hands and body. ***Never wash contaminated clothing in a washing machine or remove contaminated clothing or apparel from a spill site. This will help prevent further site contamination.*** These should also be properly disposed of.

APPENDIX A

VERMONT SOLID WASTE DISTRICTS, ALLIANCES AND MUNICIPALITIES

ADDISON COUNTY SOLID WASTE MANAGEMENT DISTRICT

P.O. Box 573, Route 7 South
Middlebury, VT 05753
(802) 388-2333
Fax: 388-0037
email: acswmd@acswmd.org
Website: www.acswmd.org

Participating Towns:

Addison, Bridport, Cornwall, Ferrisburg, Goshen, Leicester, Lincoln, Middlebury, Monkton, New Haven, Orwell, Panton, Ripton, Shoreham, Starksboro, Vergennes, Waltham, Weybridge, Whiting

BENNINGTON REGIONAL PLANNING COMMISSION

Box 342
Arlington, VT 05250
(802) 375-9964
Fax: 375-1561

Participating Towns:

Arlington*, Dorset*, Manchester*, Pownal**, Rupert, Sandgate*, Shaftsbury**, Stamford, Sunderland
* town works closely with BRPC

** send mailings directly to town contact

Town Contacts:

Pownal: Steffan Strohmaier, Pownal Town Office, P.O. Box 411, Pownal VT 05261 Tel# 823-7757.
Shaftsbury: Dennis McCarthy, Asst. to Sel. Bd., P.O. Box 409, Shaftsbury VT 05262 Tel #442-4043.

CENTRAL VERMONT SOLID WASTE MANAGEMENT DISTRICT

137 Barre Street
Montpelier, VT 05602
(802) 229-9383 or 1-800-730-9475
Fax: 229-1318
email: fieldprograms@cvswmd.com

Participating Towns:

Barre City, Barre Town, Berlin, Bradford, Cabot, Calais, Chelsea, East Montpelier, Hardwick, Marshfield, Middlesex, Montpelier, Northfield, Orange, Plainfield, Roxbury, Tunbridge, Walden, Washington, Williamstown, Woodbury

CHITTENDEN SOLID WASTE DISTRICT

1021 Redmond Road
Williston, VT 05495
(802) 872-8100
Fax: 878-5787
Recycling Hotline: 872-8111
E-mail: info@cswd.net

Participating Towns:

Bolton, Burlington, Charlotte, Colchester, Essex, Essex Junction, Hinesburg, Huntington, Jericho, Milton, Richmond, St. George, Shelburne, South Burlington, Westford, Williston, Winooski

GREATER UPPER VALLEY SOLID WASTE MANAGEMENT DISTRICT

96 Mill St. P.O. Box 58
North Hartland, VT 05052-0058
(802) 296-3688
Fax: 281-7088
E-mail: guvswd@valley.net

Participating Towns:

Bridgewater, Hartland, Norwich, Pomfret, Sharon, Strafford, Thetford, Vershire, West Fairlee, Woodstock

JOINT MUNICIPAL SURVEY COMMITTEE/SOLID WASTE ALTERNATIVE COMMITTEE

87 Halls Pond Road
Salem, NY 12865
(518) 9702
email: pam@starlitridge.com

Participating Towns:

Benson, Chittenden, Fair Haven, Middletown Springs, Pawlet, Rutland Town, Shrewsbury, Sudbury, Tinmouth, West Haven

LAMOILLE REGIONAL SOLID WASTE MANAGEMENT DISTRICT

29 Sunset Drive
Morrisville VT 05661-9788
(802) 888-7317
Fax: 888-6507
email: info@lrswmd.org

Participating Towns:

Belvidere, Cambridge, Craftsbury, Eden, Elmore, Hyde Park, Johnson, Morristown, Stowe, Waterville, Wolcott, Worcester

LONDONDERRY GROUP

Londonderry Recycling Coordinator
P.O. Box 118
South Londonderry, VT 05148
(802) 824-6304

Participating Towns:

Langrove, Londonderry, Peru, Weston, Windham.

MAD RIVER SOLID WASTE ALLIANCE

P.O. Box 210
Waterbury Center, VT 05677
(802) 244-7373
Fax: (802) 244-7570
Email: malterport@aol.com

Participating Towns:

Duxbury, Fayston, Moretown, Waitsfield, Warren, Waterbury.

NORTHEAST KINGDOM WASTE MANAGEMENT DISTRICT

P.O. Box 1075
Lyndonville, VT 05851
(802) 626-3532 or 800-734-4602
Fax: 626-3519
email: progmgr@nekwmd.org

Participating Towns:

Averill, Averys Gore, Barnet, Bloomfield, Brighton, Brunswick, Concord, Danville, East Haven, Ferdinand, Granby, Groton, Guildhall, Holland, Lewis, Lunenburg, Lyndon, Maidstone, Morgan, Newark, Peacham, Ryegate, Sheffield, Stannard, Victory, Waterford, Warren Gore, Warners Grant, Westmore, Wheelock.

NORTHWEST VERMONT SOLID WASTE MANAGEMENT DISTRICT

10-12 Kingman Street
P.O. Box 1547
St. Albans, VT 05478
(802) 524-5986
Fax: 524-5987
email: nwswdps@adelphia.net

Participating Towns:

Alburg, Bakersfield, Berkshire, Enosburg, Fairfield, Fletcher, Isle LaMotte, Montgomery, Richford, St. Albans City, Sheldon, South Hero.

RUTLAND COUNTY SOLID WASTE DISTRICT

2 Green Hill Lane
Rutland, VT 05701-5915
(802) 775-7209
Fax: 773-5796
E-mail: rcswd@rcswd.com
Recycling Hot Line: 773-4083

Participating Towns:

Brandon, Castleton, Clarendon, Danby, Hubbardton, Ira, Mendon, Mt. Tabor, Pittsford, Poultney, Proctor, Rutland City, Sherburne, Wallingford, Wells, West Rutland.

SOUTHERN WINDSOR/WINDHAM COUNTY SOLID WASTE MANAGEMENT DISTRICT

c/o NH/VT Solid Waste Project
130 Pleasant Street suite #3
Claremont, NH 03743
(603) 543-1201
Fax: (603) 542-5727

Participating Towns:

Andover, Baltimore, Cavendish, Chester, Grafton, Ludlow, Plymouth, Reading, Rockingham, Springfield, Weathersfield, Westminster, West Windsor, Windsor.

WHITE RIVER ALLIANCE

c/o Del Cloud
Bethel Town Manager
RR 1 Box 335
Bethel, VT 05032
(802) 234-9340
Fax: (802) 234-6840

Participating Towns:

Barnard, Bethel, Hancock, Pittsfield, Rochester, Royalton, Stockbridge.

WINDHAM SOLID WASTE MANAGEMENT DISTRICT

327 Old Ferry Road
Brattleboro, VT 05301
(802) 257-0272
Fax: 257-5122

Participating Towns:

Brattleboro, Brookline, Dover, Dummerston, Guilford, Halifax, Jamaica, Marlboro, Newfane, Putney, Readsboro, Townshend, Vernon, Whitingham, Wilmington.

OTHER CONTACTS

Towns not listed in any of these Solid Waste Districts or Alliances should contact their town clerk, town offices or the Vermont Agency of Natural Resources for more information on proper disposal of Hazardous Waste.

APPENDIX B

MERCURY CLEAN-UP PROFESSIONALS

The following is a partial list of companies that offer remediation (clean-ups/elimination, etc.) concerning air quality related situations. This list is not a recommendation or endorsement by the Vermont Agency of Natural Resources.

Key: L=liquid mercury
M=microbial (mold, mildew, fungus, and/or bacterial)
O=odors (post fire, etc.)
C=chemical
F=fuel

Clean Harbors Env. Services, Inc.

Offices also near Concord, NH and Boston, MA
(1-800-OILTANK)
32 Basik Road
Glenmount, NY 12077
(518) 434-0149
Key- (M,O,L,C,F)

Environmental Products & Service

2 Flynn Avenue
Burlington, VT 05401
(802) 862-1212 or (1-800-THETANK)
FAX-(802)860-7445
(24 hr, 7/day/upc full cleanup response)
Key- (L,C,F,M)

Seacoast Ocean Services/SOS

36 Custom House Wharf
Portland, Maine 04101
(800) 339-2111 or (207) 774-2111
FAX (207) 774-7240
Email: servoprovt@aow.com
Key- (M,O,L,C,F)

Twin State Environmental Corp.

34 Roosevelt Highway
Colchester, VT 05446
(802) 654-8663
FAX (802) 654-8667
Email: tsec@together.net
Key- (L,C,F)

APPENDIX C

HAZARDOUS WASTE TRANSPORTERS

The following is a partial list of companies that offer hazardous waste transportation. This list is not a recommendation or endorsement by the Vermont Agency of Natural Resources.

APTUS Inc.

21750 Cedar Avenue

P.O. Box 550

Lakeville, MN 55044

Contact: Bruce Burniece (612) 469-3475

Clean Harbors Environmental Services

35 Commerce Street #9

Williston, VT 05495

Contact: Cathy McNamara (802) 651-0558

ENPRO Services Inc.

12 Mulliken Way

Newburyport, MA 01950

Contact: Larry Bouchard (978) 465-1595

Environmental Hazards Management Inc.

P.O. Box 785

Williston, VT 05495

Contact: Ken Morton (802) 862-4537

Environmental Products & Services of VT

2 Flynn Avenue

Burlington, VT 05401

Contact: Donald Melander (802) 862-1212

Heritage Environmental Services

2 Avenue D

Williston, VT 05495

Contact: Kendra Demarest (802) 860-1200

North Country Environmental Services

11 Mill Street

Barre, VT 05461

Contact: David Barchard (802) 479-5299

Safety Kleen Corp.

221 Sutton Street

North Andover, MA 01845

Contact: Brenda Leonardo

Total Waste Management

142 River Road
Newington, NH 03801
Contact: Kevin Schmit (800) 345-4525

Triumvirate Environmental Inc.

P.O. Box 136
Boston, MA 02143-0003
Contact: Jeff Plotts (800) 966-9282

APPENDIX D

MERCURY RECYCLERS

The following is a partial list of mercury recyclers that accept all mercury-added products. This list is not a recommendation or endorsement by the Vermont Agency of Natural Resources.

Adrow Chemical

2 Lines Ave.
Wanaque, NJ 07465
Phone: (201) 839-2372
Contact: Bill Delaney or Frank Bindhammer

Bethlehem Apparatus

890 Front St., P.O. Box Y
Hellertown, PA 18055
Phone: (610) 838-7034
Contact: John Boyle

Mercury Refining Co.

1218 Central Avenue
Albany, NY 12205
Phone: (518) 459-0820
Contact: Aaron Mars

Advance Env. Recycling Corp.

2591 Mitchell Ave.
Allentown, PA 18103
Phone: (800) 554-2372

Environmental Enterprises, Inc.

10163 Cincinnati-Dayton Rd.
Cincinnati, OH 45241
Phone: (800) 722-2818

Mercury Waste Solutions, Inc.

21211 Durand Avenue
Union Grove, WI 53182
Phone: (800) 741-3343
Contact: Zach Unruh



Environmental Fact Sheet

Vermont Department of
Environmental Conservation
103 South Main Street
Waterbury, VT 05671

<http://www.anr.state.vt.us/dec/dec.htm>

VTDEC Publication #EA-1001

November, 2000

Fluorescent Lamps: Handling and Disposal Guidelines

Fluorescent and HID Lamps:

Fluorescent and HID lamps contain mercury, a highly toxic heavy metal. When lamps are broken or thrown in the trash, mercury is released to the environment. Even the small amount of mercury-laden phosphor powder contained in lamps can damage our lakes and streams and poison fish and wildlife. It is due to this toxicity of the mercury contained in lamps, that there are restrictions (limits) on their disposal.

In Vermont, the following types of lamps should not be placed in the trash:

Fluorescent Lamps

- full size fluorescents
- compact fluorescents

High Intensity Discharge (HID) Lamps

- mercury vapor lamps
- metal halide lamps
- sodium lamps



Why Use Fluorescent and HID Lamps?

Using energy-efficient lighting makes good sense because:

- Fluorescent and HID lamps last longer
- Use less electricity than incandescent lamps and therefore:
 - Cost less to run
 - Result in less air pollution emitted from coal-burning power plants.

Vermont Law Requires:

- Proper labeling of mercury-added products.
- Towns and Solid Waste Districts to implement a program to collect mercury-added consumer products and to inform the public about them.
- Proper disposal.

General Recycling Guide for Fluorescent Lamps:

Here are a few precautions to take with Fluorescent and HID lamps after they have burned out:

- Do not break or crush lamps because mercury will be released.
- To avoid breaking the lamps, package them carefully when storing and transporting them. **DO NOT TAPE THEM TOGETHER!**
- Contact your local Town Manager or Solid Waste District (listed on the back of sheet) or the Agency of Natural Resources for information on the recycling program for Fluorescent and HID lamps in your area.
- If lamps are accidentally broken, follow the clean-up procedure below.

Lamp Breakage Clean-up Procedure

- 1 Keep all people and pets away from breakage area so that mercury powder is not tracked into other areas.
- 2 Keep the area well ventilated.
- 3 Assemble the necessary supplies before cleaning up: Latex gloves, tweezers, tape, and a puncture resistant container.
- 4 Using the latex gloves, carefully pick up any broken glass and place in a puncture resistant container. Tweezers may be needed to safely pick up broken glass. Tape can also be used to pick up any remaining small pieces of glass and powder residue still located on the spill surface. **DO NOT VACUUM.**
- 5 After clean-up is complete, place the contaminated clean-up equipment along with any other material that came in contact with the mercury powder into the puncture resistant container or a sealable plastic bag.
- 6 Contact your local Town Manager, Solid Waste District or the Agency of Natural Resources for waste management options.

For additional information contact: Environmental Assistance Division tele: 802-241-3589 fax: 802-241-3273
e-mail: ead@dec.anr.state.vt.us
web site: <http://www.anr.state.vt.us/dec/ead/eadhome.htm>

Fluorescent Lamp Management Q&A for Businesses & Municipalities

Should I crush my lamps?

No, crushing mercury-containing lamps may pose health and environmental risks when mercury vapors are released. Lamps should be stored in ways that avoid breakage.

How should I store mercury-containing lamps?

- Place used lamps in packaging functionally equivalent to that used to ship new lamps.
- Seal full packages with tape (**Do not tape lamps together**).
- Label packages with any one of the following phrases:
 - “Waste Mercury-Containing Lamp(s)”
 - “Used Mercury-Containing Lamp(s)”
 - “Universal Waste Mercury-Containing Lamp(s)”
- Store packages of lamps no more than five (5) feet high.
- Store packages for no more than one year.
- Store packages of waste mercury-containing lamps in a storage area identified by a sign that is clearly visible and has a label that includes the words: “Waste Mercury-Containing Lamps”.

What if a mercury-containing lamp breaks?

Once a lamp is broken, it is considered a hazardous waste and should not be thrown in the trash. First allow the area to ventilate for 15 minutes. Then transfer any damaged or broken mercury-containing lamps and residue to a closed compatible container labeled “Hazardous Waste” (with a description of the contents). Once properly contained and labeled, the broken lamps and residue should be stored on an impervious surface within a structure that sheds rain and snow.

How should we train workers who handle waste lamps?

All employees who handle or manage mercury-containing products shall be informed of proper handling and emergency procedures.

Do I need any permits for transporting my own waste fluorescent and HID lamps?

No, only commercial haulers of waste lamps need to get a waste transporter's permit or certification.

What are the disposal options for mercury-containing lamps?

- ➊ Recycling through a Municipal or Solid Waste District Household Hazardous Waste collection program,
- ➋ Direct shipment to a lamp recycler or,
- ➌ Shipment through a hazardous waste transporter.

Where can I get additional information?

Additional information can be found by:

- Contacting your local Town Manager (if not in a Solid Waste District),
- Contacting your local Solid Waste District (*see the list at right*)
- Contacting the Agency of Natural Resources:
 - Waste Management Division (802) 241-3888
 - Environmental Assistance Division (802) 241-3589
- Accessing the following website <http://www.anr.state.vt.us/dec/waste.htm>
- Reviewing Subchapter 9 of the Vermont Hazardous Waste Regulations (*accessible through the above website*)

Vermont Solid Waste Districts

ADDISON COUNTY
SOLID WASTE DISTRICT
(802) 388-2333

BENNINGTON REGIONAL
PLANNING COMMISSION
(802) 375-2576

CENTRAL VERMONT
SOLID WASTE DISTRICT
1-800-730-9475 OR (802) 229-9383

CHITTENDEN
SOLID WASTE DISTRICT
(802) 872-8111

GREATER UPPER VALLEY
SOLID WASTE DISTRICT
(802) 296-3688

LAMOILLE REGIONAL
SOLID WASTE DISTRICT
(802) 888-7317

MAD RIVER
SOLID WASTE ALLIANCE
(802) 244-7373

NORTHEAST KINGDOM
WASTE MANAGEMENT DISTRICT
1-800-734-4602 OR (802) 626-3532

NORTHWEST VERMONT
SOLID WASTE DISTRICT
(802) 524-5986

SOUTHERN WINDSOR/
WINDHAM COUNTY
SOLID WASTE MGMT DISTRICT
(603) 543-1201 OR (802) 885-5827

RUTLAND COUNTY
SOLID WASTE DISTRICT
(802) 775-7209 OR 802-773-4083

RUTLAND NON-DISTRICT
TOWNS JMISC/SWAC
(802) 235-2710

WHITE RIVER
ALLIANCE
(802) 234-9340

WINDHAM SOLID
WASTE DISTRICT
(802) 257-0272



Environmental Fact Sheet

Vermont Department of
Environmental Conservation
103 South Main Street
Waterbury, VT 05671

<http://www.anr.state.vt.us/dec/dec.htm>

VTDEC Publication #EA-1002

July, 2001

Waste Mercury-Added Devices: Handling and Disposal Guidelines

Thermometers, Silent Switches and Temperature Probes

In addition to thermometers, mercury has been used for many years in electrical products. A moving drop of mercury is used to open or close electrical circuits in devices like thermostats, silent wall switches, sump pumps, and the tilt switches in automobiles, chest freezers, washing machines, and space heaters. Mercury is a naturally occurring heavy metal which at room temperature takes the form of a silvery liquid. When a mercury-containing device is broken or thrown in the trash, mercury is released to the environment. Even a small amount of mercury can damage our lakes and streams and poison fish and wildlife. It is because of mercury's toxicity that restrictions (limits) have been placed on how and where mercury-added products are disposed.



Recognizing a Mercury-Added Device Is Not Always Easy

Although it is easy to see the silvery mercury in the bulb of a thermometer or the glass tilt switch of a home thermostat, most mercury containing devices enclose their mercury-added switches inside rubber, plastic or metal coverings. Also, not all electrical switches and temperature probes use mercury to function. Your Town Clerk, Town Manager, Solid Waste District (listed on the back of this sheet) and the Agency of Natural Resources has more information about which products have mercury in them and about the recycling programs for mercury-added devices in your area. (Also, see our Environmental Fact Sheet on Waste Mercury-Containing Lamps)

Vermont Law Requires...

- ☞ Proper labeling of mercury-added products.
- ☞ Towns and Solid Waste Districts to offer programs to collect mercury-added consumer products and to inform the public about them.
- ☞ Proper disposal, **NOT** IN THE TRASH!

General Recycling Guidelines

- ☞ Do not break, crush or take apart a mercury-added switch or device because mercury will be released.
- ☞ To avoid breaking the devices, package them carefully in individually sealed plastic bags placed inside larger sealable containers before storing or transporting them.
- ☞ Contact your Town Clerk, local Solid Waste District (listed on the back of this sheet) or the Agency of Natural Resources for information about recycling programs for mercury-added devices in your area.
- ☞ Contact local heating and air conditioning contractors or wholesalers about free thermostat take-back available through the Thermostat Recycling Corporation.
- ☞ If a mercury-added device is accidentally broken, use the following clean-up procedure.

Mercury Spill Cleanup Procedure

DO NOT SWEEP OR VACUUM MERCURY!

- 1 Keep all people and pets away from the breakage area so that mercury is not tracked elsewhere.
- 2 Keep the area well ventilated by opening windows and shutting off the heat or air conditioning.
- 3 Collect the necessary supplies before cleaning up: latex gloves, stiff paper or cards, paper towels or tissues, wide masking or duct tape, a leak-tight plastic bag or sealable container, a small plastic scoop or eye dropper.
- 4 Wearing the gloves, carefully pick up any broken glass or pieces of the device. Place on a paper towel or tissue. Wrap or fold the paper towel and place it in a leak-tight plastic bag or sealable container.
- 5 Working from the edge of the spill towards the center, use a card or stiff paper to push small beads of mercury into larger droplets. Push the droplets into a plastic scoop or pick them up with an eye dropper. Place the mercury in a leak-tight plastic bag or sealable container.
- 6 Use the sticky side of masking or duct tape to pick up remaining bits of glass or mercury beads. Put the tape, debris, gloves and cleanup equipment in a leak-tight plastic bag or sealable container.
- 7 Contact your Town Clerk, Solid Waste District or the Agency of Natural Resources about how to dispose of mercury spill cleanup materials.

Mercury-Added Device Management Q & A for Businesses and Municipalities

How should I handle mercury-added devices?

Mercury-added switches and devices are often removable components found inside much larger appliances. Once the switch or component has been removed from the larger product, the component should not be disassembled further. If need be, it should be stored in an individually sealed plastic bag placed inside a larger sealable container to avoid breakage. Direct exposure to mercury metal may pose health and environmental risks when mercury vapors are released.

Is every waste mercury-added product a hazardous waste?

When taken by itself, a mercury-added switch would exhibit the hazardous waste characteristic of toxicity for mercury. However, the hazardous waste regulations which apply to the proper handling and disposal of a mercury-added component do not automatically extend to the larger products containing them. For example, a mercury-added hood or trunk light switch does not turn the whole car into a hazardous waste.

May waste mercury-added products or devices be handled as something other than a hazardous waste?

Yes. Both Vermont and federal hazardous waste regulations already contain provisions to simplify the handling and recycling of waste mercury-added thermostats and lamps. These are called "Universal Wastes". Under current Vermont Waste Management Division policy, the terms of these provisions have been extended to all fabricated mercury-added products, switches, and devices that are not presently listed as so-called "Universal Wastes".

What if a mercury-added device breaks?

At a minimum, the device, the released mercury and cleanup debris should be sealed in a plastic bag and transferred to a closed compatible container labeled "Hazardous Waste" (with a description of the contents) and managed as a hazardous waste.

What should we tell workers who handle waste mercury-added products?

All employees who handle or manage mercury-added products should be informed of the proper handling and emergency procedures for these products and for mercury.

What are the disposal options for mercury-added devices?

- 1 Recycling through a Municipal or Solid Waste District's Household Hazardous Waste collection program.
- 2 Thermostats only Recycling by heating, ventilation and air conditioning wholesalers participating in the free thermostat take-back sponsored by the Thermostat Recycling Corporation.
- 3 Direct shipment as "Universal Waste" to a mercury recycling facility.
- 4 Shipment through a hazardous waste transporter to a proper destination facility.

Where can I get additional information?

- ☞ Contact your Town Clerk or Town Manager (if not in a Solid Waste District)
- ☞ Contact your Solid Waste District (see list to the right or the Agency web site below)
- ☞ Contact the Vermont Agency of Natural Resources:
 - Waste Management Division (802) 241-3888 (Hazardous/Universal Wastes)
 - Environmental Assistance Division (802) 241-3589 (Mercury-Added Products) or, on the web at: www.anr.state.vt.us/dec/waste.htm or www.mercvt.org
- ☞ Also, see our "Waste Mercury Containing Lamps" and "Universal Waste" Fact Sheets
- ☞ Review the Vermont Hazardous Waste Management Regulations in Subchapter 9: Universal Waste Management Standards. (also available on the Agency of Natural Resources website above)

Vermont Solid Waste Districts

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SOLID WASTE DISTRICT
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LAMOILLE REGIONAL
SOLID WASTE DISTRICT
(802) 888-7317

MAD RIVER
SOLID WASTE ALLIANCE
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WASTE DISTRICT
(802) 257-0272

For more information contact:

Environmental
Assistance
Division

tele: 802-241-3589 fax: 802-241-3273
e-mail: ead@dec.anr.state.vt.us
www.anr.state.vt.us/dec/ead/eadhome.htm

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11. Factsheet: Fluorescent Lamps: Handling and Disposal Guidelines. State of Vermont Agency of Natural Resources. November 2000.
12. Factsheet: Waste Mercury-Containing Switches and Devices: Handling and Disposal Guidelines. Agency of Natural Resources. June 2001.
13. Mercury Factsheet: What is Mercury? Why be concerned? Indiana Office of Pollution Prevention and Technical Assistance. May 2000.

APPENDIX B

PCB Regulations

Canada Gazette



Gazette du Canada

Part II

Partie II

OTTAWA, WEDNESDAY, SEPTEMBER 17, 2008

OTTAWA, LE MERCREDI 17 SEPTEMBRE 2008

Statutory Instruments 2008

Textes réglementaires 2008

SOR/2008-247 to 290 and SI/2008-93 to 107

DORS/2008-247 à 290 et TR/2008-93 à 107

Pages 1882 to 2241

Pages 1882 à 2241

NOTICE TO READERS

The *Canada Gazette* Part II is published under authority of the *Statutory Instruments Act* on January 9, 2008, and at least every second Wednesday thereafter.

Part II of the *Canada Gazette* contains all “regulations” as defined in the *Statutory Instruments Act* and certain other classes of statutory instruments and documents required to be published therein. However, certain regulations and classes of regulations are exempted from publication by section 15 of the *Statutory Instruments Regulations* made pursuant to section 20 of the *Statutory Instruments Act*.

The *Canada Gazette* Part II is available in most libraries for consultation.

For residents of Canada, the cost of an annual subscription to the *Canada Gazette* Part II is \$67.50, and single issues, \$3.50. For residents of other countries, the cost of a subscription is US\$67.50 and single issues, US\$3.50. Orders should be addressed to Government of Canada Publications, Public Works and Government Services Canada, Ottawa, Canada K1A 0S5.

The *Canada Gazette* is also available free of charge on the Internet at <http://canadagazette.gc.ca>. It is accessible in Portable Document Format (PDF) and in HyperText Mark-up Language (HTML) as the alternate format. The PDF format of Part I, Part II and Part III is official since April 1, 2003, and is published simultaneously with the printed copy.

Copies of Statutory Instruments that have been registered with the Clerk of the Privy Council are available, in both official languages, for inspection and sale at Room 418, Blackburn Building, 85 Sparks Street, Ottawa, Canada.

AVIS AU LECTEUR

La Partie II de la *Gazette du Canada* est publiée en vertu de la *Loi sur les textes réglementaires* le 9 janvier 2008, et au moins tous les deux mercredis par la suite.

La Partie II de la *Gazette du Canada* est le recueil des « règlements » définis comme tels dans la loi précitée et de certaines autres catégories de textes réglementaires et de documents qu’il est prescrit d’y publier. Cependant, certains règlements et catégories de règlements sont soustraits à la publication par l’article 15 du *Règlement sur les textes réglementaires*, établi en vertu de l’article 20 de la *Loi sur les textes réglementaires*.

On peut consulter la Partie II de la *Gazette du Canada* dans la plupart des bibliothèques.

Pour les résidents du Canada, le prix de l’abonnement annuel à la Partie II de la *Gazette du Canada* est de 67,50 \$ et le prix d’un exemplaire, de 3,50 \$. Pour les résidents d’autres pays, le prix de l’abonnement est de 67,50 \$US et le prix d’un exemplaire, de 3,50 \$US. Veuillez adresser les commandes à : Publications du gouvernement du Canada, Travaux publics et Services gouvernementaux Canada, Ottawa, Canada K1A 0S5.

La *Gazette du Canada* est aussi disponible gratuitement sur Internet au <http://gazetteducanada.gc.ca>. La publication y est accessible en format de document portable (PDF) et en langage hypertexte (HTML) comme média substitut. Le format PDF en direct de la Partie I, de la Partie II et de la Partie III est officiel depuis le 1^{er} avril 2003 et est publié en même temps que la copie imprimée.

Des exemplaires des textes réglementaires enregistrés par le greffier du Conseil privé sont à la disposition du public, dans les deux langues officielles, pour examen et vente à la Pièce 418, Édifice Blackburn, 85, rue Sparks, Ottawa, Canada.

Registration
SOR/2008-273 September 5, 2008

CANADIAN ENVIRONMENTAL PROTECTION ACT, 1999

PCB Regulations

P.C. 2008-1659 September 5, 2008

Whereas, pursuant to subsection 332(1)^a of the *Canadian Environmental Protection Act, 1999*^b, the Minister of the Environment published in the *Canada Gazette*, Part I, November 4, 2006, a copy of the proposed *PCB Regulations*, substantially in the annexed form, and persons were given an opportunity to file comments with respect to the proposed Regulations or to file a notice of objection requesting that a board of review be established and stating the reasons for the objection;

Whereas, pursuant to subsection 93(3) of that Act, the National Advisory Committee has been given an opportunity to provide its advice under section 6^c of that Act;

And whereas, in the opinion of the Governor in Council, pursuant to subsection 93(4) of that Act, the proposed Regulations do not regulate an aspect of a substance that is regulated by or under any other Act of Parliament in a manner that provides, in the opinion of the Governor in Council, sufficient protection to the environment and human health;

Therefore, Her Excellency the Governor General in Council, on the recommendation of the Minister of the Environment and the Minister of Health, pursuant to subsection 93(1) and section 97 of the *Canadian Environmental Protection Act, 1999*^b, hereby makes the annexed *PCB Regulations*.

Enregistrement
DORS/2008-273 Le 5 septembre 2008

LOI CANADIENNE SUR LA PROTECTION DE L'ENVIRONNEMENT (1999)

Règlement sur les BPC

C.P. 2008-1659 Le 5 septembre 2008

Attendu que, conformément au paragraphe 332(1)^a de la *Loi canadienne sur la protection de l'environnement (1999)*^b, le ministre de l'Environnement a fait publier dans la *Gazette du Canada* Partie I, le 4 novembre 2006, le projet de règlement intitulé *Règlement sur les BPC*, conforme en substance au texte ci-après, et que les intéressés ont ainsi eu la possibilité de présenter leurs observations à cet égard ou un avis d'opposition motivé demandant la constitution d'une commission de révision;

Attendu que, conformément au paragraphe 93(3) de cette loi, le comité consultatif national s'est vu accorder la possibilité de formuler ses conseils dans le cadre de l'article 6^c de celle-ci;

Attendu que la gouverneure en conseil est d'avis que, aux termes du paragraphe 93(4) de cette loi, le projet de règlement ne vise pas un point déjà réglementé sous le régime d'une autre loi fédérale de manière à offrir une protection suffisante pour l'environnement et la santé humaine,

À ces causes, sur recommandation du ministre de l'Environnement et du ministre de la Santé et en vertu du paragraphe 93(1) et de l'article 97 de la *Loi canadienne sur la protection de l'environnement (1999)*^b, Son Excellence la Gouverneure générale en conseil prend le *Règlement sur les BPC*, ci-après.

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^a S.C. 2004, c. 15, s. 31

^b S.C. 1999, c. 33

^c S.C. 2002, c. 7, s. 124

^a L.C. 2004, ch. 15, art. 31

^b L.C. 1999, ch. 33

^c L.C. 2002, ch. 7, art. 124

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PCB REGULATIONS

PART 1

GENERAL

Definitions	1. (1) The following definitions apply in these Regulations.
“Act” « Loi »	“Act” means the <i>Canadian Environmental Protection Act, 1999</i> .
“authorized facility” « installation agréée »	“authorized facility” means a facility, including a transfer site, that is authorized by the authorities of the jurisdiction in which it is located to process PCBs or products containing PCBs or to conduct laboratory analysis or research with PCBs or products containing PCBs.
“National Fire Code” « Code national de prévention des incendies »	“National Fire Code” means the National Fire Code of Canada 2005, NRCC No. 47667, issued by the Canadian Commission on Building and Fire Codes, National Research Council of Canada, as amended from time to time.

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RÈGLEMENT SUR LES BPC

PARTIE 1

GÉNÉRALITÉS

1. (1) Les définitions qui suivent s'appliquent au présent règlement.	Définitions
« BPC » Tout biphényle chloré visé à l'article 1 de la liste des substances toxiques de l'annexe 1 de la Loi.	« BPC » “PCB”
« Code national de prévention des incendies » Le <i>Code national de prévention des incendies</i> — Canada 2005, CNRC 47667F, avec ses modifications successives, publié par la Commission canadienne des codes du bâtiment et de prévention des incendies du Conseil national de recherches du Canada.	« Code national de prévention des incendies » “National Fire Code”
« installation agréée » Installation — notamment un centre de transfert — qui est autorisée par les autorités du territoire où elle est située à transformer	« installation agréée » “authorized facility”

“PCB” « BPC » “process” « transformer » “product” « produit »	“PCB” means any chlorobiphenyl described in item 1 of the List of Toxic Substances in Schedule 1 to the Act. “process” includes to mix with a product. “product” includes equipment.	des BPC ou des produits qui en contiennent, ou à les utiliser pour des analyses de laboratoire ou des recherches. « Loi » La <i>Loi canadienne sur la protection de l’environnement</i> (1999). « produit » S’entend notamment d’une pièce d’équipement. « transformer » S’entend notamment du fait de mélanger avec tout produit.	« Loi » « Act » « produit » “product” « transformer » “process”
Concentration — several matrices	(2) For the purposes of these Regulations, if a solid or a liquid containing PCBs is composed of several matrices, the concentration of PCBs is based on the mass of the matrix in which the PCBs are located.	(2) Pour l’application du présent règlement, lorsqu’un solide ou un liquide qui contient des BPC est composé de plusieurs matrices, la concentration de BPC est basée sur la masse de la matrice dans laquelle les BPC se trouvent.	Concentration — plusieurs matrices
Concentration and quantity	(3) For the purposes of these Regulations, the concentration and quantity of PCBs shall be determined (a) by a laboratory (i) accredited by the Standards Council of Canada (SCC), the Canadian Association for Environmental Analytical Laboratories Inc. (CAEAL), or any other accreditation body that is a signatory to the <i>International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement</i>, and the laboratory shall be accredited in accordance with the International Organization for Standardization standard ISO/IEC 17025:2005 entitled <i>General Requirements for the Competence of Testing and Calibration Laboratories</i>, as amended from time to time, and (ii) for which the scope of accreditation shall include the analytical method used to determine the concentration of PCBs in the matrix in which the PCBs are located; or (b) by a laboratory (i) accredited in accordance with the <i>Environmental Quality Act</i>, R.S.Q., c. Q-2, as amended from time to time, and (ii) for which the scope of accreditation shall include the analytical method used to determine the concentration of PCBs in the matrix in which the PCBs are located.	(3) Pour l’application du présent règlement, la concentration et la quantité de BPC sont déterminées : a) soit par tout laboratoire : (i) qui est accrédité à la norme de l’Organisation internationale de normalisation intitulée <i>Exigences générales concernant la compétence des laboratoires d’étalonnages et d’essais</i> (ISO/IEC 17025:2005), avec ses modifications successives, par le Conseil canadien des normes (CCN), l’Association canadienne des laboratoires d’analyse environnementale (ACLAE) ou tout autre organisme d’accréditation signataire de l’<i>International Laboratory Accreditation Cooperation (ILAC) Mutual Recognition Arrangement</i>, (ii) dont la portée d’accréditation couvre la méthode d’analyse utilisée pour déterminer la concentration des BPC dans la matrice dans laquelle les BPC se trouvent; b) soit par tout laboratoire : (i) qui est accrédité conformément à la <i>Loi sur la qualité de l’environnement</i>, L.R.Q., ch. Q-2, avec ses modifications successives, (ii) dont la portée d’accréditation couvre la méthode d’analyse utilisée pour déterminer la concentration des BPC dans la matrice dans laquelle se trouvent les BPC.	Concentration et quantité
Sampling method	(4) For the purposes of these Regulations, other than section 13, the concentration of PCBs in a matrix is determined using a provincially, nationally or internationally recognized sampling method for PCBs in the matrix in which the PCBs are located.	(4) Pour l’application du présent règlement, sauf l’article 13, la concentration de BPC se trouvant dans une matrice est déterminée au moyen de toute méthode d’échantillonnage pour les BPC dans cette matrice qui est reconnue à l’échelle provinciale, nationale ou internationale.	Méthode d’échantillonnage
Sampling method — bulk solid products	(5) For the purposes of section 13, the concentration of PCBs is determined using a sampling method for bulk solid products, which is set out in either federal or provincial legislation, as amended from time to time, or approved by the United States Environmental Protection Agency for compliance with the <i>Resource Conservation and Recovery Act</i> or with the regulations made under that Act, as amended from time to time.	(5) Pour l’application de l’article 13, la concentration de BPC est déterminée au moyen de toute méthode d’échantillonnage pour les produits solides en vrac qui est prévue par une loi ou un règlement fédéral ou provincial, avec ses modifications successives, ou qui est approuvée par la United States Environmental Protection Agency pour l’application de la loi des États-Unis intitulée <i>Resource Conservation and Recovery Act</i> ou de ses règlements avec leurs modifications successives.	Méthode d’échantillonnage — produits solides en vrac

Application	2. (1) These Regulations apply to PCBs and to any products containing PCBs.	2. (1) Le présent règlement s'applique aux BPC et à tout produit qui en contient.	Application
Non-application	(2) These Regulations do not apply to the following: (a) the export and import of PCBs that are hazardous waste or hazardous recyclable material within the meaning of the <i>Export and Import of Hazardous Waste and Hazardous Recyclable Material Regulations</i> or the export of PCBs that are waste within the meaning of the <i>PCB Waste Export Regulations, 1996</i> ; (b) the sale, importation or advertising of liquids containing PCBs for use in microscopy, including immersion oils, but not including refractive index oils, which is prohibited under section 4 of the <i>Hazardous Products Act</i> ; and (c) the offer for sale, sale and use of land contaminated with PCBs or with products containing PCBs.	(2) Il ne s'applique toutefois pas aux activités suivantes : a) l'exportation et l'importation de BPC qui sont des déchets dangereux ou des matières recyclables dangereuses au sens du <i>Règlement sur l'exportation et l'importation de déchets dangereux et de matières recyclables dangereuses</i> et l'exportation de déchets contenant des BPC au sens du <i>Règlement sur l'exportation de déchets contenant des BPC (1996)</i> ; b) la vente, l'importation ou la publicité des liquides pour usage en microscopie qui contiennent des BPC, y compris les huiles à immersion mais à l'exclusion des huiles à indice de réfraction, interdites par l'article 4 de la <i>Loi sur les produits dangereux</i> ; c) la mise en vente, la vente et l'utilisation de terrains contaminés par des BPC ou des produits qui en contiennent.	Exclusion
Sale of property	3. Nothing in these Regulations shall be construed as preventing the sale of (a) personal property or movables that contain PCBs, or real property or immovables that have PCBs or products containing PCBs, and that form part of the sale of the whole or part of a business, including a manufacturing or a processing business; (b) real property or immovables that have products containing PCBs if the products continue to be used after the sale for the same purpose at the same place and are an integral part of the property or immovable; or (c) real property or immovables on which a PCB storage site is located.	3. Le présent règlement n'a pas pour effet d'empêcher la vente des biens suivants : a) tout bien meuble ou personnel qui contient des BPC ou tout bien immeuble ou réel où se trouvent des BPC ou des produits qui en contiennent, lesquels biens sont compris dans la vente de tout ou partie d'une entreprise, y compris une entreprise de fabrication ou de transformation; b) tout bien immeuble ou réel dont font partie intégrante les produits qui contiennent des BPC qui s'y trouvent, si les produits continuent d'être utilisés aux mêmes fins et au même endroit après la vente; c) tout bien immeuble ou réel où se trouve un dépôt de BPC.	Vente de biens
Compliance	4. In addition to the persons who must comply with the requirements set out in these Regulations, a person who owns PCBs or products containing PCBs shall ensure that the requirements of these Regulations with respect to those PCBs or products are met.	4. En plus des personnes auxquelles il incombe des obligations en vertu du présent règlement, le propriétaire de BPC ou de produits qui en contiennent veille à ce que les exigences du présent règlement concernant ces BPC ou produits soient remplies.	Conformité

PART 2

PROHIBITIONS AND
PERMITTED ACTIVITIES

PROHIBITIONS

Release into the environment	5. (1) No person shall release PCBs into the environment, other than from the equipment referred to in subsection (2), in a concentration of (a) 2 mg/kg or more for a liquid containing PCBs; or (b) 50 mg/kg or more for a solid containing PCBs.
Release from equipment	(2) No person shall release more than one gram of PCBs into the environment from equipment

PARTIE 2

INTERDICTIONS ET
ACTIVITÉS PERMISES

INTERDICTIONS

Rejet dans l'environnement	5. (1) Il est interdit de rejeter dans l'environnement, autrement qu'à partir d'une pièce d'équipement visée au paragraphe (2), des BPC de l'une ou l'autre des concentrations suivantes : a) dans le cas d'un liquide qui contient des BPC, une concentration égale ou supérieure à 2 mg/kg; b) dans le cas d'un solide qui contient des BPC, une concentration égale ou supérieure à 50 mg/kg.
Rejet à partir d'une pièce d'équipement	(2) Il est interdit de rejeter plus d'un gramme de BPC dans l'environnement à partir d'une pièce

referred to in section 16 that is in use or from equipment in use for which an extension has been granted under section 17.

Prohibited activities

- 6.** Except as provided in these Regulations, no person shall
- (a) manufacture, export or import PCBs or a product containing PCBs in a concentration of 2 mg/kg or more;
 - (b) offer for sale or sell PCBs or a product containing PCBs in a concentration of 50 mg/kg or more; or
 - (c) process or use PCBs or a product containing PCBs.

PERMITTED ACTIVITIES

Laboratory analysis

- 7.** A person may manufacture, export, import, offer for sale, sell, process and use PCBs or products containing PCBs for the purpose of laboratory analysis if the analysis is conducted
- (a) in an authorized facility that is authorized for that purpose; or
 - (b) in a facility that conforms to internationally recognized guidelines on best laboratory practices, if the authorities of the jurisdiction in which the facility is located do not have a mechanism in place to authorize the facility to conduct the analysis.

Research

- 8.** (1) A person may offer for sale or sell PCBs or products containing PCBs to be processed or used for the purpose of research to determine the effects of those PCBs or products on human health or on the environment, if the facility in which they are processed or used is
- (a) an authorized facility that is authorized for that purpose; or
 - (b) a facility that conforms to internationally recognized guidelines on best laboratory practices, if the authorities of the jurisdiction in which the facility is located do not have a mechanism in place to authorize the facility to conduct the research.

Processing and use

- (2) A person may process and use the PCBs or products containing PCBs for the purpose of the research referred to in subsection (1) at a facility that meets the requirement set out in paragraph (1)(a) or (b).

Electrical capacitor

- 9.** A person may offer for sale, sell and use an electrical capacitor containing PCBs if the electrical capacitor
- (a) is an integral part of a consumer product;
 - (b) is fusion sealed; and
 - (c) would be rendered inoperable and irreparable if the PCBs were removed from it.

Aircraft, ships, trains and other vehicles

- 10.** A person may export, import, offer for sale, sell and use for transportation purposes aircraft, ships, trains and other vehicles that contain PCBs

d'équipement visée à l'article 16 qui est en usage ou d'une pièce d'équipement dont l'usage fait l'objet d'une prolongation en vertu de l'article 17 et qui est en usage.

- 6.** Sauf dans la mesure prévue par le présent règlement, il est interdit :

- a) de fabriquer, d'exporter ou d'importer des BPC ou tout produit qui en contient en une concentration égale ou supérieure à 2 mg/kg;
- b) de mettre en vente ou de vendre des BPC ou tout produit qui en contient en une concentration égale ou supérieure à 50 mg/kg;
- c) de transformer ou d'utiliser des BPC ou tout produit qui en contient.

Activités interdites

ACTIVITÉS PERMISES

- 7.** Il est permis de fabriquer, d'exporter, d'importer, de mettre en vente, de vendre, de transformer et d'utiliser des BPC et des produits qui en contiennent pour des analyses de laboratoire, si celles-ci sont effectuées :

- a) dans toute installation agréée à cette fin;
- b) dans le cas où les autorités du territoire où elle est située ne disposent d'aucun mécanisme l'autorisant à les effectuer, dans toute installation qui est conforme à des lignes directrices, reconnues à l'échelle internationale, sur les pratiques exemplaires en laboratoire.

Analyses de laboratoire

- 8.** (1) Il est permis de mettre en vente ou de vendre des BPC ou des produits qui en contiennent pour qu'ils soient utilisés ou transformés à des fins de recherche visant à déterminer les effets des BPC ou des produits sur la santé humaine ou l'environnement, si l'installation où ils sont utilisés ou transformés se conforme à l'une ou l'autre des exigences suivantes :

- a) elle est agréée à cette fin;
- b) dans le cas où les autorités du territoire où elle est située ne disposent d'aucun mécanisme l'autorisant à effectuer des recherches, elle est conforme à des lignes directrices, reconnues à l'échelle internationale, sur les pratiques exemplaires en laboratoire.

Recherches

- (2) Il est permis de transformer et d'utiliser des BPC et des produits qui en contiennent pour effectuer les recherches visées au paragraphe (1) dans une installation qui se conforme à l'une ou l'autre des exigences prévues à ce paragraphe.

Transformation et utilisation

- 9.** Il est permis de mettre en vente, de vendre et d'utiliser tout condensateur électrique qui contient des BPC, si les conditions suivantes sont réunies :

- a) il fait partie intégrante d'un produit de consommation;
- b) ses joints sont thermoscellés;
- c) il ne fonctionnerait plus et serait irréparable si les BPC en étaient extraits.

Condensateurs électriques

- 10.** Il est permis d'exporter, d'importer, de mettre en vente, de vendre et d'utiliser pour le transport, tout aéronef, navire, train ou autre véhicule

Aéronefs, navires, trains et autres véhicules

	only in their communication, navigation or electronic control equipment or cables.	dont seuls l'équipement de communication, de navigation ou de commande électronique ou les câbles contiennent des BPC.	
Colouring pigment	11. (1) A person may manufacture, export, import, offer for sale, sell, process and use a colouring pigment containing PCBs produced incidentally if the concentration of the PCBs is less than 50 mg/kg.	11. (1) Il est permis de fabriquer, d'exporter, d'importer, de mettre en vente, de vendre, de transformer et d'utiliser des pigments pour la coloration qui contiennent des BPC produit par inadvertance en une concentration inférieure à 50 mg/kg.	Pigments pour la coloration
Annual average concentration	(2) Despite subsection (1), the annual average concentration of PCBs produced incidentally in colouring pigment that a person may manufacture, export, import, offer for sale, sell, process and use shall not exceed 25 mg/kg.	(2) Toutefois, la concentration moyenne annuelle de BPC produit par inadvertance dans les pigments pour la coloration fabriqués, exportés, importés, mis en vente, vendus, transformés et utilisés par toute personne ne peut dépasser 25 mg/kg.	Moyenne annuelle maximale
Destruction	12. A person may process PCBs or products containing PCBs for the purpose of destroying PCBs or recovering PCBs for the purpose of destroying them in an authorized facility that is authorized for that purpose.	12. Il est permis, dans une installation agréée à cette fin, de transformer des BPC et des produits qui en contiennent pour les détruire ou pour les récupérer afin de les détruire.	Destruction
Solid products	13. (1) A person may manufacture solid products containing PCBs in a concentration of less than 50 mg/kg using bulk solid products containing PCBs in a concentration of less than 50 mg/kg, and may use those solid products.	13. (1) Il est permis de fabriquer des produits solides qui contiennent des BPC en une concentration inférieure à 50 mg/kg à partir de produits solides en vrac qui eux-mêmes contiennent des BPC en une concentration inférieure à 50 mg/kg et d'utiliser ces produits solides.	Produits solides
Application	(2) Subsection (1) only applies to the manufacture of the types of products that are manufactured before the day on which these Regulations come into force.	(2) Le paragraphe (1) ne s'applique qu'aux types de produits qui sont fabriqués avant l'entrée en vigueur du présent règlement.	Application
Exception	(3) No person shall offer for sale or sell the products manufactured in accordance with subsection (1) unless the products are used in the course of a commercial or industrial activity.	(3) Il est interdit de mettre en vente ou de vendre des produits fabriqués conformément au paragraphe (1) pour tout usage en dehors d'une activité commerciale ou industrielle.	Exception
Cables, pipelines, electrical capacitors and other equipment	14. (1) A person may use the following products containing PCBs: (a) cables, if they remain in place on the day on which these Regulations come into force; (b) pipelines that transport natural gas, petroleum or petroleum products and any associated equipment that is in contact with the natural gas, petroleum or petroleum products if the pipelines and the equipment remain in place on the day on which these Regulations come into force; (c) fusion sealed capacitors if they are used in relation to communication equipment or electronic control equipment; and (d) the following equipment containing PCBs in a concentration of less than 50 mg/kg if the equipment is used for the purpose for which it was manufactured: (i) electrical capacitors, other than light ballasts, and electrical transformers and their auxiliary electrical equipment, other than pole-top electrical transformers and their pole-top auxiliary electrical equipment, (ii) electromagnets that are not used in the handling of food, feed or any additive to food or feed, and	14. (1) Il est permis d'utiliser les produits ci-après qui contiennent des BPC : a) tout câble, s'il demeure à l'endroit où il se trouvait à l'entrée en vigueur du présent règlement; b) tout pipeline qui transporte du gaz naturel, du pétrole ou des produits pétroliers, ainsi que tout équipement connexe qui est en contact avec le gaz naturel, le pétrole ou les produits pétroliers, si le pipeline et l'équipement demeurent à l'endroit où ils se trouvaient à l'entrée en vigueur du présent règlement; c) tout condensateur électrique dont les joints sont thermoscellés et qui est utilisé à des fins de communication ou de commande électronique; d) les pièces d'équipement ci-après qui contiennent des BPC en une concentration inférieure à 50 mg/kg et qui sont utilisées aux fins auxquelles elles étaient destinées lors de leur fabrication : (i) les condensateurs électriques, autres que les ballasts de lampes, et les transformateurs électriques et tout équipement électrique connexe, à l'exception des transformateurs sur poteaux et de tout équipement électrique connexe sur poteaux,	Câbles, pipelines, condensateurs électriques et pièces d'équipements

(iii) heat transfer equipment, hydraulic equipment, vapour diffusion pumps and bridge bearings.

(ii) les électroaimants ne servant pas à la manutention des aliments destinés aux humains ou aux animaux, ou de tout additif à ces aliments,

(iii) l'équipement caloporteur, l'équipement hydraulique, les pompes à diffusion de vapeur et les appareils d'appui de pont.

Electrical capacitors

(2) A person may import fusion sealed capacitors containing PCBs for use in relation to communication tactical equipment or electronic control tactical equipment.

(2) Il est permis d'importer tout condensateur électrique qui contient des BPC et dont les joints sont thermoscellés pour qu'il soit utilisé à des fins de communication tactique ou de commande électronique tactique.

Condensateurs électriques

Liquids for servicing — concentration less than 2 mg/kg

15. (1) A person may use liquids containing PCBs in a concentration of less than 2 mg/kg for the purpose of servicing equipment containing PCBs.

15. (1) Il est permis d'utiliser tout liquide qui contient des BPC en une concentration inférieure à 2 mg/kg pour l'entretien de toute pièce d'équipement qui contient des BPC.

Liquides pour entretien — concentration inférieure à 2 mg/kg

Liquids for servicing — concentration of 500 mg/kg or more

(2) A person may use liquids containing PCBs in a concentration of 500 mg/kg or more for the purpose of servicing equipment containing PCBs in a concentration of 500 mg/kg or more until December 31, 2009.

(2) Il est également permis, jusqu'au 31 décembre 2009, d'utiliser tout liquide qui contient des BPC en une concentration égale ou supérieure à 500 mg/kg pour l'entretien de toute pièce d'équipement qui elle-même contient des BPC en une concentration égale ou supérieure à 500 mg/kg.

Liquide pour entretien — concentration de 500 mg/kg ou plus

END-OF-USE DATES AND EXTENSION

UTILISATION — DATES LIMITES ET PROLONGATION

Equipment referred to in subparagraphs 14(1)(d)(i) to (iii)

16. (1) A person may use the equipment referred to in subparagraphs 14(1)(d)(i) to (iii) until the following dates if the equipment is in use on the day on which these Regulations come into force:

16. (1) Il est permis d'utiliser les pièces d'équipement visées aux sous-alinéas 14(1)(d)(i) à (iii) qui sont en usage à l'entrée en vigueur du présent règlement jusqu'aux dates suivantes :

Pièces d'équipement visées aux sous-alinéas 14(1)(d)(i) à (iii)

(a) in the case of equipment containing PCBs in a concentration of 500 mg/kg or more, December 31, 2009; and

a) si elles contiennent des BPC en une concentration égale ou supérieure à 500 mg/kg, jusqu'au 31 décembre 2009;

(b) in the case of equipment containing PCBs in a concentration of at least 50 mg/kg but less than 500 mg/kg,

b) si elles contiennent des BPC en une concentration égale ou supérieure à 50 mg/kg mais inférieure à 500 mg/kg :

(i) December 31, 2009, if the equipment is located at a drinking water treatment plant or food or feed processing plant, in a child care facility, preschool, primary school, secondary school, hospital or senior citizens' care facility or on the property on which the plant or facility is located and within 100 m of it, and

(i) jusqu'au 31 décembre 2009, si elles se trouvent dans une usine de traitement d'eau potable ou de transformation des aliments destinés aux humains ou aux animaux, dans une garderie, dans une école — de niveau préscolaire, primaire ou secondaire —, dans un hôpital ou dans une résidence pour personnes âgées ou sur le terrain d'un tel établissement, à 100 m ou moins de celui-ci,

(ii) December 31, 2025, if the equipment is located at any other place.

(ii) jusqu'au 31 décembre 2025, si elles se trouvent à tout autre endroit.

Light ballasts and pole-top electrical transformers

(2) A person may use the following equipment containing PCBs in a concentration of 50 mg/kg or more until December 31, 2025, if the equipment is in use on the day on which these Regulations come into force:

(2) Il est permis, jusqu'au 31 décembre 2025, d'utiliser les pièces d'équipement ci-après qui sont en usage à l'entrée en vigueur du présent règlement et qui contiennent des BPC en une concentration égale ou supérieure à 50 mg/kg :

Ballasts de lampes et transformateurs sur poteaux

(a) light ballasts; and

a) les ballasts de lampes;

(b) pole-top electrical transformers and their pole-top auxiliary electrical equipment.

b) les transformateurs sur poteaux ainsi que tout équipement électrique connexe sur poteaux.

Liquid — concentration of 2 mg/kg or more

(3) A person may use a liquid containing 2 mg/kg or more of PCBs that is in equipment until the day on which the liquid is removed from the equipment.

(3) Il est permis d'utiliser tout liquide qui contient des BPC en une concentration égale ou supérieure à 2 mg/kg dans une pièce d'équipement jusqu'à ce qu'il en soit extrait.

Liquides — concentration de 2 mg/kg ou plus

Extension of end-of-use date	17. (1) Despite subsection 15(2), paragraph 16(1)(a) and subparagraph 16(1)(b)(i), a person may use the equipment and the liquids used for servicing that equipment, referred to in those provisions, until the date set out in an extension granted by the Minister under subsection (2) for that equipment and those liquids.	17. (1) Malgré le paragraphe 15(2), l'alinéa 16(1)a) et le sous-alinéa 16(1)b)(i), il est permis d'utiliser les pièces d'équipement et les liquides utilisés pour leur entretien visés à ces dispositions jusqu'à l'expiration de toute prolongation accordée par le ministre en vertu du paragraphe (2) pour ces pièces d'équipement et ces liquides.	Prolongation de la date de fin d'utilisation
Application	(2) The Minister shall, on receiving a written application containing the information set out in subsection (3), grant an extension up to the date applied for but no later than December 31, 2014, if either of the following conditions are met: (a) the equipment is being replaced with equipment that is engineered to order, and (i) it is not technically feasible to replace the equipment on or before December 31, 2009, (ii) the applicant is taking all necessary measures to minimize or eliminate any harmful effect of the PCBs in the equipment on the environment and on human health, (iii) a plan has been prepared, along with timelines, to end the use of the equipment by the date applied for, (iv) a plan has been prepared for inspecting the equipment on a monthly basis for the period of the extension for damage that could lead to the release of PCBs, and (v) the equipment bears the label required under section 29; or (b) the equipment is located at a facility that is scheduled for permanent closure on or before December 31, 2014, and (i) the applicant is taking all necessary measures to minimize or eliminate any harmful effect of the PCBs in the equipment on the environment and on human health, (ii) a plan has been prepared, along with timelines, to end the use of the equipment by the date applied for, (iii) a plan has been prepared for inspecting the equipment on a monthly basis, for the period of the extension, for damage that could lead to the release of PCBs, and (iv) the equipment bears the label required under section 29.	(2) Sur réception d'une demande écrite comportant les renseignements prévus au paragraphe (3), le ministre accorde une prolongation jusqu'à la date prévue dans la demande mais au plus tard jusqu'au 31 décembre 2014, si l'une ou l'autre des conditions suivantes est remplie : a) la pièce d'équipement doit être remplacée par une pièce d'équipement conçue et fabriquée sur mesure et : (i) il est techniquement impossible de le faire le 31 décembre 2009 ou avant cette date, (ii) le demandeur prend les mesures nécessaires pour éliminer ou atténuer tout effet nocif des BPC contenus dans la pièce sur l'environnement et la santé humaine, (iii) un plan, incluant un échéancier, a été dressé afin que l'utilisation de la pièce cesse au plus tard à la date prévue dans la demande, (iv) un plan a été dressé pour l'inspection de la pièce une fois par mois durant la prolongation afin que soit décelé tout dommage pouvant mener au rejet de BPC, (v) la pièce porte l'étiquette exigée par l'article 29; b) la pièce d'équipement se trouve dans une installation dont la fermeture permanente est prévue au plus tard pour le 31 décembre 2014 et : (i) le demandeur prend les mesures nécessaires pour éliminer ou atténuer tout effet nocif des BPC contenus dans la pièce sur l'environnement et la santé humaine, (ii) un plan, incluant un échéancier, a été dressé afin que l'utilisation de la pièce cesse au plus tard à la date prévue dans la demande, (iii) un plan a été dressé pour l'inspection de la pièce une fois par mois durant la prolongation afin que soit décelé tout dommage pouvant mener au rejet de BPC; (iv) la pièce porte l'étiquette exigée par l'article 29.	Demande
Information	(3) The application shall contain the following: (a) the name, civic and mailing addresses, telephone number, fax number, if any, and e-mail address, if any, of the applicant and of any person authorized to act on the applicant's behalf; (b) a technical description of the equipment which is the subject of the application, including (i) the type and function of the equipment, (ii) the quantity of liquid containing PCBs that is in the equipment and the quantity of liquid needed for servicing that equipment, expressed in litres,	(3) La demande comporte : a) les nom, adresses municipale et postale et numéro de téléphone du demandeur et de toute personne autorisée à agir en son nom et, le cas échéant, leurs numéro de télécopieur et adresse électronique; b) les caractéristiques techniques de la pièce d'équipement qui fait l'objet de la demande, notamment : (i) son type et sa fonction, (ii) la quantité de liquide qui contient des BPC qui s'y trouve et la quantité de liquide nécessaire pour son entretien, exprimées en litres,	Renseignements

	(iii) the concentration of PCBs in the liquid, expressed in milligrams of PCBs per kilogram of liquid, (iv) the quantity of PCBs in the liquid that is in the equipment, expressed in kilograms, and (v) the name-plate description, if any, and the manufacturer's serial number, if any; (c) the unique identification number that is on the label required under section 29; (d) the name, if any, and civic address of the facility where the equipment is located, or, if there is no civic address, the location using the owner's site identification system, and the function and technical description of the facility; (e) information demonstrating that (i) it is not technically feasible to replace the equipment on or before December 31, 2009, or (ii) the facility where the equipment is located is scheduled for permanent closure on or before December 31, 2014; (f) information demonstrating that the applicant is taking all necessary measures to minimize or eliminate any harmful effect of the PCBs that are contained in the equipment on the environment and on human health; (g) the plan, along with timelines, for ending the use of the equipment; and (h) the plan for inspecting the equipment.	(iii) la concentration de BPC dans le liquide, exprimée en milligrammes de BPC par kilogramme de liquide, (iv) la quantité de BPC dans le liquide qui s'y trouve, exprimée en kilogrammes, (v) s'il y a lieu, l'information figurant sur la plaque d'identification et le numéro de série de son fabricant; c) le numéro d'identification unique figurant sur l'étiquette en application de l'article 29; d) le nom, s'il y a lieu, et l'adresse municipale de l'installation où se trouve la pièce d'équipement ou, à défaut, l'endroit où elle se trouve d'après le système d'identification de site du propriétaire, et la fonction et les caractéristiques techniques de l'installation; e) les renseignements qui établissent : (i) soit qu'il est techniquement impossible de remplacer la pièce d'équipement le 31 décembre 2009 ou avant cette date, (ii) soit que la fermeture permanente de l'installation dans laquelle se trouve la pièce d'équipement est prévue au plus tard pour le 31 décembre 2014; f) les renseignements qui établissent que les mesures nécessaires ont été prises par le demandeur pour éliminer ou atténuer tout effet nocif des BPC contenus dans la pièce d'équipement sur l'environnement et la santé humaine; g) le plan et l'échéancier qui seront mis en œuvre afin que cesse l'utilisation de la pièce d'équipement; h) le plan d'inspection de la pièce d'équipement.	
Notice of change to information	(4) The applicant shall notify the Minister in writing of any change to the information provided under subsection (3) within 30 days after the day on which the change occurs.	(4) Le demandeur est tenu d'aviser le ministre par écrit de tout changement des renseignements fournis en application du paragraphe (3) dans les trente jours suivant la date du changement.	Avis de changement des renseignements
False or misleading information	(5) The Minister shall refuse to grant an extension if the Minister has reasonable grounds to believe that the applicant has provided false or misleading information in support of its application.	(5) Le ministre refuse d'accorder une prolongation s'il a des motifs raisonnables de croire que le demandeur a fourni des renseignements faux ou trompeurs au soutien de sa demande.	Renseignements faux ou trompeurs
Revocation	(6) The Minister shall revoke the extension if	(6) Il révoque la prolongation :	Révocation
	(a) the requirements set out in subsection (2) are no longer met during the period of the extension; or	a) si, durant la prolongation, les conditions prévues au paragraphe (2), selon le cas, ne sont plus remplies;	
	(b) the Minister has reasonable grounds to believe that the applicant has provided false or misleading information to the Minister in support of its application.	b) s'il a des motifs raisonnables de croire que le demandeur lui a fourni des renseignements faux ou trompeurs au soutien de sa demande.	
Reasons for revocation	(7) The Minister shall not revoke the extension unless the Minister provides the applicant with	(7) Il ne peut toutefois révoquer la prolongation que si, à la fois :	Motifs de révocation
	(a) written reasons for the revocation; and	a) il a avisé le titulaire par écrit des motifs de la révocation;	
	(b) an opportunity to be heard, by written representation, in respect of the revocation.	b) il lui a donné la possibilité de présenter des observations écrites au sujet de celle-ci.	

PART 3

STORAGE

Application —
concentration
of 50 mg/kg or
more

18. (1) Subject to subsection (3), this Part applies to a solid or liquid product containing PCBs in a concentration of 50 mg/kg or more

(a) that is in an amount equal to or greater than 100 L if the product is a liquid, or in an amount equal to or greater than 100 kg if the product is a solid; or

(b) that is in a lesser amount if the product contains 1 kg or more of PCBs.

Determination
of amount

(2) For the purposes of subsection (1), the amount of PCBs or products containing PCBs is the aggregate of all amounts of PCBs and products that are located at a particular site.

Non-
application

(3) This Part does not apply in respect of the following products containing PCBs:

(a) solid or liquid products that are processed daily or used;

(b) pipelines that transport natural gas, petroleum or petroleum products, and any associated equipment that is in contact with the natural gas, petroleum or petroleum products, if they remain in place on the day on which these Regulations come into force; and

(c) cables, if they remain in place on the day on which these Regulations come into force.

Requirement to
store

19. (1) A person who owns, controls or possesses PCBs or products containing PCBs that are not processed daily or used shall, within 30 days after the day on which those PCBs or products are no longer processed or used or within 30 days after the day on which these Regulations come into force, whichever is later, either

(a) send them for destruction to an authorized facility that is authorized for that purpose; or

(b) store them at a PCB storage site for the period during which they are not processed daily or used.

Remote from or
no access to
roadway

(2) Despite subsection (1), if the PCBs or products containing PCBs are remote from a roadway system or if there is no access to a roadway system, the person who owns, controls or possesses the PCBs or products may store them at a PCB storage site as soon as feasible but no later than one year after the day on which they are not processed daily or used or one year after the day on which these Regulations come into force, whichever is later. That person shall use best management practices for them from the time that they cease to be processed daily or used until the time that they are stored at a PCB storage site.

Prohibition
against storage

20. (1) Effective one year after the day on which these Regulations come into force, no person shall store PCBs or products containing PCBs at the

PARTIE 3

STOCKAGE

18. (1) Sous réserve du paragraphe (3), la présente partie s'applique aux produits liquides ou solides qui contiennent des BPC en une concentration égale ou supérieure à 50 mg/kg et :

a) dont la quantité est égale ou supérieure à 100 L, dans le cas d'un produit liquide, ou à 100 kg, dans le cas d'un produit solide;

b) dont la quantité est moindre, si ces produits renferment 1 kg ou plus de BPC.

(2) Pour l'application du paragraphe (1), la quantité de BPC ou de produits qui en contiennent correspond à la somme de toutes les quantités de BPC et de produits qui se trouvent dans un même emplacement.

(3) La présente partie ne s'applique pas aux produits ci-après qui contiennent des BPC :

a) les produits liquides ou solides qui sont transformés quotidiennement ou utilisés;

b) tout pipeline qui transporte du gaz naturel, du pétrole ou des produits pétroliers, ainsi que tout équipement connexe qui est en contact avec le gaz naturel, le pétrole ou les produits pétroliers, si le pipeline et l'équipement demeurent à l'endroit où ils se trouvaient à l'entrée en vigueur du présent règlement;

c) les câbles, s'ils demeurent à l'endroit où ils se trouvaient à l'entrée en vigueur du présent règlement.

19. (1) Le propriétaire de BPC ou de produits qui en contiennent ou la personne qui en a la possession ou le contrôle est tenu, dans les trente jours suivant la date où ceux-ci cessent d'être transformés quotidiennement ou utilisés ou celle de l'entrée en vigueur du présent règlement, selon la plus tardive de ces dates :

a) soit de les expédier pour qu'ils soient détruits dans une installation agréée à cette fin;

b) soit de les stocker dans un dépôt de BPC pendant qu'ils ne sont pas transformés quotidiennement ou utilisés.

(2) Si les BPC ou les produits qui en contiennent sont éloignés de tout système routier ou se trouvent à un endroit où il n'y a pas d'accès à un tel système, le propriétaire ou la personne peut les stocker dans un dépôt de BPC le plus tôt possible, sans toutefois dépasser un an à compter de la date où ils cessent d'être transformés quotidiennement ou utilisés ou celle de l'entrée en vigueur du présent règlement, selon la plus tardive de ces dates. Ils sont tenus d'appliquer des pratiques exemplaires de gestion pour les BPC et les produits dès qu'ils cessent d'être transformés quotidiennement ou utilisés, et ce, jusqu'à leur stockage dans un dépôt de BPC.

20. (1) À compter d'un an après la date d'entrée en vigueur du présent règlement, il est interdit de stocker des BPC ou des produits qui en contiennent

Application —
Concentration
égale ou
supérieure à
50 mg/kgDétermination
des quantités

Exclusion

Obligation de
stockerEndroit éloigné
ou inaccessibleInterdiction de
stocker

	following plants or facilities or on the land on which those plants or facilities are located and within 100 m of them: (a) a drinking water treatment plant or a food or feed processing plant; or (b) a child care facility, preschool, primary school, secondary school, hospital, or senior citizens' care facility.	dans l'un des établissements ci-après ou sur le terrain d'un tel établissement, à 100 m ou moins de celui-ci : a) une usine de traitement d'eau potable ou de transformation des aliments destinés aux humains ou aux animaux; b) une garderie, une école — de niveau préscolaire, primaire ou secondaire —, un hôpital ou une résidence pour personnes âgées.	
Light ballasts	(2) Subsection (1) does not apply to light ballasts.	(2) Le paragraphe (1) ne s'applique pas aux ballasts de lampes.	Ballasts de lampes
Maximum storage periods	21. (1) Despite any other provision in these Regulations and subject to section 22, no person shall store PCBs or products containing PCBs, other than those referred to in section 23, beyond the following time limits: (a) one year, beginning on the day on which their use is no longer permitted under these Regulations or the day on which they are no longer processed daily or used, whichever is sooner, if the PCBs or products are stored at a facility that is not referred to in paragraph (1)(b) or (c); (b) one year, if the PCBs or products are stored at an authorized facility that is a transfer site; and (c) two years, if the PCBs or products are stored at an authorized facility that is authorized to destroy them.	21. (1) Malgré toute autre disposition du présent règlement mais sous réserve de l'article 22, il est interdit de stocker des BPC et des produits qui en contiennent, autres que ceux visés à l'article 23, au-delà de la période applicable suivante : a) un an à compter du jour où le présent règlement ne permet plus l'utilisation des BPC et des produits ou de celui, s'il est antérieur, où ils ont cessé d'être transformés quotidiennement ou utilisés, s'ils sont stockés à une installation qui n'est pas visée aux alinéas (1)b) ou c); b) un an, s'ils sont stockés dans une installation agréée qui est un centre de transfert; c) deux ans, s'ils sont stockés dans une installation agréée qui est autorisée à les détruire.	Périodes maximales de stockage
Transfer sites	(2) If the PCBs or products containing PCBs are sent from one transfer site to another, the period referred to in paragraph (1)(b) begins when they are received at the first transfer site.	(2) Si les BPC et les produits qui en contiennent sont expédiés d'un centre de transfert à un autre, la période prévue à l'alinéa (1)b) commence à courir le jour de leur réception au premier centre de transfert.	Centres de transfert
Destruction	(3) The owner or operator of the facility referred to in paragraph (1)(a) or (b) shall send the PCBs or products containing PCBs for destruction to an authorized facility that is authorized for that purpose within the time limit set out in those paragraphs.	(3) Le propriétaire ou l'exploitant de l'installation visée aux alinéas (1)a) ou b) est tenu d'expédier, dans le délai prévu à ces alinéas, les BPC ou les produits qui en contiennent pour qu'ils soient détruits dans une installation agréée à cette fin.	Destruction
Exceptions to maximum storage periods	22. (1) Section 21 does not apply to the storage of (a) liquids referred to in subsection 15(2) or for which an extension has been granted under subsection 17; or (b) solids and liquids containing PCBs in a concentration of 50 mg/kg or more resulting from environmental restoration work and stored on site for the duration of the work, if the requirements set out in subsections (2) and (3) are complied with.	22. (1) L'article 21 ne s'applique pas au stockage : a) des liquides visés au paragraphe 15(2) ou pour lesquels une prolongation a été accordée en vertu de l'article 17; b) des solides et des liquides qui contiennent des BPC en une concentration égale ou supérieure à 50 mg/kg et qui sont issus de travaux de restauration de l'environnement et stockés sur place pendant la durée des travaux, si les exigences prévues aux paragraphes (2) et (3) sont respectées.	Périodes maximales de stockage — exceptions
Information to be provided	(2) The owner of the land where the solids and liquids referred to in paragraph (1)(b) are located shall submit to the Minister at least 30 days before the storage of the solids or liquids or within 30 days after the day on which these Regulations come into force, whichever is later, the following information: (a) the civic address of the restoration work site or if there is no civic address, the location using the Global Positioning System; (b) the date of commencement of the restoration work; (c) the anticipated date of completion of the restoration work; and	(2) Le propriétaire du terrain où se trouvent les solides ou les liquides visés à l'alinéa (1)b) fournit au ministre, au plus tard trente jours avant la date de leur stockage ou après celle de l'entrée en vigueur du présent règlement, selon la plus tardive de ces dates, les renseignements suivants : a) l'adresse municipale de l'endroit où sont effectués les travaux de restauration ou, à défaut, sa localisation d'après le système mondial de localisation; b) la date de début des travaux de restauration; c) la date prévue pour la fin des travaux de restauration;	Renseignements à fournir

	(d) the anticipated date of the end of storage of the solids or liquids.	d) la date prévue pour la cessation du stockage des solides ou des liquides.	
Changes to information	(3) The person referred to in subsection (2) shall notify the Minister in writing of the changes to be made at least 30 days before making any changes to the information provided under that subsection.	(3) Il avise également le ministre par écrit, au moins trente jours à l'avance, de toute modification apportée aux renseignements fournis.	Modification des renseignements
PCBs or products containing PCBs stored at the coming into force	23. The person who owns PCBs or products containing PCBs, other than liquids for which an extension has been granted under section 17, that are stored on the day on which these Regulations come into force shall send them no later than December 31, 2009 for destruction to an authorized facility that is authorized for that purpose.	23. Le propriétaire de BPC ou de produits qui en contiennent, autres que des liquides pour lesquels une prolongation a été accordée en vertu de l'article 17, qui sont stockés à l'entrée en vigueur du présent règlement est tenu de les expédier, au plus tard le 31 décembre 2009, pour qu'ils soient détruits dans une installation agréée à cette fin.	BPC et produits qui en contiennent stockés à l'entrée en vigueur
PCB storage site	24. PCBs or products containing PCBs shall be stored at a site that is (a) a building, room, shipping container or other enclosed structure; or (b) an area that is enclosed by a woven mesh wire fence or any other fence or wall with similar security characteristics, and the fence or wall shall be at least 1.83 m high.	24. Les BPC et les produits qui en contiennent doivent être stockés dans un dépôt qui est : a) soit un bâtiment, une pièce, un conteneur ou tout autre ouvrage fermé; b) soit un endroit entouré d'une clôture grillagée ou d'un autre genre de clôture ou d'un mur présentant des caractéristiques similaires sur le plan de la sécurité, la clôture ou le mur ayant au moins 1,83 m de haut.	Dépôt de BPC
Storage requirements	25. The owner or operator of a PCB storage site shall (a) store all PCBs or products containing PCBs that are in liquid form in (i) sealed containers, other than drums, that are made of steel or other metals that provide sufficient durability and strength to prevent those PCBs or products from being affected by the weather or released, or (ii) drums that are (A) of a capacity not greater than 205 L, (B) a closed-head double-bung drum made of steel having a gauge of 16 or heavier, and (C) painted or treated to prevent rusting; (b) store all PCBs or products containing PCBs that are in solid form in (i) containers, other than drums, that are made of steel or other materials that provide sufficient durability and strength to prevent those PCBs or products from being affected by the weather or released, or (ii) drums that are (A) of a capacity not greater than 205 L, (B) made of steel having a gauge of 18 or heavier, (C) equipped with a securely attached, removable steel lid and a gasket made of material that is resistant to the PCBs or the products containing PCBs that are stored in the drums, and (D) painted or treated to prevent rusting; (c) store equipment containing PCB liquids in (i) containers, other than drums, that are made of steel or other materials that provide sufficient durability and strength to prevent the equipment from being affected by the weather and	25. Le propriétaire ou l'exploitant d'un dépôt de BPC : a) stocke les BPC et les produits en contenant qui sont des liquides dans : (i) soit des contenants étanches, autres que des fûts, faits d'acier ou d'autres métaux offrant une durabilité et une solidité suffisantes pour que ces BPC et ces produits ne soient pas affectés par les conditions climatiques ni rejetés, (ii) soit des fûts qui, à la fois : (A) ont une capacité d'au plus 205 L, (B) sont faits d'acier d'épaisseur minimale 16, ont un dessus non amovible et sont munis de deux bondes, (C) sont enduits d'une peinture ou d'un revêtement antirouille; b) stocke les BPC et les produits en contenant qui sont des solides dans : (i) soit des contenants, autres que des fûts, faits d'acier ou d'autres matériaux offrant une durabilité et une solidité suffisantes pour que ces BPC et ces produits ne soient pas affectés par les conditions climatiques ni rejetés, (ii) soit des fûts qui, à la fois : (A) ont une capacité d'au plus 205 L, (B) sont faits d'acier d'épaisseur minimale 18, (C) sont dotés d'un couvercle d'acier amovible solidement fixé et d'un joint fait d'un matériau résistant aux BPC et aux produits en contenant qui y sont stockés, (D) sont enduits d'une peinture ou d'un revêtement antirouille; c) stocke les pièces d'équipement qui renferment des liquides contenant des BPC dans : (i) soit des contenants, autres que des fûts, faits d'acier ou d'autres matériaux offrant une	Exigences relatives au stockage

to prevent any PCB liquid that leaks from the equipment from being released, or

(ii) drums described in subparagraph (b)(ii);

(d) store all equipment that is not in a container, other than drained equipment, if that equipment contains PCB liquid, and all containers of PCB liquid, on a floor or surface that is made of steel, concrete or any other similar durable material and that is constructed with curbing or sides that are capable of containing

(i) if one piece of equipment or one container is being stored, 125% of the volume of the PCB liquid in the equipment or container, and

(ii) if more than one piece of equipment or more than one container is being stored, the greater of twice the volume of the PCB liquid in the largest piece of equipment or the largest container and 25% of the volume of all the PCB liquid stored on the floor or surface;

(e) if the material of the floor or surface or the curbing or sides referred to in paragraph (d) are capable of absorbing any PCB liquid or other product containing PCBs, seal the floor, surface, curbing or sides with an impervious, durable, PCB-resistant coating;

(f) ensure that all floor drains, sumps or other openings in the floor or surface referred to in paragraph (d) are

(i) closed and sealed to prevent the release of liquids, or

(ii) connected to a drainage system suitable for liquid dangerous goods that terminates at a location where any spilled liquids will be contained and recovered and where the spilled liquids will not create a fire hazard or a risk to public health or safety;

(g) place on skids or pallets all equipment containing PCBs and containers of PCBs or products containing PCBs that are not permanently secured to the floor or a surface;

(h) stack containers of PCBs and products containing PCBs, other than drums, only if the containers are designed for stacking, and stack containers of PCB liquid not more than two containers high;

(i) if drums containing PCBs or products containing PCBs are stacked, separate the drums from each other with pallets and, in the case of drums of PCB liquid, stack the drums not more than two drums high;

(j) store equipment containing PCBs, and containers of PCBs or products containing PCBs, in a manner that makes them accessible for inspection;

(k) store PCBs or products containing PCBs in a manner that prevents them from catching fire or being released;

(l) store PCBs or products containing PCBs together, and separate them from other stored materials;

durabilité et une solidité suffisantes pour que les pièces d'équipement ne soient pas affectées par les conditions climatiques et que les liquides, s'ils fuient des pièces, ne soient pas rejetés,

(ii) soit des fûts visés au sous-alinéa b)(ii);

d) stocke les pièces d'équipement — autres que celles contenant des BPC qui ont été vidangées — qui ne sont pas dans un contenant et qui renferment des liquides contenant des BPC, ainsi que tout contenant qui renferme de tels liquides, sur un plancher ou une surface fait d'acier, de béton ou d'un autre matériau durable semblable et entouré d'un rebord ou de côtés capables de retenir :

(i) si une seule pièce d'équipement ou un seul contenant est stocké, 125 % du volume des liquides contenant des BPC que renferme cette pièce d'équipement ou le contenant,

(ii) si plus d'une pièce d'équipement ou plus d'un contenant est stocké, le plus élevé des volumes suivants : le double du volume des liquides contenant des BPC que renferme la plus grosse pièce d'équipement ou le plus grand contenant ou 25 % du volume de l'ensemble des liquides contenant des BPC qui sont stockés sur le plancher ou la surface;

e) scelle, au moyen d'un revêtement étanche, durable et résistant aux BPC, le plancher, la surface, le rebord ou les côtés visés à l'alinéa d), lorsqu'ils peuvent absorber des liquides ou d'autres produits qui contiennent des BPC;

f) veille à ce que les drains de sol, puisards et autres ouvertures dans le plancher ou la surface visés à l'alinéa d) soient, selon le cas :

(i) obturés et scellés pour empêcher le rejet de liquides,

(ii) reliés à un réseau de drainage convenant aux marchandises dangereuses liquides, qui se jette dans un lieu où les liquides déversés seront confinés et récupérés et où ils ne constitueront pas un risque d'incendie ni un risque pour la santé et la sécurité publiques;

g) place sur des patins ou des palettes les pièces d'équipement contenant des BPC et les contenants renfermant des BPC ou des produits en contenant qui ne sont pas fixés de façon permanente à un plancher ou à une surface;

h) empile les contenants de BPC et de produits qui en contiennent, autres que les fûts, seulement s'ils sont conçus à cette fin et, dans le cas des contenants renfermant des liquides qui contiennent des BPC, ne les empile pas à plus de deux contenants de haut;

i) s'ils sont empilés, sépare les fûts de BPC et de produits qui en contiennent les uns des autres avec des palettes et, dans le cas des fûts renfermant des liquides qui contiennent des BPC, ne les empile pas à plus de deux fûts de haut;

(m) if reasonably practicable, equip any indoor PCB storage site having a mechanical exhaust system with heat or smoke sensory controls that stop the fan and close the intake and exhaust dampers in the event of a fire;

(n) if equipment or containers of PCB liquid are stored outdoors, cover all PCB equipment that is not in a container, other than drained equipment, if that equipment contains PCB liquid, and all containers of PCB liquid, with a weatherproof roof or barrier that protects the equipment and containers and prevents rain or snow from entering the curbing and the sides of the floor and the surface under them; and

(o) ensure that all drained PCB equipment and all containers of any PCB solid or PCB equipment are structurally sound and weatherproof if stored outdoors.

j) stocke les pièces d'équipement qui contiennent des BPC et les contenants renfermant des BPC ou des produits qui en contiennent de manière à ce qu'ils soient accessibles à des fins d'inspection;

k) stocke les BPC et les produits qui en contiennent de façon à empêcher leur inflammation ou leur rejet;

l) stocke les BPC et les produits qui en contiennent ensemble, à l'écart des autres matériaux stockés;

m) dans la mesure du possible, munit tout dépôt de BPC intérieur ayant un dispositif mécanique de ventilation de commandes sensibles à la chaleur ou à la fumée qui, en cas d'incendie, arrêtent le ventilateur et ferment les registres d'admission et d'évacuation d'air;

n) s'ils sont stockés dehors, couvre les pièces d'équipement — autres que celles contenant des BPC qui ont été vidangées — qui ne sont pas dans un contenant et qui renferment des liquides contenant des BPC, ainsi que tout contenant qui renferme de tels liquides, d'une toiture ou d'un écran à l'épreuve des intempéries qui les protège et empêche la pluie et la neige de pénétrer à l'intérieur du rebord et des côtés du plancher et de la surface sur lesquels ils sont posés;

o) s'ils sont stockés dehors, veille à ce que les pièces d'équipement contenant des BPC qui ont été vidangées et tout contenant qui renferme des solides ou des pièces d'équipement contenant des BPC aient une structure en bon état et soient à l'épreuve des intempéries.

Access to PCB storage site

26. The owner or operator of a PCB storage site shall keep all points of access to the PCB storage site locked or guarded.

Inspection and maintenance of a PCB storage site

27. The owner or operator of a PCB storage site shall

(a) inspect all floors, curbing, sides, drains, drainage systems, weatherproof roofs and barriers, fences and walls of the PCB storage site, any fire alarm system, fire extinguishers and fire suppression system and all equipment containing PCBs, containers used for the storage of PCBs or products containing PCBs and materials for clean-up at the PCB storage site

(i) each month,

(ii) at intervals of more than one month, if the Minister, on the written request of the owner or operator, determines that it is not reasonably practicable to inspect the site each month, due to its remote location, or

(iii) at intervals of less than one month, if more frequent inspections are necessary for the safe operation of the site; and

(b) keep in good condition and, if damaged, immediately repair or replace the floors, curbing, sides, drains, drainage systems, weatherproof roofs or barriers, fences, walls, fire alarm system, fire extinguishers, fire suppression system, equipment containing PCBs and containers and immediately clean up any contaminated area.

26. Le propriétaire ou l'exploitant d'un dépôt de BPC tient chaque point d'accès au dépôt verrouillé ou veille à ce qu'il soit gardé.

27. Le propriétaire ou l'exploitant d'un dépôt de BPC :

a) en inspecte les planchers, les rebords, les côtés, les drains, les réseaux de drainage, les toitures et écrans à l'épreuve des intempéries, les clôtures, les murs, le système d'alarme-incendie, les extincteurs et le réseau d'extinction automatique, ainsi que les pièces d'équipement qui contiennent des BPC, les contenants servant au stockage des BPC ou des produits qui en contiennent et les agents de nettoyage qui s'y trouvent :

(i) tous les mois,

(ii) à des intervalles de plus d'un mois, si le ministre, à la demande écrite du propriétaire ou de l'exploitant, a déterminé qu'il est en pratique impossible d'inspecter le dépôt tous les mois en raison de son isolement,

(iii) à des intervalles de moins d'un mois, si l'exploitation du dépôt en toute sécurité exige des inspections plus fréquentes;

b) les garde en bon état et, en cas de dommage, les répare ou les remplace immédiatement et nettoie sur-le-champ les aires contaminées.

Accès au dépôt de BPC

Inspection et entretien des dépôts de BPC

Fire protection
and emergency
procedures

28. (1) The owner or operator of a PCB storage site shall

(a) develop and implement at the PCB storage site a fire protection and emergency procedures plan and shall

(i) update and test the plan once per year,

(ii) keep a written copy of the latest plan at the PCB storage site and another at their principal place of business, and

(iii) make the latest plan readily available to persons who implement the plan and to the local fire department or to the local officer appointed by the provincial Fire Marshall if there is no local fire department or to any other local authority responsible for fire protection;

(b) ensure that all employees who are authorized to enter the PCB storage site are familiar with the contents of the latest plan;

(c) equip the indoor PCB storage site with a fully operative fire alarm system that is maintained, inspected and tested in accordance with articles 6.3.1.1 and 6.3.1.2 of the National Fire Code and with

(i) portable fire extinguishers that are selected and installed in accordance with article 2.1.5.1 of the National Fire Code and maintained, inspected and tested in accordance with article 6.2.1.1 of that Code, or

(ii) an automatic fire suppression system that meets the requirements of article 3.2.7.9 of the National Fire Code, if required;

(d) keep a copy of the records referred to in sections 43 and 44 at the PCB storage site and make a copy readily available to the local fire department and, if there is no local fire department, to the local officer appointed by the provincial Fire Marshall or to any other local authority responsible for fire protection;

(e) ensure that all employees who are authorized to enter the PCB storage site are made aware of the hazards of PCBs and are familiar with the use of protective equipment and clothing and the clean-up procedures referred to in the *Guidelines for the Management of Wastes Containing Polychlorinated Biphenyls (PCBs)*, CCME-TS/WM-TRE008, September 1989, as amended from time to time, issued by the Canadian Council of Ministers of the Environment; and

(f) store absorbent materials for clean-up near the PCB storage site.

(2) Despite paragraph (1)(c), if the indoor PCB storage site is a shipping container, the owner or operator of the site does not have to equip that site with a fire alarm system.

Shipping
containers

28. (1) Le propriétaire ou l'exploitant d'un dépôt de BPC :

a) élabore et met en œuvre un plan d'intervention d'urgence et de lutte contre les incendies et :

(i) le met à jour et le vérifie annuellement,

(ii) en conserve une copie écrite à jour au dépôt et à son établissement principal,

(iii) en met une copie à jour à la disposition de toute personne qui participe à sa mise en œuvre et au service d'incendie local ou, à défaut, au fonctionnaire local nommé par le commissaire provincial aux incendies ou à toute autre autorité locale chargée de la protection contre les incendies,

b) veille à ce que tous les employés autorisés à entrer dans le dépôt connaissent bien le contenu du plan à jour;

c) s'agissant d'un dépôt intérieur, le munit d'un système d'alarme-incendie en état de fonctionnement qui est entretenu, inspecté et mis à l'essai conformément aux exigences des articles 6.3.1.1 et 6.3.1.2 du Code national de prévention des incendies, ainsi que :

(i) soit d'extincteurs portatifs qui sont choisis et installés conformément à l'article 2.1.5.1 de ce code et qui sont entretenus, inspectés et mis à l'essai conformément aux exigences de l'article 6.2.1.1 de ce code,

(ii) soit d'un réseau d'extinction automatique conforme aux exigences de l'article 3.2.7.9 du même code, si celles-ci s'appliquent;

d) conserve au dépôt une copie des documents et registres visés aux articles 43 et 44 respectivement et en met une à la disposition du service d'incendie local ou, à défaut, au fonctionnaire local nommé par le commissaire provincial aux incendies ou à toute autre autorité locale chargée de la protection contre les incendies;

e) veille à ce que tous les employés autorisés à entrer dans le dépôt soient informés des dangers que présentent les BPC et connaissent bien l'utilisation du matériel et des vêtements de protection et les méthodes de nettoyage mentionnées dans le *Guide pour la gestion des déchets contenant des biphényles polychlorés (BPC)* CCME-TS/WM-TRE008, septembre 1989, avec ses modifications successives, publié par le Conseil canadien des ministres de l'environnement;

f) garde les matériaux absorbants servant au nettoyage près du dépôt.

(2) Malgré l'alinéa (1)c), le propriétaire ou l'exploitant d'un dépôt de BPC intérieur qui est un conteneur n'est pas tenu de le munir d'un système d'alarme-incendie.

Protection
contre les
incendies et
mesures
d'urgence

Conteneur

PART 4

LABELLING, REPORTS AND RECORDS

LABELLING

Equipment and liquids used for their servicing

29. (1) The owner of equipment referred to in section 16, other than equipment for which an extension has been applied for under section 17, or of a liquid used in its servicing referred to in subsection 15(2) shall affix a label in a readily visible location on the equipment or on the container of the liquid, no later than 30 days after the day on which it ceases to be used.

Equipment for which extension applied for

(2) The owner of equipment for which an extension has been applied under section 17 shall affix a label in a readily visible location on the equipment.

Exceptions

(3) Subsection (1) does not apply to
 (a) equipment or containers of liquids that bear a label on the day on which these Regulations come into force that indicates the presence of PCBs; and
 (b) equipment that is too small, including light ballasts, to bear the label referred to in subsection (4), until the day on which they cease to be used and are placed in a container that bears the label.

Description

(4) The label must
 (a) state “ATTENTION — contains 50 mg/kg or more of PCBs / contient 50 mg/kg ou plus de BPC” in black lettering on a white background, in a font size of no less than 36 points;
 (b) measure at least 150 mm by 150 mm or at least 76 mm by 76 mm in the case of capacitors; and
 (c) in the case of equipment for which an extension is applied for under section 17, state a unique identification number.

Cables and pipelines

30. (1) The owner of a cable, a pipeline or equipment associated with a pipeline, referred to in paragraphs 14(1)(a) and (b), containing PCBs in a concentration of 50 mg/kg or more that is in a room, a tunnel or a facility shall either

(a) affix the label in the form set out in subsection 29(4) in a readily visible location on a part of the cable, pipeline or associated equipment that is accessible; or
 (b) place a notice in a readily visible location at the entrance of the room, tunnel or facility that states the information set out in paragraph 29(4)(a) and measures at least 150 mm by 150 mm.

If dismantled

(2) If a part of the cable, pipeline or associated equipment is dismantled, the owner of the cable, pipeline or associated equipment shall affix on each dismantled part the label in the form set out in

PARTIE 4

ÉTIQUETAGE, RAPPORTS ET DOSSIERS

ÉTIQUETAGE

Pièces d'équipement et liquides pour leur entretien

29. (1) Le propriétaire d'une pièce d'équipement visée à l'article 16, autre qu'une pièce d'équipement qui fait l'objet d'une demande de prolongation en vertu de l'article 17, ou de tout liquide utilisé pour l'entretien visé au paragraphe 15(2) est tenu d'apposer une étiquette, à un endroit bien en vue sur la pièce d'équipement ou le contenant du liquide, au plus tard trente jours après que la pièce ou le contenant cesse d'être utilisé.

(2) Le propriétaire d'une pièce d'équipement qui fait l'objet d'une demande de prolongation en vertu de l'article 17 est tenu d'y apposer une étiquette à un endroit bien en vue.

Équipement faisant l'objet d'une demande de prolongation

(3) Le paragraphe (1) ne s'applique pas :

a) aux pièces d'équipement et aux contenants de liquide qui portent, à l'entrée en vigueur du présent règlement, une étiquette qui indique la présence de BPC;
 b) aux pièces d'équipement qui sont trop petites, y compris les ballasts de lampes, pour que l'étiquette visée au paragraphe (4) y soit apposée, jusqu'à ce qu'elles cessent d'être utilisées et qu'elles soient placées dans un contenant sur lequel l'étiquette est apposée.

Exceptions

(4) L'étiquette doit :

a) porter la mention « ATTENTION — contains 50 mg/kg or more of PCBs / contient 50 mg/kg ou plus de BPC », inscrite en caractères d'au moins 36 points, en noir sur fond blanc;
 b) être d'une dimension minimale de 150 mm sur 150 mm ou, dans le cas d'un condensateur, 76 mm sur 76 mm;
 c) dans le cas d'une pièce d'équipement qui fait l'objet d'une demande de prolongation en vertu de l'article 17, porter un numéro d'identification unique.

Description

30. (1) Le propriétaire de câbles, de pipelines ou d'équipement connexe visés aux alinéas 14(1)(a) et (b) qui contiennent des BPC en une concentration égale ou supérieure à 50 mg/kg et se trouvent dans une pièce, un tunnel ou une installation est tenu :

a) soit d'apposer une étiquette conforme au paragraphe 29(4) à un endroit bien en vue sur toute partie accessible du câble, pipeline ou équipement connexe;
 b) soit de placer à l'entrée de la pièce, du tunnel ou de l'installation à un endroit bien en vue une affiche d'une dimension minimale de 150 mm sur 150 mm portant la mention prévue à l'alinéa 29(4)a).

Câbles et pipelines

(2) En cas de désassemblage d'une partie du câble, du pipeline ou de l'équipement connexe, le propriétaire de ceux-ci est tenu, dans les trente jours suivant le désassemblage, d'apposer une étiquette

Désassemblage

subsection 29(4), no later than 30 days after the day on which it is dismantled.

A facility other than transfer site or destruction facility

31. (1) The owner or operator of a PCB storage site, other than the PCB storage site of an authorized facility that is a transfer site or that is authorized to destroy PCBs, shall affix a label in a readily visible location on any product containing PCBs in a concentration of 50 mg/kg or more and that are stored at the PCB storage site, which

(a) is in the form referred to in subsection 29(4); and

(b) states “Date of Commencement of Storage” and the date on which the storage begins.

Transfer site or destruction facility

(2) The owner or operator of the PCB storage site of an authorized facility that is a transfer site or that is authorized to destroy PCBs shall affix a label in the form set out in subsection 29(4) in a readily visible location on any container that is a fixed tank and that is used at the facility for the storage of PCBs or products containing PCBs in a concentration of 50 mg/kg or more.

Notice

(3) The owner or operator of a PCB storage site shall place a notice in a readily visible location at the entrance of the site that states the information set out in paragraph 29(4)(a) and that measures at least 150 mm by 150 mm.

Exception

(4) Subsections (1) and (2) do not apply if the product or the container bear a label on the day on which these Regulations come into force that indicates the presence of PCBs and that states “Date of Commencement of Storage” and the date on which the storage begins.

Retention of labels

32. The person who is required to affix a label on a product or container in accordance with sections 29 to 31 shall ensure that it bears that label for the duration that the person possesses the product or container.

conforme au paragraphe 29(4) sur chaque partie désassemblée du câble, du pipeline ou de l'équipement connexe.

31. (1) Le propriétaire ou l'exploitant d'un dépôt de BPC d'une installation autre qu'une installation agréée qui est un centre de transfert ou qui est autorisée à détruire des BPC est tenu d'apposer une étiquette à un endroit bien en vue sur tout produit en contenant qui y sont stockés et qui contiennent des BPC en une concentration égale ou supérieure à 50 mg/kg; l'étiquette

a) est conforme au paragraphe 29(4);

b) porte la mention « Date de début de stockage » et la date de début de stockage.

(2) Le propriétaire ou l'exploitant d'un dépôt de BPC d'une installation agréée qui est un centre de transfert ou qui est autorisée à détruire des BPC est tenu d'apposer une étiquette conforme au paragraphe 29(4) à un endroit bien en vue sur tout contenant qui est un réservoir fixe utilisé pour stocker des BPC à l'installation ou des produits qui en contiennent en une concentration égale ou supérieure à 50 mg/kg.

(3) Le propriétaire ou l'exploitant d'un dépôt de BPC place à l'entrée du dépôt à un endroit bien en vue une affiche d'une dimension minimale de 150 mm sur 150 mm portant la mention prévue à l'alinéa 29(4)a).

(4) Les paragraphes (1) et (2) ne s'appliquent pas si le produit ou le contenant porte, à l'entrée en vigueur du présent règlement, une étiquette qui indique la présence de BPC, qui porte la mention « Date de début de stockage » et indique la date de début de stockage.

32. La personne qui a l'obligation d'apposer une étiquette sur un produit ou un contenant en application des articles 29 à 31 veille à ce que le produit ou le contenant la porte en tout temps pendant qu'il est en sa possession.

Installation autre qu'un centre de transfert ou de destruction

Centre de transfert ou de destruction

Affiche

Exception

Conservation des étiquettes

REPORTS

End of use of equipment and liquids — 2009

33. (1) The owner of the equipment referred to in paragraph 16(1)(a) and subparagraph 16(1)(b)(i), other than the equipment for which an extension is granted by the Minister in accordance with section 17, or the liquids referred to in subsection 15(2) shall prepare a report that is current to December 31 of each calendar year in which the person owns the equipment or the liquids and that contains the following information:

(a) the name, civic and mailing addresses, telephone number, fax number, if any, and e-mail address, if any, of the owner and any person authorized to act on the owner's behalf;

(b) the civic addresses of the facilities where the equipment and liquids are located or, if there is no civic address, their location using the owner's site identification system;

RAPPORTS

33. (1) Le propriétaire des pièces d'équipement visées à l'alinéa 16(1)a) ou au sous-alinéa 16(1)b)(i), autres que celles pour lesquelles une prolongation a été accordée par le ministre en vertu de l'article 17, ou des liquides visés au paragraphe 15(2) est tenu de préparer un rapport, au 31 décembre de chaque année civile durant laquelle il en est propriétaire, comportant les renseignements suivants :

a) ses nom, adresses municipale et postale, numéro de téléphone et, le cas échéant, numéro de télécopieur et adresse électronique, ainsi que ceux de toute personne autorisée à agir en son nom;

b) l'adresse municipale des installations où se trouvent les pièces d'équipement et les liquides ou, à défaut, l'endroit où ils se trouvent d'après le système d'identification de site du propriétaire;

Date de fin d'utilisation des pièces d'équipement et des liquides — 2009

Equipment and liquids for which extension granted

(c) the quantity of the liquids containing PCBs in the equipment and of the liquids, expressed in litres,

(i) that are in use on December 31,

(ii) that are stored on December 31 at the person's PCB storage site,

(iii) that are sent, in that calendar year, to an authorized facility that is a transfer site,

(iv) that are sent, in that calendar year, to an authorized facility that is authorized to destroy them, or

(v) that are destroyed in that calendar year; and

(d) a certification that the information is accurate and complete and that is dated and signed by the owner or by a person authorized to act on the owner's behalf.

(2) The owner of the equipment referred to in paragraph 16(1)(a) and subparagraph 16(1)(b)(i) or the liquids referred to in subsection 15(2) for which an extension is granted by the Minister in accordance with section 17 shall prepare a report that is current to December 31 of each calendar year in which the person owns the equipment or the liquids and that contains the following information for each piece of equipment or container of liquid:

(a) the information required under paragraphs (1)(a) and (d);

(b) the unique identification number that is on the label referred to in paragraph 29(4)(c);

(c) the civic address, function and technical description of the facility where the equipment or container of liquid is located or, if there is no civic address, its location using the owner's site identification system;

(d) the progress on the plan's implementation and the timelines for ending the use of the equipment;

(e) the measures taken to minimize or eliminate any harmful effect of the PCBs in the equipment on the environment and on human health; and

(f) the findings of the inspections of the equipment.

(3) The owner of the equipment referred to in subparagraph 16(1)(b)(ii) and subsection 16(2) shall prepare a report that is current to December 31 of each calendar year in which the person owns the equipment and that contains the following information:

(a) the information required under paragraphs (1)(a), (b) and (d); and

(b) the quantity, expressed in litres, of liquids containing PCBs in the equipment, and the concentration, expressed in mg/kg, of the PCBs

(i) that are stored on December 31 at the person's PCB storage site,

c) la quantité, exprimée en litres, de liquides qui contiennent des BPC dans les pièces d'équipement et de liquides :

(i) en usage le 31 décembre,

(ii) stockés à son dépôt le 31 décembre,

(iii) expédiés, au cours de l'année civile, à une installation agréée qui est un centre de transfert,

(iv) expédiés, au cours de l'année civile, à une installation agréée qui est autorisée à les détruire,

(v) détruits au cours de l'année civile;

d) une attestation, datée et signée par lui ou par toute personne autorisée à agir en son nom, portant que les renseignements sont complets et exacts.

(2) Le propriétaire des pièces d'équipement visées à l'alinéa 16(1)a) ou au sous-alinéa 16(1)b)(i) ou des liquides visés au paragraphe 15(2) pour lesquels une prolongation a été accordée par le ministre en vertu de l'article 17 est tenu de préparer un rapport, au 31 décembre de chaque année civile durant laquelle il en est propriétaire, comportant les renseignements suivants pour chaque pièce d'équipement et contenant de liquides :

a) les renseignements prévus aux alinéas (1)a) et d);

b) le numéro d'identification unique figurant sur l'étiquette conformément à l'alinéa 29(4)c);

c) l'adresse municipale, la fonction et les caractéristiques techniques de l'installation où se trouvent la pièce d'équipement ou le contenant des liquides ou, à défaut, l'endroit où il se trouvent d'après le système d'identification de site du propriétaire;

d) le progrès accompli dans la mise en œuvre du plan et de l'échéancier dressé en vue de la cessation de l'utilisation de la pièce d'équipement;

e) les mesures prises pour éliminer ou atténuer tout effet nocif des BPC contenus dans la pièce d'équipement sur l'environnement et la santé humaine;

f) les résultats des inspections de la pièce d'équipement.

(3) Le propriétaire des pièces d'équipement visées au sous-alinéa 16(1)b)(ii) ou au paragraphe 16(2) est tenu de préparer un rapport, au 31 décembre de chaque année civile durant laquelle il en est propriétaire, comportant les renseignements suivants :

a) les renseignements prévus aux alinéas (1)a), b) et d);

b) la quantité de liquides qui contiennent des BPC dans les pièces d'équipement, exprimée en litres, et la concentration de ces BPC dans les liquides, exprimée en mg/kg :

(i) stockés à son dépôt de BPC le 31 décembre,

Pièces d'équipement et liquides pour lesquels une prolongation a été accordée

End of use of equipment — 2025

Date de fin d'utilisation des pièces d'équipement — 2025

- (ii) that are sent, in that calendar year, to an authorized facility that is a transfer site,
- (iii) that are sent, in that calendar year, to an authorized facility that is authorized to destroy them, or
- (iv) that are destroyed in that calendar year.

Research

34. The person who offers for sale, sells, processes or uses PCBs or products containing PCBs for the purpose of research in accordance with section 8 shall prepare a report that is current to December 31 in each calendar year in which the person offers for sale, sells, processes or uses those PCBs or products and that contains the following information:

- (a) the name, civic and mailing addresses, telephone number, fax number, if any, and e-mail address, if any, of the person and of any person authorized to act on that person's behalf;
- (b) an indication of whether the person offers for sale, sells, processes or uses the PCBs or products;
- (c) the quantity of the PCBs or of the products containing PCBs that are offered for sale, sold, processed or used in that calendar year; and
- (d) a certification that the information is accurate and complete and that is dated and signed by the person or by a person authorized to act on their behalf.

Colouring pigment

35. The person who manufactures, exports or imports colouring pigment in accordance with section 11 shall prepare a report that is current to December 31 in each calendar year in which the person manufactures, imports or exports the colouring pigment and that contains the following information:

- (a) the name, civic and mailing addresses, telephone number, fax number, if any, and e-mail address, if any, of the person and of any person authorized to act on that person's behalf;
- (b) an indication of whether the person manufactures, exports or imports colouring pigment;
- (c) the quantity of colouring pigment, expressed in kilograms, the maximum concentration of PCBs in the colouring pigment, expressed in mg/kg, and the average annual concentration of PCBs in the colouring pigment, expressed in mg/kg, that is manufactured, imported or exported in that calendar year;
- (d) in the case of importing, the name, telephone number and civic and mailing addresses of the person from whom the colouring pigment is imported and, in the case of exporting, the name, telephone number and civic and mailing addresses of the person to whom the colouring pigment is exported; and
- (e) a certification that the information is accurate and complete and that is dated and signed by the person or by a person authorized to act on their behalf.

- (ii) expédiés, au cours de l'année civile, à une installation agréée qui est un centre de transfert,
- (iii) expédiés, au cours de l'année civile, à une installation agréée qui est autorisée à les détruire,
- (iv) détruits au cours de l'année civile.

Recherches

34. La personne qui met en vente, vend, transforme ou utilise des BPC ou des produits qui en contiennent en vue d'effectuer des recherches conformément à l'article 8 est tenue de préparer un rapport, au 31 décembre de chaque année civile durant laquelle elle les a mis en vente, vendus, utilisés ou transformés, comportant les renseignements suivants :

- a) ses nom, adresses municipale et postale, numéro de téléphone et, le cas échéant, numéro de télécopieur et adresse électronique, ainsi que ceux de toute personne autorisée à agir en son nom;
- b) une mention indiquant si elle les a mis en vente, vendus, transformés ou utilisés;
- c) la quantité de BPC ou de produits qui ont été mis en vente, vendus, transformés ou utilisés durant l'année civile;
- d) une attestation, datée et signée par elle ou par toute personne autorisée à agir en son nom, portant que les renseignements sont complets et exacts.

35. La personne qui fabrique, exporte ou importe, conformément à l'article 11, des pigments pour la coloration est tenue de préparer un rapport, au 31 décembre de chaque année civile durant laquelle elle les fabrique, exporte ou importe, comportant les renseignements suivants :

Pigments pour la coloration

- a) ses nom, adresses municipale et postale, numéro de téléphone et, le cas échéant, numéro de télécopieur et adresse électronique, ainsi que ceux de toute personne autorisée à agir en son nom;
- b) une mention indiquant si elle les a fabriqués, exportés ou importés;
- c) la quantité, exprimée en kilogrammes, de pigments qui ont été fabriqués, exportés ou importés durant l'année civile ainsi que la concentration moyenne annuelle et la concentration maximale en BPC de ces pigments, exprimée en mg/kg;
- d) les nom, adresses municipale et postal et numéro de téléphone de la personne de qui proviennent les pigments, dans le cas où ils sont importés, ou à qui ils sont expédiés, dans le cas où ils sont exportés;
- e) une attestation, datée et signée par elle ou par toute personne autorisée à agir en son nom, portant que les renseignements sont complets et exacts.

Solid products
containing
PCBs

36. The person who manufactures solid products containing PCBs in accordance with section 13 shall prepare a report that is current to December 31 in each calendar year in which the person manufactures the products and that contains the following information:

- (a) the name, civic and mailing addresses, telephone number, fax number, if any, and e-mail address, if any, of the person and of any person authorized to act on that person's behalf;
- (b) the quantity of solid products manufactured in that calendar year, expressed in kilograms, and the maximum concentration and average concentration of PCBs in the solid products, expressed in mg/kg, for that calendar year;
- (c) the name, telephone number and civic and mailing addresses of the person to whom the manufacturer sells the products; and
- (d) a certification that the information is accurate and complete and that is dated and signed by the person or by a person authorized to act on their behalf.

Stored PCBs
or products —
PCB
concentration
of 50 mg/kg
or more

37. The person who owns and stores PCBs or products containing PCBs in a concentration of 50 mg/kg or more, other than the equipment and liquids referred to in section 33, shall prepare a report that is current to December 31 in each calendar year in which the person stores the PCBs or products at their PCB storage site and that contains the following information:

- (a) the name, civic and mailing addresses, telephone number, fax number, if any, and e-mail address, if any, of the owner and of any person authorized to act on the owner's behalf;
- (b) the civic addresses of the PCB storage sites where the PCBs or products are located, or if there is no civic address, their location using the owner's site identification system;
- (c) the quantity of liquids containing PCBs in the products, expressed in litres, and the quantity of solids containing PCBs in the products, expressed in kilograms, and the concentration of PCBs in the liquids and the solids, expressed in mg/kg
 - (i) that are stored on December 31 at the person's PCB storage site,
 - (ii) that are sent, in that calendar year, to an authorized facility that is a transfer site,
 - (iii) that are sent, in that calendar year, to an authorized facility that is authorized to destroy them, or
 - (iv) that are destroyed in that calendar year; and
- (d) a certification that the information is accurate and complete and that is dated and signed by the owner of the PCBs or products containing PCBs or by a person authorized to act on the owner's behalf.

36. La personne qui fabrique, conformément à l'article 13, des produits solides qui contiennent des BPC est tenue de préparer un rapport, au 31 décembre de chaque année civile durant laquelle elle les fabrique, comportant les renseignements suivants :

- a) ses nom, adresses municipale et postale, numéro de téléphone et, le cas échéant, numéro de télécopieur et adresse électronique, ainsi que ceux de toute personne autorisée à agir en son nom;
- b) la quantité, exprimée en kilogrammes, de produits qui ont été fabriqués durant l'année civile ainsi que la concentration moyenne et la concentration maximale en BPC de ces produits, exprimée en mg/kg, pour cette année civile;
- c) les nom, adresse municipale et postale et numéro de téléphone de la personne à qui elle a vendu les produits;
- d) une attestation, datée et signée par elle ou par toute personne autorisée à agir en son nom, portant que les renseignements sont complets et exacts.

37. Le propriétaire de BPC ou de produits qui en contiennent en une concentration égale ou supérieure à 50 mg/kg, autres que les pièces d'équipement ou les liquides visés à l'article 33, qui les stocke à son dépôt de BPC est tenu de préparer un rapport, au 31 décembre de chaque année civile durant laquelle il les stocke ainsi, comportant les renseignements suivants :

- a) ses nom, adresses municipale et postale, numéro de téléphone et, le cas échéant, numéro de télécopieur et adresse électronique, ainsi que ceux de toute personne autorisée à agir en son nom;
- b) l'adresse municipale des dépôts où sont stockés les BPC et les produits ou, à défaut, l'endroit où ils se trouvent d'après le système d'identification de site du propriétaire;
- c) la quantité de liquides qui contiennent des BPC dans les produits, exprimée en litres, la quantité de solides qui contiennent des BPC dans les produits, exprimée en kilogrammes, et la concentration de BPC dans les liquides ou les solides, exprimée en mg/kg :
 - (i) stockés à son dépôt de BPC le 31 décembre,
 - (ii) expédiés, au cours de l'année civile, à une installation agréée qui est un centre de transfert,
 - (iii) expédiés, au cours de l'année civile, à une installation agréée qui est autorisée à les détruire,
 - (iv) détruits au cours de l'année civile,
- d) une attestation, datée et signée par lui ou par toute personne autorisée à agir en son nom, portant que les renseignements sont complets et exacts.

Produits solides
qui contiennent
des BPC

BPC ou
produits
stockés —
concentration
de BPC de
50 mg/kg ou
plus

Stored PCBs or products — transfer site or destruction facility

38. The owner of an authorized facility that is a transfer site or that is authorized to destroy PCBs or products containing PCBs and who stores them at their PCB storage site, other than the owner referred to in section 37, shall prepare a report that is current to December 31 in each calendar year and that contains the following information:

- (a) the name, civic and mailing addresses, telephone number, fax number, if any, and e-mail address, if any, of the owner and of any person authorized to act on the owner's behalf;
- (b) the civic addresses of the sites where the PCBs or products containing PCBs are stored, or if there is no civic address, the location of the sites using the owner's site identification system;
- (c) the quantity of liquids containing PCBs in the products, expressed in litres, or the quantity of solids containing PCBs in the products, expressed in kilograms, and the concentration of the PCBs in the liquids and the solids, expressed in mg/kg
 - (i) that are stored on December 31 at the owner's PCB storage site,
 - (ii) that are sent, in that calendar year, to an authorized facility that is a transfer site,
 - (iii) that are sent, in that calendar year, to an authorized facility that is authorized to destroy them, or
 - (iv) that are destroyed in that calendar year; and
- (d) a certification that the information is accurate and complete and that is dated and signed by the owner of the authorized facility or by a person authorized to act on the owner's behalf.

Date of submission of report

39. (1) The person who is required to prepare a report in accordance with subsection 33(1) or (2) and with any of sections 34 to 38 shall submit it to the Minister on or before March 31 of the year following the calendar year for which the report is made.

Report made under subsection 33(3)

(2) The person who is required to prepare a report in accordance with subsection 33(3) shall submit it to the Minister

- (a) on or before March 31, 2010 for reports that are current to December 31 of the year that these Regulations come into force up to the year 2009;
- (b) on or before March 31, 2014 for reports that are current to December 31 of each of the years 2010 to 2013;
- (c) on or before March 31, 2018 for reports that are current to December 31 of each of the years 2014 to 2017;
- (d) on or before March 31, 2022 for reports that are current to December 31 of each of the years 2018 to 2021;
- (e) on or before March 31, 2026 for reports that are current to December 31 of each of the years 2022 to 2025;

38. Le propriétaire d'une installation agréée qui est un centre de transfert ou qui est autorisée à détruire des BPC et des produits qui en contiennent, autre que le propriétaire visé à l'article 37, et qui les stocke à son dépôt de BPC est tenu de préparer un rapport, au 31 décembre de chaque année civile durant laquelle il les transforme ou les détruit, comportant les renseignements suivants :

- a) ses nom, adresses municipale et postale, numéro de téléphone et, le cas échéant, numéro de télécopieur et adresse électronique, ainsi que ceux de toute personne autorisée à agir en son nom;
- b) l'adresse municipale des dépôts où sont stockés les BPC et les produits ou, à défaut, l'endroit où ils se trouvent d'après le système d'identification de site du propriétaire;
- c) la quantité de liquides qui contiennent des BPC dans les produits, exprimée en litres, la quantité de solides qui contiennent des BPC dans les produits, exprimée en kilogrammes, et la concentration de BPC dans les liquides ou les solides, exprimée en mg/kg :
 - (i) stockés à son dépôt de BPC le 31 décembre,
 - (ii) expédiés, au cours de l'année civile, à une installation agréée qui est un centre de transfert,
 - (iii) expédiés, au cours de l'année civile, à une installation agréée qui est autorisée à les détruire,
 - (iv) détruits au cours de l'année civile,
- d) une attestation, datée et signée par lui ou par toute personne autorisée à agir en son nom, portant que les renseignements sont complets et exacts.

BPC ou produits stockés — Centre de transfert ou de destruction

39. (1) La personne qui est tenue de préparer tout rapport visé aux paragraphes 33(1) ou (2) ou à l'un des articles 34 à 38 le présente au ministre au plus tard le 31 mars de l'année civile qui suit celle pour laquelle il est établi.

Date de présentation des rapports

(2) Celle qui est tenue de préparer le rapport visé au paragraphe 33(3) le présente au ministre :

- a) au plus tard le 31 mars 2010, s'il porte sur toute année civile suivant l'entrée en vigueur du présent règlement jusqu'à l'année 2009;
- b) au plus tard le 31 mars 2014, s'il porte sur l'une ou l'autre des années 2010 à 2013;
- c) au plus tard le 31 mars 2018, s'il porte l'une ou l'autre des années 2014 à 2017;
- d) au plus tard le 31 mars 2022, s'il porte sur l'une ou l'autre des années 2018 à 2021;
- e) au plus tard le 31 mars 2026, s'il porte sur l'une ou l'autre des années 2022 à 2025;
- f) au plus tard le 31 mars 2027, s'il porte sur l'année 2026;
- g) au plus tard le 31 mars 2030, s'il porte sur l'une ou l'autre des années 2027 à 2029.

Rapport visé au paragraphe 33(3)

	(f) on or before March 31, 2027 for reports that are current to December 31 of the year 2026; and (g) on or before March 31, 2030 for reports that are current to December 31 of each of the years 2027 to 2029.		
Release into the environment	40. (1) For the purposes of paragraph 95(1)(a) of the Act, where there occurs or is a likelihood of a release into the environment of PCBs in contravention of section 5, the person who is designated to be provided with a written report is the Manager of Inspection Program, Environmental Enforcement Division, Enforcement Branch of the Department of the Environment in the region where the release occurs or is likely to occur.	40. (1) Pour l'application de l'alinéa 95(1)(a) de la Loi, en cas de rejet dans l'environnement — effectif ou probable — de BPC en violation de l'article 5, la personne désignée pour recevoir le rapport écrit est le Gestionnaire du programme d'inspection, Direction de l'application de la loi en environnement, Direction générale de l'application de la loi du ministère de l'Environnement, dans la région où a lieu le rejet — effectif ou probable.	Rejets dans l'environnement
Contents	(2) The report shall include the following information: (a) the name, civic and mailing addresses and telephone number of the person who owns or has the charge, management or control of the PCBs that are released into the environment; (b) the date, time and location of the release; (c) a description of the source of the release; and (d) the quantity of liquids containing PCBs released, expressed in litres, the quantity of solids containing PCBs released, expressed in kilograms, and the concentration of PCBs in the liquids and the solids that are released, expressed in mg/kg.	(2) Le rapport comporte les renseignements suivants : a) les nom, adresses municipale et postale et numéro de téléphone de la personne qui a toute autorité sur les BPC qui ont été rejetés dans l'environnement ou qui en est propriétaire; b) les date, heure et lieu du rejet; c) une description de la source du rejet; d) la quantité de liquides qui contiennent des BPC rejetés, exprimée en litres, la quantité de solides qui contiennent des BPC rejetés, exprimée en kilogrammes, et la concentration de BPC dans les liquides ou les solides rejetés, exprimée en mg/kg.	Contenu
Retention	41. Any person who is required to submit a report under these Regulations shall keep a copy of the report at their principal place of business in Canada for at least five years after the day on which the report is submitted.	41. Toute personne qui est tenue de présenter un rapport en application du présent règlement en conserve une copie à son établissement principal au Canada pendant au moins cinq ans après la date de sa présentation.	Conservation
Method of submission	42. Each report referred to in sections 33 to 38 shall be submitted electronically in the format provided by the Department of the Environment, but the report shall be submitted in writing if (a) no such format is provided; or (b) it is, owing to circumstances beyond the control of the person required to submit the report, impracticable to submit the report electronically in the format provided.	42. Les rapports visés aux articles 33 à 38 sont présentés sous forme électronique selon le modèle établi par le ministère de l'Environnement. Ils sont toutefois présentés par écrit dans les cas suivants : a) aucun modèle n'a été établi par le ministère; b) il est pratiquement impossible, pour des raisons indépendantes de la volonté de la personne tenue de les présenter, de le faire sous forme électronique selon le modèle établi.	Méthode de présentation
RECORDS DOCUMENTS ET REGISTRES			
Records for permitted activities	43. The following persons shall maintain records that demonstrate that they manufacture, process, use, sell, offer for sale, store, import or export PCBs or products containing PCBs in accordance with the Act and these Regulations: (a) the owner of PCBs or products containing PCBs; (b) the person who is engaged in any of these activities; and (c) the owner or operator of a PCB storage site.	43. Les personnes ci-après conservent les documents établissant que des BPC ou des produits qui en contiennent ont été fabriqués, transformés, utilisés, mis en vente, vendus, stockés, importés ou exportés conformément à la Loi et au présent règlement : a) le propriétaire des BPC ou des produits; b) la personne qui exerce l'activité; c) le propriétaire ou l'exploitant du dépôt de BPC.	Documents concernant les activités permises
Inspection record	44. (1) The owner or operator of a PCB storage site shall maintain a record of all inspections conducted at the PCB storage site under paragraph 27(a) (a) listing all items that are inspected; (b) describing any deficiency found;	44. (1) Le propriétaire ou l'exploitant d'un dépôt de BPC tient un registre de toutes les inspections effectuées au dépôt de BPC en application de l'alinéa 27a), lequel fait état : a) de tous les points inspectés;	Registres d'inspections

	(c) setting out the measures taken to remedy the deficiency; and (d) specifying the dates of the inspections and the names of the inspectors.	b) de toutes les lacunes relevées; c) des mesures à prendre pour y remédier; d) de la date de l'inspection et du nom de l'inspecteur.	
Owner of equipment — extension	(2) The owner of equipment for which an extension of the end-of-use date is applied under section 17 shall maintain a record of all inspections conducted on the equipment that contains the information set out in paragraphs (1)(a) to (d).	(2) Le propriétaire d'une pièce d'équipement dont l'utilisation fait l'objet d'une prolongation en vertu de l'article 17 tient un registre de toutes les inspections de la pièce d'équipement qui ont été effectuées, lequel fait état des renseignements prévus aux alinéas (1)a) à d).	Propriétaire d'une pièce d'équipement — prolongation
Retention of records	45. The person who is required to maintain a record under sections 43 and 44 shall retain it at their principal place of business in Canada or at the place where they conduct the activity for at least five years (a) after the destruction of the PCBs or the products containing PCBs that are the subject of the record, in the case of the owner of PCBs or products containing PCBs or the owner or operator of the PCB storage site where the PCBs or products containing PCBs are stored; or (b) after the completion of an activity referred to in section 43, in the case of the person who is engaged in that activity.	45. Toute personne qui est tenue de conserver des documents ou de tenir un registre en application des articles 43 et 44 respectivement les conserve à son établissement principal au Canada ou à l'établissement où l'activité est exercée pendant au moins cinq ans après : a) dans le cas du propriétaire de BPC ou de produits qui en contiennent ou du propriétaire ou de l'exploitant d'un dépôt de BPC où sont stockés des BPC ou des produits qui en contiennent, la date de destruction des BPC ou des produits qui en contiennent visés par le document ou le registre; b) dans le cas de la personne qui exerce une activité visée à l'article 43, la date de la fin de l'activité.	Conservation des dossiers

PART 5

REPEALS AND COMING INTO FORCE

REPEALS

Repeal	46. The <i>Chlorobiphenyls Regulations</i>¹ are repealed.
Repeal	47. The <i>Storage of PCB Material Regulations</i>² are repealed.

COMING INTO FORCE

Coming into force	48. These Regulations come into force on the day on which they are registered.
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PARTIE 5

ABROGATIONS ET ENTRÉE EN VIGUEUR

ABROGATION

46. Le <i>Règlement sur les biphényles chlorés</i>¹ est abrogé.	Abrogation
47. Le <i>Règlement sur le stockage des matériels contenant des BPC</i>² est abrogé.	Abrogation

Entrée en vigueur

48. Le présent règlement entre en vigueur à la date de son enregistrement.	Entrée en vigueur
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¹ SOR/91-152

² SOR/92-507; SOR/2000-102, s. 15

¹ DORS/91-152

² DORS/92-507; DORS/2000-102, a. 15

Appendix E

Iqaluit West 40 Landfill Drainage Management Review

City of Iqaluit

West 40 Landfill Drainage Management Review

Prepared by:

Ken Johnson

AECOM

17203 103 Avenue NW
Edmonton, AB, Canada T5S 1J4
www.aecom.com

780 488 6800 tel
780 488 2121 fax

Project Number:

60221928

Date:

September 16, 2011

Statement of Qualifications and Limitations

The attached Report (the “Report”) has been prepared by AECOM Canada Ltd. (“Consultant”) for the benefit of the client (“Client”) in accordance with the agreement between Consultant and Client, including the scope of work detailed therein (the “Agreement”).

The information, data, recommendations and conclusions contained in the Report (collectively, the “Information”):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the “Limitations”)
- represents Consultant’s professional judgement in light of the Limitations and industry standards for the preparation of similar reports
- may be based on information provided to Consultant which has not been independently verified
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued
- must be read as a whole and sections thereof should not be read out of such context
- was prepared for the specific purposes described in the Report and the Agreement
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time

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Consultant agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but Consultant makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

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- as agreed in writing by Consultant and Client
- as required by law
- for use by governmental reviewing agencies

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This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.



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780 488 6800 tel
780 488 2121 fax

September 16, 2011

Paul Clow
Project Officer
City of Iqaluit
Box 460
Iqaluit, NU XOA 0H0

Dear Mr Clow:

Project No: 601221928

Regarding: West 40 Landfill Drainage Management Review

Enclosed for your reference is a report which reviews the current landfill drainage management at the West 40 Landfill in Iqaluit, NU. The report reviews historical sample test results from landfill runoff retention and detention ponds on site and compares the results to appropriate regulatory guidelines. Options which have been examined by the City of Iqaluit for the future treatment of landfill runoff are presented and commented on. Recommendations are provided for the collection, treatment, and appropriate effluent quality criteria.

Should you have any questions or concerns please do not hesitate to call the undersigned at (780) 453 0910.

Sincerely,
AECOM Canada Ltd.

Ken Johnson, P.Eng
Senior Planner and Engineer
Ken.Johnson@aecom.com

XX:xx
Encl.
cc:

Distribution List

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Revision Log

Revision #	Revised By	Date	Issue / Revision Description

AECOM Signatures

Report Prepared By:

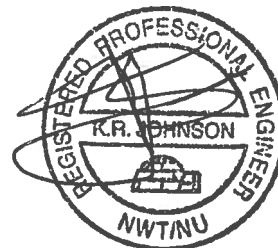
Kristi Beckman

Kristi Beckman, EIT
Project Engineer

Report Reviewed By:

Ken Johnson

Ken Johnson, P.Eng.
Project Manager



2014 09 16

Executive Summary

The City of Iqaluit's Water Licence states that the City is required to collect, monitor and control the discharge of runoff from the West 40 Landfill site and adjacent Sludge Management Facility. The City currently employs a surface water management system to divert off-site surface runoff from entering the site, and to collect on-site surface runoff for a controlled discharge into the environment. The landfill site relies on the local permafrost regime to provide a low permeability barrier to control the subsurface runoff.

In 2006 the City upgraded the landfill's drainage management system by constructing two berm structures, three on-site detention ponds and an off-site retention pond. The berm structures create a continuous ditch system for surface runoff collection and controlled movement on site. On-site runoff water drains into detention ponds around the site and then into a larger on-site retention pond where the water is stored until it is decanted as a controlled discharge into a marine environment. In 2010 the City of Iqaluit purchased a tube filtration system and has been filtering the retention pond water through this device prior to discharge.

The historical sampling results from the landfill runoff between 2004 and 2011 show that the water is consistently over the maximum allowable concentration limits for iron, manganese and zinc as listed in the Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories. There are no specific guidelines in place for landfill surface runoff water in Nunavut. In the absence of specific guidelines, the most appropriate benchmark for comparing sample results are the Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories, as well as limits established from other Nunavut Water Licences.

The City of Iqaluit has examined treatment options which could be applied to the landfill runoff, including wetland treatment, mechanical treatment (membrane bioreactor technology) and physical-chemical treatment with filtration. The City has completed a conceptual design for a constructed wetland that would treat the runoff by utilizing the natural processes of wetland vegetation, soils and soil microbial populations to degrade and store contaminants. The City has also completed a review of Membrane Bioreactor Technology which combines filtration and a suspended growth bioreactor to treat the runoff. Most recently the City advanced a turnkey proposal on physical-chemical treatment applying a Geotube® filtration system to remove precipitated solids.

The City initiated a filtration process in 2010 to determine the practicality and the potential treatment of the runoff by filtration alone. The 2010 sampling results of the filtered runoff suggest some contaminant removal, however the 2011 sampling results are inconclusive. The next phase of the trial process for the City will be applying chemical treatment in advance of the physical filtration process.

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Appendix C.	Landfill Water Sample Testing Results

Appendix D.	City of Iqaluit Water License Monitoring Program
Appendix E.	Canadian Environmental Quality Guidelines Summary Table
Appendix F.	City of Iqaluit Landfill Runoff Wetland Treatment Conceptual Design Report
Appendix G.	Membrane Bioreactor Technology Report
Appendix H.	WESATech Proposal Iqaluit Landfill Runoff

1. Introduction

The City of Iqaluit Water Licence No. 3AM-IQA0611 Type “A” (valid until July 15, 2012) requires that the City of Iqaluit collect, monitor and control discharge of the runoff from the West 40 Landfill site and adjacent Sludge Management Facility. Currently the City of Iqaluit sends approximately 30,000 cubic meters of compacted waste to the landfill annually (estimate provided by Landfill Foreman September 2011). In 2007 AECOM calculated that the volume of winter runoff water generated from the landfill would be approximately 7,700 m³ and that the summer runoff would be 6,600 m³. The West 40 Landfill currently employs a surface water management system to divert off-site surface runoff from entering the site, and to collect on-site surface runoff for a controlled discharge into the environment. The landfill site relies on the local permafrost regime to provide a low permeability barrier to control the subsurface runoff.

2. Current Site Conditions

2.1 Current Drainage Management Plan

In 2006 the City of Iqaluit upgraded the West 40 landfill to improve drainage management. The current landfill drainage management system on site is based on a system of berms, ditches, detention ponds and a retention pond. A figure showing the landfill operating conditions can be located in Appendix A.

A berm structure on site diverts off-site runoff around the site and divert on-site runoff into a ditch collection system. The perimeter berm structures provide the infrastructure for a continuous ditch system for surface runoff management. On-site runoff control ditches drain to several control ponds (refer to Appendix A for locations). In 2006 three new drainage control ponds were constructed on site, increasing the total number of control ponds to 4 with an approximate total volume of 3000 m³. The control ponds provide a point where runoff may be sampled and transferred to the retention pond.

The runoff retention pond was constructed in 2006 and has approximately 5000 m³ of storage volume. The retention pond provides storage before the runoff is decanted into the receiving water system. Upon notification of the regulatory authorities the water is currently either decanted from the retention pond directly or decanted after filtration. In 2010 the City of Iqaluit purchased a tube filtration system and has been filtering the retention pond water through this device before the water enters the receiving environment.

Appendix B contains a photo presentation of the current landfill drainage management system on site.

Associated with the capital improvements have been operational improvements the drainage management. The landfill operating staff has taken steps to minimize the generation of on-site runoff by initiating removal of clean snow from the landfill site. The removal of snow ultimately reduces the amount of on-site runoff.

The City of Iqaluit is continuing to make capital improvements to the drainage management system associated with the West 40 landfill. Construction has been awarded for the expansion of the perimeter berm on the east side of the site to provide a larger berm structure, and an impermeable membrane on the interior face of the berm.

2.2 Summary of Historical Landfill Water Sampling Data

Twelve water samples taken from the retention pond, detention ponds and landfill runoff between 2004 and 2011 were provided by the City of Iqaluit and reviewed by AECOM. Currently there are no specific guidelines for the discharge of landfill surface runoff in Nunavut so the sample results were compared to limits for discharge from a

sewage lagoon from the City of Iqaluit Water Licence (2006) and the Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories (GDTMWNWT).

All twelve samples throughout the time period tested exceeded the limits for iron, manganese and zinc. Table 1 presents the maximum and minimum sample results for these three parameters compared to the guideline limit. The June 2006 sample results from the retention pond exceeded the limits for iron, manganese and zinc as well as for BOD₅, TSS, aluminum, copper and lead. All other samples analyzed were below the limits for BOD₅, TSS, aluminum, copper and lead.

Table 1. Comparison of GDTMWNWT Limit and Maximum and Minimum Sample Results

	GDTMWNWT Limit	Maximum Sample Result	Minimum Sample Result
Iron	0.3 mg/L	122 mg/L INAC Results July 30, 2009	2.3 mg/L Detention Pond May 9, 2006
Manganese	0.05 mg/L	1.61 mg/L Retention Pond #2 May 23 2011	0.61 mg/L Retention Pond Sample #1 May 3 2010
Zinc	0.5 mg/L	15.0 mg/L Control Pond 2007	0.5 mg/L INAC Results July 30, 2009

Full summary sample results are located in Appendix C.

3. Review and Recommendation of Discharge Criteria

3.1 Origin of Effluent Quality Criteria for Landfill Runoff

The current water license in place for the City of Iqaluit was issued on May 15, 2006 (License No. 3AM-IQA0611 Type "A") and will expire in July 15, 2012. Within this license there is a condition (Part E, Item 17) which states that the City must submit a report "that will include a discussion of available treatment options, proposed discharge criteria, ... and a monitoring program". In response to this condition of the current license, the City retained Earth Tech as an Engineering Consultant in 2008 to meet the reporting requirements.

In June 2008 Earth Tech completed the report entitled City of Iqaluit – Water License Monitoring Program. The report identified parameters that should be tested for and also recommended the frequency of sampling of both the detention ponds and the retention pond associated with the landfill runoff management system. Table 2 lists the parameters from the report. The report was reviewed and supported by Environment Canada and Indian and Northern Affairs Canada. The report did not recommend any specific limits (maximum allowable concentrations) on the parameters to be monitored.

Table 2. Landfill Runoff Monitoring Parameters and Frequency as Recommended in 2008 Water Licence Monitoring Program Report

Parameter	Earth Tech's Recommendation on Sampling Frequency
Detention Ponds	
pH	Annually
Turbidity	Annually
Total suspended solids	Annually
BOD ₅	Annually
COD	Annually
TOC	Annually
Retention Pond	
pH	Annually
Turbidity	Annually
Total suspended solids	Annually
BOD ₅	Annually
COD	Annually
TOC	Annually
Ammonia nitrogen	Annually
TKN	Annually
Total phosphorous	Annually
Full Metal Scan + Hg	Annually
Total Coliform	Annually
Fecal Coliform	Annually
BTEX	Annually
PCBs	Annually

The full 2008 City of Iqaluit Water License Monitoring Program report is presented in Appendix D.

3.2 Sampling Criteria from Other Jurisdictions

The West 40 Landfill discharges into a marine environment, for this reason it is not appropriate to consult or compare sampling guidelines and criteria developed for surface water discharge situations with data from the West 40 Landfill runoff.

The Canadian Council of Ministers of the Environment (CCME) have guidelines for the discharge of water into marine environments for the protection of aquatic life. The criteria outlined in CCME's Water Quality Guidelines for The Protection of Aquatic Life lists guidelines for select metal parameters and petroleum hydrocarbon parameters. The CCME guidelines were developed in a national context for receiving environments across Canada.

The CCME Water Quality Guidelines for the Protection of Aquatic Life are located in Appendix E.

3.3 Applicable Sampling Parameters and Maximum Allowable Concentrations

It is most applicable to compare landfill runoff water sample results from the West 40 Landfill with the Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories (GDTMWNWT) (Season: Summer, 150-600Lcd, marine/bay receiving environment). The GDTMWNWT criteria are the current effluent quality guidelines referenced in the City of Iqaluit's Water Licence.

Another applicable reference is a water licence issued by the Nunavut Water Board to Defense Construction Canada for a DEW Line remediation project (licence number 1BR-DYE0914). This water licence lists guidelines that apply to discharge events associated with demolition rinse water, water from dewatering contaminated soil areas, contact water and potential seepage from a non-hazardous waste disposal facility and other monitoring stations at the site (Cape Dyer, Dye-M).

The City of Iqaluit's Water Licence issued in 2006 lists guidelines for water and waste disposal. The guidelines listed in this licence are for discharge of a municipal wastewater treatment lagoon and can be used as a reference when establishing appropriate guidelines for the discharge of landfill runoff.

Table 3 compares the parameters and maximum allowable concentrations from the three appropriate references discussed above.

Table 3. Appropriate Parameters and Maximum Allowable Concentrations for Comparison with West 40 Landfill Runoff Sampling Results

Parameter	Maximum Allowable Concentration	Source
pH	6 to 9	2009 Cape Dyer WL & 1992 GDTWNWT
Oil and Grease	5	2009 Cape Dyer WL
Arsenic (total)	0.1	2009 Cape Dyer WL
Cadmium (dissolved)	10	2009 Cape Dyer WL
Chromium (dissolved)	0.1	2009 Cape Dyer WL & 1992 GDTWNWT
Cobalt (dissolved)	0.5	1992 GDTWNWT
Copper (dissolved)	0.2	2009 Cape Dyer WL & 1992 GDTWNWT
Lead (dissolved)	0.05	2009 Cape Dyer WL & 1992 GDTWNWT
Mercury (total)	0.0006	2009 Cape Dyer WL & 1992 GDTWNWT
Nickel (dissolved)	0.3	1992 GDTWNWT
PCB (total)	1	2009 Cape Dyer WL
Zinc (total)	0.5	2009 Cape Dyer WL & 1992 GDTWNWT
Benzene	0.37	2009 Cape Dyer WL
Toluene	0.002	2009 Cape Dyer WL
Ethylbenzene	0.09	2009 Cape Dyer WL
BOD (5 Day)	120	1992 GDTWNWT & 2006 City of Iqaluit WL
TSS	180	2006 City of Iqaluit WL
Aluminum (total)	2	1992 GDTWNWT
Barium (total)	1	1992 GDTWNWT
Boron (dissolved)	5	1992 GDTWNWT
Cyanide (total)	0.1	1992 GDTWNWT
Fluoride (dissolved)	5	1992 GDTWNWT
Iron (dissolved)	0.3	1992 GDTWNWT
Manganese (dissolved)	0.05	1992 GDTWNWT

Methylene Blue Active Substances (MBAS)	5	1992 GDTWNWT
Molybdenum (total)	0.2	1992 GDTWNWT
Selenium (total)	0.05	1992 GDTWNWT
Silver (total)	0.1	1992 GDTWNWT
Suplhate (dissolved)	500	1992 GDTWNWT
Sulphide (dissolved)	0.5	1992 GDTWNWT
Tin (total)	5	1992 GDTWNWT

Note: 2009 Cape Dyer WL refers to the 2009 Cape Dyer DEW Line Remediation Water Licence
2006 City of Iqaluit WL refers to the City of Iqaluit 2006 Water Licence

4. Landfill Water Treatment Options

The City of Iqaluit has examined treatment options which may be applied to the landfill runoff water in the future. Currently none of the option listed below have been pursued further than the conceptual design and planning stage.

4.1 Constructed Wetland Treatment (Earth Tech Conceptual Design Report 2007)

4.1.1 Overview of Constructed Wetland Technology

In 2007 Earth Tech (now AECOM) was retained by the City of Iqaluit to develop a conceptual plan for a wetland treatment system for the West 40 Landfill. The full report is attached as Appendix F. It was determined that a constructed wetland system was most appropriate wetland configuration because of the runoff volumes and cold climate conditions. Constructed wetlands are engineered systems that are designed and constructed to utilize the natural functions of wetland vegetation, soils and soil microbial populations to treat contaminants in wastewater streams. As wastewater flows slowly through a wetland, pollutants are removed through physical, chemical and biological processes. The physical processes include entrapment, sedimentation and adsorption. The biological processes include nitrification and denitrification, the uptake of nutrients and metals by plants and by organisms that occupy the bedding media. Constructed wetlands are advantageous to natural wetland systems because they can be specifically engineered for particular wastewater characteristics, they have lower lifecycle costs, and they may be operated with less labor and power. It is important to note that wetland technology is still in a developing phase, and it is not possible to predict the ultimate performance of a wetland system.

4.1.2 Proposed Details of a Constructed Wetland Structure for the West 40 Landfill

The conceptual design report recommended that a subsurface horizontal flow wetland system be designed to treat the surface runoff from the landfill site. Subsurface flow wetlands involve passing the wastewater substrate through gravel or organic soil based systems. The large surface area of the media and plant roots provides space for microbial activity to degrade contamination. Media based wetland systems have high efficiencies at removing biodegradable organic matter and nitrate-nitrogen. Subsurface flow systems are below ground and work ideally in colder climates. Subsurface wetlands are preferred because they reduce odor and bug problems and reduce the potential for human contact with contaminated wastewater.

The proposed wetland treatment system would be located adjacent to the existing landfill site. The available and optimal location is the area east of the runoff retention pond which is sloped west to east. This land is currently under the control of another jurisdiction, therefore the City would have to negotiate for the use of this land for the wetland system. The wetland would be in operation from June to October. The proposed wetland would have a subsurface flow with permeable soil matrix growing medium. Landfill runoff would be introduced via a perforated head pipe to a gravel flow dispersion trench.

The wetland system would be developed in two phases. Phase 1 would have 7,700 m³ treatment capacity to meet the 2007 current discharge quality requirements. Phase 2 would have a 6,600 m³ treatment capacity for the future process improvements. The cost estimated to implement a constructed wetland at the site in 2007 for Phase 1 was \$273,770 and for Phase 2 was \$268,437.

4.2 Membrane Bioreactor Technology (2007 Earth Tech Letter Report)

4.2.1 Overview of Membrane Bioreactor Technology

Membrane bioreactors (MBRs) combine the membrane filtration process with a suspended growth bioreactor to degrade contaminants. The 2007 Earth Tech (now AECOM) report on Membrane Bioreactor Technology prepared for the City of Iqaluit outlines a mechanical treatment option for the treatment of runoff from the West 40 Landfill. An immersed MBR was recommended as the most appropriate MBR technology because of the lower energy demand when compared to side stream MBR configurations. To treat the West 40 Landfill runoff an anoxic and aerobic tank would be required in front of the MBR for nitrogen removal. The MBR system would be able to produce effluent that is well below any guideline limits.

The MBR would only be in operation for the summer months (120 days) and would require proper storage and maintenance work during the winter months. Commissioning the MBR for each season would be a difficult task.

The order of magnitude cost estimate prepared in 2007 for an MBR for only one season of operation was 2.4 million dollars (including a 40% contingency allowance for construction and engineering services). MBRs are associated with high capital and operation/maintenance costs.

Appendix G contains the full Membrane Bioreactor Report.

4.3 WESATech Geotube® Physical – Chemical Treatment System (WESATech Proposal)

WESA Technologies (WESATech) is an Ontario based company which focuses on the design and implementation of water and wastewater treatment systems. In 2010 WESATech prepared a proposal for the City of Iqaluit to implement a physical – chemical treatment system using a Geotube® filtration system for the West 40 landfill runoff to meet specified effluent discharge criteria.

4.3.1 Overview of WESATech Geotube® Physical-Chemical Treatment System

The WESATech Geotube® physical-chemical treatment process involves chemical treatment, solid filtration and neutralization all carried out continuously. The landfill runoff properties are characterized initially and the contaminants which require removal are identified. A chemical treatment process is designed to precipitate the contaminants from solution and to flocculate the contaminants into larger filterable particles. The Geotube® then works as a physical barrier to remove suspended solids. The solids that remain in the Geotube® can be returned to the landfill or transported for disposal at an appropriate facility. The Geotube® system can be stored in a shipping container and commissioned each time it is required to be used.

In the 2010 proposal the contaminants requiring removal from the West 40 Landfill runoff were iron, manganese and zinc. A two-stage chemical treatment step was proposed by WESATech. In the first chemical step calcium hydroxide solution would be added to raise the pH of the runoff water to induce the precipitation of the metals. In the second chemical treatment stage aluminum sulphate and polymer were added to flocculate the metals into larger particles. The chemical treatment stages were air mixed to promote the oxidation of the iron and manganese in the solution,

which leads to precipitation. The filtered water then entered a final neutralization step where the pH was adjusted to between 7 and 8 using hydrochloric acid.

The cost of the WESATech Geotube® equipment (pumps, tanks, Geotube®, piping, fittings, and chemicals for one season and transportation) to Iqaluit was estimated to be \$75,000. This amount does not include the cost of manpower on site. The cost of a WESATech operator was estimated to be \$1000/day. For the 2010 discharge event the cost of operator time and expenses per seasonal treatment and discharge event would be \$25,000. Supplies for seasonal treatment events were estimated to be \$10,000.

The complete WESATech proposal is included as Appendix H.

4.4 Tube Filtration System Currently in Use at the West 40 Landfill

The City of Iqaluit has purchased and utilized a tube filtration system on two discharge events from the retention pond. The first event was in July 2010 and the second event was in June 2011. The tube filter used by the City has a nominal pore size of 450 microns. The pore size decreases during operation as the tube captures suspended solids. The City has not used any chemical pretreatment on the runoff. As proposed by WESATech, pretreatment could enhance contaminant removal through the flocculation of dissolved contaminants.

The performance of the tube filter in removing contaminants based upon the very limited sampling in 2010 (unfiltered discharge versus filtered discharge) is encouraging with substantial reductions in aluminum, iron, zinc and turbidity reported by the City of Iqaluit (2010 NTWWA conference presentation). The results reported by the City in 2011 do not show significant signs of contaminant removal which suggests that the City may wish to consider chemical pretreatment in the future as part of the tube filtration process.

5. Conclusions and Recommendations

5.1 Collection and Control of Landfill Runoff

The landfill runoff management system has been designed and constructed for the collection and control of off-site runoff (clean) and on-site runoff (contaminated) water. The on-site runoff is controlled so that water drains into a series of detention ponds on site and is then transferred to one retention pond off-site for storage prior to be discharge into the environment. Prior to any discharges the City consults and notifies the regulatory authorities. Improvements to the collection system are currently being completed by the City to improve the management of the on-site runoff.

5.2 Treatment of Landfill Runoff

The City has investigated potential treatment processes which may be applied to the landfill runoff, including wetland treatment, membrane treatment and WESATech Geotube® physical-chemical treatment. Based upon the capital cost of the three options, the membrane treatment option is not financially viable for the City. The wetland treatment option may be financially viable; however negotiation is required with the current land owner. Negotiation could take a considerable amount of time and may not be successful, depending upon the stakeholders involved. The City has implemented a physical filtration process on a trial basis. The performance of filtration alone for the treatment of the landfill runoff has been inconclusive; therefore it is recommended that the City advance the use of a chemical treatment in advance of the filtration process. The WESATech Geotube® physical-chemical proposal is financially viable for the City and operationally practical for the City staff.

5.3 Effluent Quality Criteria for Treated Runoff

The City has completed an investigation into the appropriate parameters that should be tested for and a frequency of testing for the landfill runoff management system. This investigation was reviewed and supported by Environment Canada and Indian and Northern Affairs Canada. The City should continue to monitor for the parameters recommended in the 2008 Water License Monitoring Report. The Guidelines for the Discharge of Treated Municipal Wastewater in the NWT have been developed for arctic locations discharging into a marine environment, and are the most applicable standards of concentration limits to apply to the City of Iqaluit's discharge from the retention pond at the landfill. The Cape Dyer water licence has criteria that may also be used to supplement the GDTMWNWT in cases where a standard does not exist.

Appendix A

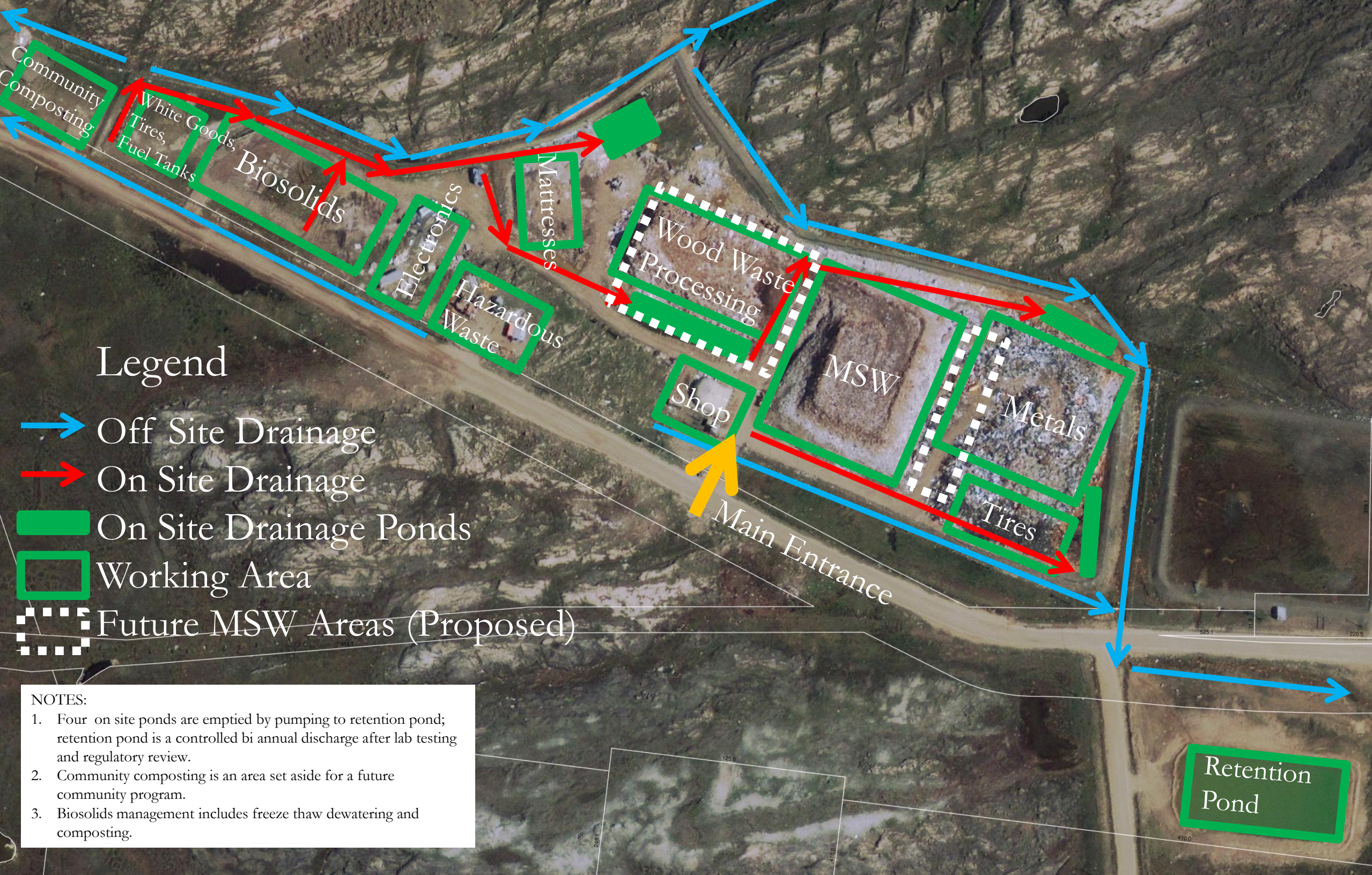
West 40 Landfill Drainage Management Review

Landfill Operating Conditions

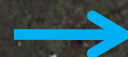
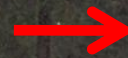
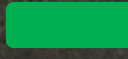
Iqaluit Landfill Operating Configuration

Prepared by Ken Johnson, MCIP, P. Eng.

2011 04 21



Legend

-  Off Site Drainage
-  On Site Drainage
-  On Site Drainage Ponds
-  Working Area
-  Future MSW Areas (Proposed)

NOTES:

1. Four on site ponds are emptied by pumping to retention pond; retention pond is a controlled bi annual discharge after lab testing and regulatory review.
2. Community composting is an area set aside for a future community program.
3. Biosolids management includes freeze thaw dewatering and composting.

Appendix B

West 40 Landfill Drainage Management Review

**Photo Presentation of Current Landfill
Drainage Management System**



On site runoff **detention** pond on northeast side of landfill site. Runoff is naturally flows from this pond to runoff **detention** pond at south west corner.

On site runoff **detention** pond at south east corner of landfill site. Runoff drains from this pond to runoff **detention** pond at south west corner.





On site runoff detention pond at south west corner of landfill site. Runoff is pumped from this pond to runoff **retention** pond.



Runoff **retention** pond , south of landfill site, receives runoff from landfill detention pond . Retention pond is sample and discharge twice each year.

Off site runoff
management
control system
on southeast
side of the
landfill site
(view to south)



Off site runoff
management
control system
on southeast
side of the
landfill site
(view to north)



Off site runoff
management
control system
on south of the
landfill site
(view to west)





Off site runoff management control system on north side of the landfill site (view to northwest)

Discharge to minor wetland of off site runoff management control system on north side of the landfill site (view to south east)





On site runoff **detention** pond on northeast side of landfill site. Runoff is pumped from this pond to runoff **detention** pond at south west corner.

On site runoff **detention** pond at south east corner of landfill site. Runoff drains from this pond to runoff **detention** pond at south west corner.





On site runoff detention pond at south west corner of landfill site. Runoff is pumped from this pond to runoff **retention** pond.



Runoff **retention** pond , south of landfill site, receives runoff from landfill detention pond . Retention pond is sample and discharge twice each year.

Appendix C

West 40 Landfill Drainage Management Review

Landfill Water Sample Testing Results

City of Iqaluit West 40 Landfill Water Historical Water Sampling Results

		2011-08-09	2011-06-21	2011-06-23	2011-06-24	2010-06-03	2010-06-10	2010-06-10	2009-07-30	2008-06-09	2007	2007	2006-06	2004-07	IQUALUIT WATER LISCENCE 2006 DISCHARGE CRITERIA		GUIDELINES FOR THE DISCHARGE OF TREATED MUNICIPAL WASTEWATER IN THE NWT (1)	
		Retention Pond #1	Retention Pond	Retention Pond #2	Retention Pond #3	Retention Pond Sample #1	Retention Pond Sample #2	Retention Pond Sample #3	INAC Results	Detention Pond	Retention Pond	Control Pond	Control Pond	Runoff Sample Results				
PARAMETER	UNITS														AVE.	GRAB		
INORGANICS																		
Alkalinity (Total as CaCO3)	mg/L									98	99	110	474					
Biochemical Oxygen Demand	mg/L	70	5	11	11	8	5	5		16	11	19	269	5.2	120	180.0	120	
Chloride (Dissolved)	mg/L									90	110	249	249	215				
Conductivity	umho/cm									824	1050	1180	2050	1667.0				
Chemical Oxygen Demand	mg/L		75	70	80	63	60	63		280	410	480	660					
Hardness (CaCO3)	mg/L									2.40	2.54	4.00		4.42				
N-NH3 (Ammonia)	mg/L	3.74	5.81	6.01	4.77	4.03	3.85	4.00		0.02	0.04	ND	<0.02	<0.2				
Nitrite (N)	mg/L									ND	ND	ND	<0.05	<0.2				
Nitrate (N)	mg/L									ND	ND	ND	<0.07					
Nitrite +Nitrate	mg/L									ND	ND	ND						
Oil and Grease	mg/L													2.00				
pH		7.99	7.65	8.01	8.01	7.74	7.84	7.96		7.9	7.20	7.10	7.52	7.41	6-9		6-9	
Sulphate (Dissolved)	mg/L									179	293	307	307.0	398.0			500	
Total Dissolved Solids	mg/L									516	610	682	1130					
Total Kjeldahl Nitrogen	mg/L	7.16	9.44	8.21	7.57	5.36	6.11	5.90					20.7					
Total Organic Carbon	mg/L	26.6	25.5	24.8	23.6	20.7	23.1	21.7		18.6	26.5	41.9						
Total Inorganic Carbon	mg/L									20	24	27						
Total Phosphorus	mg/L	0.04	0.05	0.04	0.14	0.13	0.07	0.08		0.05	0.2	0.2	0.8	0.3				
Total Suspended Solids	mg/L	9	11	14	177	54	15	14		15	20	29	868	32.0	180	270	180	
Turbidity	NTU	8.9	31.6	39.1	55.4	26.1	27.8	28.8		14.7	40	53						
METALS																		
Aluminum	mg/L	0.07	0.04	0.05	0.22	0.26	0.08	0.08		0.29	0.21	0.11	5.01	0.05			2	
Antimony	mg/L	0.0006	0.0007	0.006	<0.0005	0.0009	0.0009	0.0009	0.002	0.001	0.0016	0.0032	0.0238	0.0051				
Arsenic	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	ND	0.002	0.0030	0.018	0.002			0.05	
Barium	mg/L	0.03	0.03	0.04	0.03	0.02	0.03	0.03	0.57	0.021	0.03	0.05	0.12	0.04			1	
Beryllium	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	0	ND	ND	ND	<0.0002	<0.001				
Bismuth	mg/L									ND	ND	ND	<0.001	<0.001				
Boron	mg/L	0.97	0.99	0.82	0.69	0.43	0.59	0.60	0.31	0.30	0.39	0.48	1.06	0.71			5	
Bromide	mg/L												203	166				
Cadmium	mg/L	<0.0001	0.0006	0.0006	0.0006	0.0011	0.0011	0.0011	0.0001	0.0005	0.0019	0.0048	0.0024	0.0024			0.005	
Calcium	mg/L	147	122	128	123	112	146	144		100	150	200	203	166				
Chromium	mg/L	0.009	0.006	0.007	0.005	0.003	0.006	0.035	0.008	ND	ND	ND	0.0241	<0.005			0.1	
Cobalt	mg/L	0.0014	0.0015	0.0014	0.0018	0.0022	0.0023	0.0024	0.010	0.0032	0.0057	0.0038	0.0024	0.0055			0.1	
Copper	mg/L	0.002	0.011	0.011	0.011	0.027	0.027	0.027	0.01	0.006	0.023	0.058	0.294	0.023			0.2	
Iron	mg/L	1.52	3.28	3.68	4.98	4.05	4.03	4.08	122	2.3	4.30	7.50	12.8	8.86			0.3	
Lead	mg/L	<0.001	0.002	0.002	0.002	0.004	0.003	0.003	0.002	0.0019	0.007	0.022	0.099				0.05	
Lithium	mg/L									0.012	0.015	0.024	0.020					
Manganese	mg/L	0.68	1.48	1.61	1.34	0.61	0.78	0.81		0.84	1.10	1.00	1.02	0.90			0.05	
Magnesium	mg/L	26	18	22	22	13	19	18		11	12	11	49					
Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0001				0.1	<0.0001			0.0006	
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005		0.002	0	0	<0.002	0.006			0.2	
Nickel	mg/L	0.010	0.011	0.012	0.010	0.012	0.013	0.013	0.013	0.008	0.011	0.014	0.0226	0.016			0.3	
Potassium	mg/L	30	22	26	22	16	19	19		9.5	11	13	61.7	36.8				
Selenium	mg/L	<0.01	<0.005	<0.005	<0.005	<0.01	<0.01	<0.01	0.002	ND	ND	ND	0.0009	<0.002			0.05	
Silicon	mg/L	4.9	2.3	2.5	2.7	1.7	2.3	2.3		1.3	1.5	1.4	9.4	-				
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.001	ND	ND	0.0001	0.0006	<0.0001			0.1	
Sodium	mg/L	172	112	132	122	70	103	103		41	41	40	207	125				
Strontium	mg/L	0.914	0.813	0.920	0.761	0.499	0.841	0.853		0.600	0.770	1.100	1.010	0.86				
Thallium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0005	ND	ND	ND	<0.00001	<0.00005				
Tin	mg/L									ND	ND	ND	0.02	0.001			5	
Titanium	mg/L	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	<0.01		0.02	0.008	ND	0.382	<0.005				
Uranium	mg/L			0.004	0.006				0.005	0.0003	0.0003	0.0002	<0.001	<0.0001				
Vanadium	mg/L	0.006	0.004			0.003	0.003	0.003	0.019	0.002	0.001	ND	0.010	-				
Zinc	mg/L	0.05	1.9	1.57	1.6	2.0	1.8	1.7	0.5	2.5	6.90	15.0	0.763	15.2			0.5	
Zirconium	mg/L									ND			0.005					
MICROBIOLOGICAL																		
Background	CFU/100mL										4200	3500						
Total Coliforms	CFU/100mL		10			190	250	280			500.00	300.00						
Fecal Coliforms	CFU/100mL		<10			7	12	3			20.00	<10	<1					
VOLATILE ORGANIC COMPOUNDS																		
Benzene	ug/L		<0.5			<0.5	<0.5	<0.5										
Ethylbenzene	ug/L		<0.5			<0.5	<0.5	<0.5										
m/p-xylene	ug/L		<1.0			<1.0	<1.0	<1.0										
o-xylene	ug/L		<0.5			<0.5	<0.5	<0.5										
Toluene	ug/L		<0.5			<0.5	<0.5	<0.5										
VOC SURROGATES																		
Toluene-d8	%		102			98	95	95										
Polychlorinated Biphenyls - PCBs																		
Phenols	mg/L												4.42					
Polychlorinated Biphenyls (PCBs)	ug/L		<0.1	<0.02	<0.02	<0.1	<0.1	<0.1										

Notes:
⁽¹⁾ Guidelines for the Discharge of Treated Municipal Wastewater in the NWT, 1992 (Season: Summer, 150-600 Lcd) (Receiving Env: Marine/Bay).

City of Iqaluit Landfill Storage Retention Pond Decant Historical Water Sampling Results

		2011-06-22 Start	2011-06-23 Mid	2011-06-24 End	2010-07-27 Start	2010-07-27 End	2010-06-03 Start	2010-06-10 Mid	2010-06-10 End	2008-06-09	IQUALUIT WATER LISCENCE 2006 DISCHARGE CRITERIA		GUIDELINES FOR THE DISCHARGE OF TREATED MUNICIPAL WASTEWATER IN THE NWT (1)
PARAMETER	UNITS										AVE.	GRAB	
INORGANICS													
Alkalinity (Total as CaCO3)	mg/L												
Biochemical Oxygen Demand	mg/L	5	11	11	11	9	8	5	5	16	120	180.0	120
Chloride (Dissolved)	mg/L												
Conductivity	umho/cm												
Chemical Oxygen Demand	mg/L	75	70	80	83	75	8	5	5	16			
Hardness (CaCO3)	mg/L												
N-NH3 (Ammonia)	mg/L	5.81	6.01	4.77	3.21	3.33	4.03	3.85	4				
Nitrite (N)	mg/L												
Nitrate (N)	mg/L				<0.1	<0.1	<0.1						
Nitrite +Nitrate	mg/L												
Oil and Grease	mg/L												
pH		7.65	8.01	8.08	8.11	8.15	7.74	7.84	7.96	7.9	6-9		6-9
Sulphate (Dissolved)	mg/L												500
Total Dissolved Solids	mg/L												
Total Kjeldahl Nitrogen	mg/L	9.44	8.21	7.57	6.61	4.86	5.36	6.11	5.9				
Total Organic Carbon	mg/L	25.5	24.8	23.6	23.4	23.8	20.7	23.1	21.7	18.6			
Total Inorganic Carbon	mg/L												
Total Phosphorus	mg/L	0.05	0.04	0.14	0.05	0.05	0.13	0.07	0.08	0.05			
Total Suspended Solids	mg/L	11	14	177	14	12	54	15	15	15	180	270	180
Turbidity	NTU	31.6	39.1	55.4	6.9	6.4	26.1	27.8	28.8	14.7			
METALS													
Aluminum	mg/L	0.04	0.05	0.22	0.02	0.02	0.26	0.08	0.08				2
Antimony	mg/L	0.0007	0.0006	<0.0005	0.0008	0.0008	0.0009	0.0009	0.0009				
Arsenic	mg/L	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1				0.05
Barium	mg/L	0.03	0.04	0.03	0.03	0.03	0.02	0.03	0.03				1
Beryllium	mg/L	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001				
Bismuth	mg/L												
Boron	mg/L	0.99	0.82	0.69	0.77	0.75	0.43	0.59	0.6				5
Bromide	mg/L												
Cadmium	mg/L	0.0006	0.0006	0.0006	<0.0001	<0.0001	0.0011	0.0011	0.0011				0.005
Calcium	mg/L	122	128	123	165	164	112	146	144				
Chromium	mg/L	0.006	0.007	0.005	0.002	0.003	0.003	0.006	0.005				0.1
Cobalt	mg/L	0.0015	0.0014	0.0018	0.0015	0.0015	0.0022	0.0023	0.0024				0.1
Copper	mg/L	0.011	0.011	0.011	0.004	0.003	0.027	0.027	0.027				0.2
Iron	mg/L	3.26	3.68	4.98	0.54	0.52	4.05	4.03	4.08				0.3
Lead	mg/L	0.002	0.002	0.002	<0.001	<0.001	0.004	0.003	0.003				0.05
Lithium	mg/L												
Manganese	mg/L	1.48	1.61	1.34	0.38	0.37	0.61	0.78	0.81				0.05
Magnesium	mg/L	18	22	22	27	27	13	19	18				
Mercury	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				0.0006
Molybdenum	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005				0.2
Nickel	mg/L	0.011	0.012	0.01	0.009	0.009	0.012	0.013	0.013				0.3
Potassium	mg/L	22	26	22	29	30	16	19	19				
Selenium	mg/L	<0.005	<0.005	<0.005	<0.01	<0.01	<0.01	<0.01	<0.01				0.05
Silicon	mg/L	2.3	2.5	2.7	3.1	3	1.7	2.3	2.3				
Silver	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				0.1
Sodium	mg/L	112	132	122	161	162	70	103	103				
Strontium	mg/L	0.813	0.92	0.761	1.33	1.27	0.499	0.841	0.853				
Thallium	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001				
Tin	mg/L												5
Titanium	mg/L	<0.01	0.004	0.006	<0.01	<0.01	0.01	<0.01	<0.01				
Uranium	mg/L												
Vanadium	mg/L	0.004	0.004	0.006	<0.001	<0.001	0.003	0.003	0.003				
Zinc	mg/L	1.9	1.57	1.6	0.06	0.05	2	1.8	1.7				0.5
Zirconium	mg/L												
MICROBIOLOGICAL													
Background	CFU/100mL												
Total Coliforms	CFU/100mL	10					190	250	280				
Fecal Coliforms	CFU/100mL	<10					7	12	3				
VOLATILE ORGANIC COMPOUNDS													
Benzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5						
Ethylbenzene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5						
m/p-xylene	ug/L	<1	<1	<1	<1	<1	<1						
o-xylene	ug/L	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5						
Toluene	ug/L	<0.5	<0.5	<0.5	<0.5	0.8	<0.5						
VOC SURROGATES													
Toluene-d8	%	102			100	100	95	95	98				
Polychlorinated Biphenyls - PCBs													
Phenols	mg/L												
Polychlorinated Biphenyls (PCBs)	ug/L	<0.1	<0.002	<0.002	<0.1	<0.1	<0.1	<0.1	<0.1				

Notes:

(1) Guidelines for the Discharge of Treated Municipal Wastewater in the NWT, 1992 (Season: Summer, 150-600 Lcd) (Receiving Env: Marine/Bay).

Appendix D

West 40 Landfill Drainage Management Review

City of Iqaluit Water License Monitoring
Program



City of Iqaluit
Water Licence Monitoring Program

Nunavut Water
Board

JUN 27 2008

Public Registry

City of Iqaluit Water Licence Monitoring Program

Prepared for:

City of Iqaluit
City Hall
P.O. Box 460
Iqaluit, Nunavut, X0A 0H0

Prepared by:

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1.0 INTRODUCTION

1.1 Background

The City of Iqaluit is located at the south end of Baffin Island, on Frobisher Bay at 64° 31'N latitude and 68° 31'W longitude, in a region of continuous permafrost with a typical arctic climate. The community has only four months when the average monthly temperature is above freezing.

The city has a population of approximately 6,200 with a predicted increase in population to 11,300 in 2022. The infrastructure municipal facilities are currently operated under the Water Licence (File No: 3AM-IQA0611) issued by the Nunavut Water Board (NWB) in 2006. Based on the requirements of the Water Licence, one of the most important responsibilities of the City of Iqaluit is to monitor the quantity and quality of the "water" associated with potable water supply, sewage treatment and solid waste management to protect public health and the environment.

In 2007, the City of Iqaluit retained Earth Tech (Canada), Inc. to provide services for preparing the "water" monitoring plan. The primary purpose of the monitoring plan is to help the City of Iqaluit identify appropriate water quality parameters to be monitored and sampling locations for the collection of representative samples. This monitoring plan will be submitted to the NWB for approval before it is applied for water monitoring in the City.

1.2 Scope and Objectives

It is very important for the City of Iqaluit to comply with the Water Licence for operating and monitoring the municipal facilities (i.e. water treatment, wastewater treatment, landfill etc.) properly. The water monitoring programme, once in place, will provide the appropriate framework for the City to achieve compliance associated with the water sampling requirements in the water licence.

Overall, the primary objective of the project is to develop a cost-effective compliance monitoring plan for:

- Protection against adverse impacts on public health from physical, chemical and biological hazards;
- Environment protection; and Compliance with Water Licence regulation and guidelines.

The Monitoring plan for the City of Iqaluit has been prepared based on the following key tasks:

- Identification of current criteria for water monitoring presented in Water Licence;
- Identification of the gap between the requirements of the Water Licence and the practical needs of Iqaluit for water monitoring;
- Recommendations of appropriate water quality parameters for Iqaluit;
- Confirmation of the sampling points for the recommended monitoring; and
- Preparation of final monitoring plan based upon NWB feedback.
- Organization of the Report.

The remainder of the report has been organized in the following sections:

- **Section 2.0: Municipal Facilities and "Water" Characteristics.** The treatment process and operation strategy of the drinking water treatment plant (WTP), wastewater treatment plant (WWTP) and solid waste management facility are briefly introduced in this section. In addition, the characteristics of "water", associated with water treatment, sewage disposal and landfill management, are also summarized;
- **Section 3.0: Identification of the Water Monitoring Criteria and Locations.** This section compares the requirements of the Water Licence applied for the City of Iqaluit with some standards and guidelines published by some organizations or government branches. Also, some suggestions and comments regarding the monitoring criteria required by the Water Licence are discussed.
- **Section 4.0: Budget for Sampling.** An annual budget for monitoring (sampling and analysis) is presented based on laboratory quotations from several commercial laboratories which the City of Iqaluit could use for sample analysis.

2.0 MUNICIPAL FACILITIES AND "WATER" CHARACTERISTICS

2.1 Water Treatment Facility (WTP)

The City of Iqaluit's water treatment plant (WTP) was initially commissioned in the 1960s, with Lake Geraldine Lake used as the raw water source. Due to the limited treatment capacity, the main treatment process of the WTP was upgraded between 2002 to 2004. After the upgrade, the treatment capacity of the WTP was increased to approximately $9,500 \text{ m}^3 \text{ day}^{-1}$ based on a projected population of 11,300 in 2021.

The upgraded treatment facility consists of the following processes:

- Lake Geraldine dam structure and valve chamber;
- Raw water intake pipeline and tempering system (upgraded in 1999);
- Plant inlet flow control valve;
- Ultraviolet (UV) pre-disinfection (one duty and one standby);
- Flocculation tanks (to be used for flocculation only when coagulation is required in future);
- Dual media rapid gravity filters and filter backwash and "filter to waste" storage tanks;
- Chemical (chlorine gas, zinc orthophosphate, hydrofluorosilicic acid and caustic soda) dosing systems; and
- Treated water clearwells (west clearwell and east clearwell).

Normally, raw water is drawn from the dam on the Geraldine Lake and flows to the WTP through a 250 mm main by gravity. Upon entering the WTP, the raw water is metered and controlled by a flow control valve. The raw water then flows through either of the UV reactors to inactivate pathogens. Downstream of the UV equipment the water flows through a set of flocculation tanks (these tanks will only be required to operate as flocculation tanks in the event that future coagulation is required to meet the final water quality targets), or through a flocculation tank bypass line on to the filters. From the filters the filtered water flows into the contact chamber where chlorine gas (for residual disinfection) is injected to the water along with hydrofluorosilicic acid (for fluoridation) and caustic soda (for pH adjustment). The treated flow from the contact chamber can then be diverted to either of the clearwells or into the filter backwash chamber. Zinc orthophosphate (for pipeline corrosion protection) is added before the treated water is delivered to the distribution system or an off-site reservoir. The "filter to waste" storage tank is used for accepting the filter ripening flow, of which the quality is usually above the regulatory requirements, generated by filters after backwash cycles.

This drinking water treatment process is automatically controlled by a Plant Control System (PCS) and requires minimal intervention unless there is an alarm indicated. Monitoring, fine-tuning and scheduled maintenance of the WTP operating systems provide reliability and dependability with reduced system malfunctions and breakdowns.

2.2 Wastewater Treatment Facility (WWTP)

The City of Iqaluit has historically used a primary sewage lagoon for its wastewater treatment. To improve the wastewater treatment efficiency and achieve effluent quality requirements, the City initiated construction of a new WWTP. In 1998, the city awarded a design-build contract for a new WWTP.

The design-build contractor proposed the use of an aerated membrane bioreactor (MBR) process for the wastewater treatment. In this proposed treatment process, the wastewater, after flowing through the preliminary treatment screens, is treated by a MBR system, in which most organic contaminants are degraded by microorganisms, and the treated wastewater and biomass are separated by membranes. Then, the filtrate from the membranes may be discharged to the surface water, and waste sludge generated in the treatment process may be dewatered and transferred to the landfill site for disposal.

However, due to design and construction problems, the MBR wastewater treatment process was never commissioned. In 2002, Earth Tech (Canada), Inc. conducted a detailed investigation of the WWTP, and recommended that the City reconfigure the facility to use a conventional biological wastewater treatment process to replace the MBR process. Following that, CH2M Hill developed a workable conceptual design in 2003 and Earth Tech carried out the conversion and expansion work from 2004 to 2006.

The major treatment facilities of the conventional biological treatment process (phase 1 and phase 2) consist of:

- Wastewater lift station;
- Preliminary treatment headworks (screening and grit removal);
- Primary filter (Salness filter);
- Activated-sludge aeration tanks and aeration systems (phase 2);
- Secondary clarifiers (phase 2);
- Waste sludge dewatering system (phase 2); and
- Others (chemical storage, pH adjustment, disinfection equipment).

The construction and commissioning of the new conventional biological WWTP is being carried out two phases. Phase 1 of the WWTP, the preliminary treatment process, was commissioned in May 2006, and phase 2, the biological treatment process, is scheduled for implementation within the next 5 to 10 years. The major facility equipment in phase 1 was designed for a peak flow of $14,400 \text{ m}^3 \text{ day}^{-1}$ with a service population of 12,000; the remaining equipment in phase 1 were designed for a peak flow of $9,600 \text{ m}^3 \text{ day}^{-1}$ with a service population of 8,000.

Currently, the raw wastewater enters the plant through an existing 300 mm gravity sewer main into the influent pumping chamber, where a basket screen catches any solids that have a diameter greater than 75 mm. The raw wastewater is then pumped and metered up to the coarse screens by which the particles larger than 5 mm are removed. The wastewater from the coarse screens is further screened to 300 micron particle size by fine screens and then flows by gravity into the retention channel. This primary effluent flows through the retention channel, under an underflow weir (to contain any floatable flammables), then over an overflow weir and finally out through the outfall to the Koojesse Inlet.

The sludge from the screens and the primary filter is compacted and dewatered to a solids content of approximately 20%, and dropped into a the dump trailer which is periodically emptied at the landfill site. The sludge is dewatered further by freeze-thaw over the course of one winter, and composted at the landfill site.

2.3 Landfill Facility

The City of Iqaluit produces approximately 10,000 m³ of compacted waste which enters the landfill annually, including residential, commercial and industrial wastes. Recycling is currently limited to the collection and diversion of aluminium cans. The current landfill facility was constructed on the south end of the West 40 Dump Site #3 in 1995 and expanded to the north in 2001. Further construction work in manage the site drainage was completed in 2006.

The waste disposal techniques at the landfill include compaction and covering with wood waste fill. The area method is used for the landfill operation, and includes placing waste above grade against a perimeter berm, compacting the waste using a wheeled loader and covering the waste using a wood waste material. The mulch, developed from wood construction waste, is a 250 to 300 mm layer that is placed over the waste and prevents wind blown material.

The landfill does not have an impermeable liner system to control the subsurface runoff; it relies on the local permafrost regime to provide a low permeability barrier to control the subsurface runoff. To control the surface discharge of runoff from the landfill site to the receiving environment, a surface water control system for both on-site and off-site drainage was completed in 2006.

The landfill surface runoff management system consists of a series of continuous ditches associated primarily with the perimeter berm structure of the landfill facility. The system is used to divert the "off-site" surface runoff and "on-site" surface runoff, essentially keeping the clean "off-site" water "clean" and keeping the potentially contaminated "on-site" surface runoff from leaving the landfill site. The "on-site" surface runoff is collected in several control ponds through the ditches and then pumped to a retention pond. The retention pond is discharged annually after testing and notification to the regulatory authorities.

3.0 IDENTIFICATION OF THE WATER MONITORING CRITERIA

3.1 Drinking Water Monitoring Criteria

3.1.1 Raw Water

Table 3.1 presents the water quality parameters and testing frequency that are required by the Water Licence (File No: 3AM-IQA0611) and recommended by Earth Tech for the raw water supply from Lake Geraldine Reservoir at the City of Iqaluit's WTP prior to treatment.

Table 3.1 Raw Water Monitoring Criteria and Frequency

Parameters Required by Water Licence	Required Frequency by Water Licence	Earth Tech's Recommendation
Routine Parameters		
Acidity	Monthly	Not recommended
Alkalinity	Monthly	Monthly
Bicarbonate	Monthly	Quarterly
Carbonate	Monthly	Quarterly
Chloride	Monthly	Quarterly
Conductivity	Monthly	Monthly
Hardness	Monthly	Quarterly
Hydroxide	Monthly	Quarterly
ORP	Monthly	Not recommended
pH	Monthly	Weekly
Sulphate	Monthly	Quarterly
TDS	Monthly	Monthly
TSS	Monthly	Monthly
TOC	Monthly	Monthly
TIC	Monthly	Not recommend
Temperature	Monthly	Weekly
Turbidity	Monthly	Weekly
Potable Water Parameters		
Fecal coliforms	Monthly	Quarterly
Total ICP metals	Monthly	Quarterly
Dissolved ICP metals	Monthly	Quarterly
Additional Parameters		
UV transmittance	N/A	Monthly
Color	N/A	Quarterly
Total coliforms	N/A	Quarterly
Giardia Lamblia	N/A	Quarterly
Cryptosporidium	N/A	Quarterly

As presented in **Table 3.1**, the Water Licence requires the City to monitor all of these listed parameters monthly. However, from the point view of operation of a WTP, some of these parameters may need to be monitored more frequently and some less frequently. Based on the importance of these parameters specific to the City of Iqaluit's WTP, different monitoring frequencies ranging from daily to annually are recommended as listed in **Table 3.1**. The reasoning behind these recommendations is discussed in the following paragraphs.

Parameters not recommended: Acidity, ORP and TIC.

The acidity of raw water can be directly or indirectly reflected by pH and alkalinity, which are recommended for routine monitoring. ORP monitoring is usually needed for water containing a relatively high concentration of a redox-active species, which may have some adverse effects on pipelines. The water quality of Lake Geraldine is good and there are no such redox-active species observed currently. Since many important parameters related to inorganic components, such as metals, chloride, carbonate, etc., are recommended for routine monitoring, TIC, as an overall index of the inorganic matters present in water, is not necessary. Acidity, ORP and TIC are not recommended during the normal operation of the WTP, although these parameters are to be monitored if some unusual condition arises.

Weekly monitored parameters: pH, Temperature and Turbidity.

These three parameters have significant effects on the performance of the existing water treatment process at the WTP. For example, raw water pH and temperature have great impacts on the chlorine concentration and contact time for the disinfection of treated water. Turbidity is very important for the operation of coagulation, flocculation and filtration. In addition, UV disinfection is also affected significantly by turbidity. The higher the turbidity of water in a UV reactor, the more UV light is attenuated. This means that higher UV doses will be required to achieve reliable disinfection levels when the turbidity is high. Under the current operating conditions, it is recommended to monitor these parameters weekly; if and when the coagulation and flocculation process is applied, it would be better to measure these parameters on a daily basis.

Monthly monitored parameters: Alkalinity, Conductivity, TDS, TSS, TOC and Fecal coliform.

The alkalinity of a water is its ability to neutralize an acid and is due to its CO_3^{2-} , HCO_3^- and OH^- content. This is an index of the buffering capacity of water and if it is too low, the pH value could be changed significantly during the treatment. TDS and conductivity are used directly or indirectly to estimate the dissolved solids concentration in water. Both of them have certain correlations with the parameter of hardness. Water with high TDS usually tastes bitter, salty or metallic and sometimes, it may have some unpleasant odours. TSS is used to indicate the suspended solids present in water and it can usually affect the performance of some treatment processes, such as UV disinfection, coagulation, flocculation and filtration. TOC, indicating the concentration of organics present in water, is another important parameter for the WTP operator to monitor. In addition, TOC can also be used to estimate the generation of some organic disinfection by-products (DBPs), such as THMs and HAAs. Due to the importance of these parameters to the operation of the WTP, it is recommended to monitor them monthly in the first one or two years after the monitoring program is applied and then, to optimize the monitoring costs, these parameters could be monitored quarterly if the raw water quality, confirmed by the results obtained in the first one or two years, is good enough for the operation of the WTP. The reason that these parameters are recommended to be monitored at least quarterly is that the water quality of Lake Geraldine could have a variation due to the transition between different seasons, such as the runoff in spring. Some of these parameters may need to be monitored more frequently if some unusual condition of the WTP requires doing so.

Quarterly monitored parameters: Hardness, Bicarbonate, Carbonate, Chloride, Hydroxide, Sulphate, Total ICP Metals, Dissolved ICP metals and Fecal Coliforms.

Compared with the parameters discussed above, the focus of this group of parameters is more on the suitability of raw water to be used as a source for the WTP rather than the effects of raw water on the operation of the WTP treatment process. Since the water of Lake Geraldine is characterized to be good for drinking water treatment by the WTP, it is recommended to monitor these parameters (except Fecal Coliforms) quarterly in the first one or two years after the monitoring program is applied. If these parameters are in acceptable ranges and there is no significant contaminant source affecting the water quality of Lake Geraldine, these parameters could be monitored annually. If these parameters are monitored annually, it is recommended to monitor them alternatively in warm seasons and cold seasons. For the fecal coliforms, it is quite important for the public health and safety and it is recommended to monitor this parameter quarterly for the first two years after the monitoring program is applied; the monitoring frequency can then be reduced if the observed results are stable and no significant contamination source is around the drinking water source.

Additional parameters: UVT, Color, Total Coliforms, *Giardia Lambli*a, and *Cryptosporidium*.

Since a UV reactor is used for pre-disinfection at this WTP, the UV transmittance (UVT) of raw water becomes very important for the performance of the UV reactor. The lower the UVT of the raw water, the less effective UV light can get to the target pathogens and therefore, the more pathogens could pass through the UV reactor. To ensure the UV reactor is working under design conditions, it is recommended to monitor the raw water UVT at least monthly. Color is another important parameter for the monitoring of raw water quality and it is usually regulated as an aesthetic parameter by many regulatory authorities. The current treatment process of the WTP has minor capability for the removal of color. Therefore, the raw water color monitoring is recommended at least quarterly in the first one or two years after monitoring program is applied. In warm seasons, the raw water color may need to be monitored more frequently if it has been observed to experience a significant variation during this time. However, if the color is always observed far below the regulatory requirement, it may be monitored annually in the following years for economic purposes. Total coliforms, *Giardia Lambli*a and *Cryptosporidium* are three important biological parameters for any water treatment plant to monitor, to protect the public from biohazards. It is recommended to monitor these three biological parameters quarterly for the first two years after the water monitoring program is applied and then, if these biological parameters are within acceptable ranges, the monitoring frequency may be reduced to annually.

3.1.2 Treated Water

There are no specific requirements for the quality of treated water in the Water Licence. However, it is more important for the protection of public health to monitor the quality of treated water than it is to monitor the quality of raw water. Therefore, some important parameters are recommended hereinafter for the monitoring of treated water quality. The *Guidelines for Canadian Drinking Water Quality* (March 2007) published by Health Canada on behalf of the Federal-Provincial-Territorial Committee on Drinking Water was used as a reference in the following discussion.

Generally speaking, the parameters required for monitoring the quality of treated water can be categorized as microbiological, physical, chemical (inorganic, organic, disinfectant and disinfectant by-products (DBP)) and radiological parameters. Since most drinking water sources have very low radioactive contaminants, the radiological parameters in most WTPs are not monitored in routine operation. Lake Geraldine is recognized as a good drinking water source and no radioactive contamination has been observed. Therefore, to reduce the operation cost, the City of Iqaluit does not need to monitor the radioactive parameters routinely unless such kind of contamination is suspected in Lake Geraldine. The inorganic and organic chemical parameters of treated water to be monitored primarily depend on the raw water quality. The parameters of disinfectant and DBPs are monitored based on the species of disinfectant applied at the WTP and organics present in the raw water. Physical and microbiological parameters are usually monitored in most WTPs to protect the public from aesthetic and pathogenic problems. **Table 3.2** summarizes the microbiological and physical parameters and the guideline limitations required by Health Canada.

Table 3.2 Treated Water (in WTP) Monitoring Parameters and Frequency

	Limitations Required by Health Canada	Recommended Monitoring Frequency
Microbiological Parameters		
Fecal coliforms	0 CFU/100mL	Quarterly
Total coliforms	0 CFU/100mL	Quarterly
Heterotrophic plate count	No numerical guideline ¹	Twice per year
<i>Giardia Lamblia</i>	No numerical guideline ²	Dependent on the raw water
<i>Cryptosporidium</i>	No numerical guideline ²	Dependent on the raw water
Enteric viruses	No numerical guideline ³	Dependent on the raw water
Turbidity	0.3/1.0/0.1 NTU ⁴	Weekly
Physical Parameters⁵		
Color	≤ 15 TCU	Quarterly
pH	6.5 – 8.5	Weekly
Temperature	≤ 15 °C	Weekly
Total dissolved solids	≤ 500 mg/L	Monthly
Taste and Odor	Inoffensive	Not recommended
Chemical Parameters		
Free and/or total chlorine		Weekly
THM formation potential	0.08 mg/L ⁶	Annually
HAA formation potential	0.06 mg/L ⁶	Annually

- Note:
1. No MAC is specified for HPC bacteria currently; but increases in HPC concentration above baseline levels are considered undesirable;
 2. If the presence of these protozoa is observed or suspected in drinking water sources, the WTP should achieve at least a 3-log reduction in and/or inactivation of cysts and oocysts, unless source water quality requires a greater log reduction and/or inactivation;
 3. Where treatment is required, the WTP should achieve at least a 4-log reduction and/or inactivation of viruses;
 4. Requirements listed in the table are based on conventional treatment/slow sand or diatomaceous earth filtration/membrane filtration;
 5. All limits of physical parameters listed in Table 3.2 are aesthetic objectives or operational guidance values; and
 6. Maximum contaminant levels required by USEPA.

3.1.3 Microbiological Parameters

As shown in **Table 3.2**, Health Canada has set relatively stringent requirements on treated water for microbiological parameters. For the treated water produced by the City of Iqaluit's WTP, the parameters of *E. coli*, total coliforms and turbidity should be monitored on a routine schedule. To reduce the operation cost, turbidity of treated water is recommended to be monitored at least weekly (daily measurement is preferred); *E. coli* and total coliforms should be monitored no less frequently than those done in raw water of the WTP (quarterly for the first two years and then annually if possible). Generally speaking, Heterotrophic Plate Count (HPC) does not have health effects; it is an index to reflect the variety of bacteria present in water. The lower the HPC, the better maintained the water system is. Therefore, to monitor the maintenance condition of the water system it would be better to determine the HPC level in treated water twice per year. The threat from *Giardia Lamblia* and *Cryptosporidium* against public health and safety has attracted great attention in North America since several fatal illnesses caused by drinking water contaminated by these protozoa were reported in recent years. Although there are currently no specific MACs required for these protozoa, Health Canada has set strict reduction and/or inactivation requirements for the water treatment process if possible contamination by these protozoa is suspected or known in the drinking water source. According to the *City of Iqaluit Water Treatment Plant Design Report* dated September 2001, the current treatment process at the City's WTP should be able to achieve at least a 3-log removal of *Giardia* and *Cryptosporidium*, which is a minimum requirement for a WTP without source water assessment for these parasites. Therefore, at the moment, it is important for the City's WTP to monitor the *Giardia* and *Cryptosporidium* levels in the raw water; the treatment redundancy for *Giardia* and *Cryptosporidium* can then be determined based on the obtained raw water data. If the City of Iqaluit has watershed protection plan in place it may not be necessary to monitor these protozoa levels in treated water routinely. For enteric viruses, as long as the water treatment facilities, especially filtration and chlorination, are operated properly, it should be able to achieve at least a 4-log removal at this WTP. Therefore, it is more important to monitor the parameters (chlorine residual, contact time, turbidity etc.) which can indicate the operational status of treatment facilities, than to determine the level of enteric viruses present in treated water. Due to this reason, it is not considered necessary to monitor the enteric viruses routinely in treated water.

3.1.4 Physical Parameters

Regarding the physical parameters listed in **Table 3.2**, they do not cause health risks but aesthetic problems for human consumption in most cases. Very similar aesthetic objectives or operational guidance values are regulated by both Health Canada and USEPA. Of these parameters, Odour and Taste are two very subjective parameters and are easy to be detected. So, it is not necessary to collect some specific water samples for odour and taste analysis in normal conditions. However, operators may need to check for these two aesthetic parameters in routine operation, especially in algal blooming period. Temperature and pH are two basic parameters for treated water; they may affect the chlorine disinfection process and cause pipeline corrosion and some aesthetic problems. It is recommended to determine these parameters at least weekly. For TDS and Color in treated water, they should be monitored as frequently as TDS and Color in raw water.

3.1.5 Chemical Parameters

Chemical parameters monitored in treated water can be categorized as inorganic, organic, disinfectant and disinfection by-product (DBP). As described previously, the City of Iqaluit's WTP currently uses UV irradiation for pre-disinfection, and chlorine gas for secondary disinfection and disinfection residual kept in potable water distribution systems. Many academic researchers have indicated that no significant DBPs could be generated by UV disinfection. For chlorination, some harmful DBPs, such as trihalomethanes (THMs) and haloacetic acids (HAAs), can be produced. The following parameters regarding the disinfectant and DBP in treated water are recommended to be monitored:

- Free chlorine concentration or total chlorine concentration in treated water before entering potable water distribution systems at least weekly (daily is preferred);
- THMs formation potential (FP) at least annually; it is recommended to analyze the THMs FP alternatively in warm seasons and cold seasons if it is monitored annually;
- HAAs formation potential (FP) at least annually; it is recommended to analyze the HAAs FP alternatively in warm seasons and cold seasons if it is monitored annually; and
- UV reactors should be checked routinely according to both the operation manual, and the requirements to make sure that reactors are working properly and appropriate UV doses can be delivered to the water.
- Inorganic chemical parameters include metals and anions. All of these parameters are quite important for the public safety and health and Health Canada has strict requirements on these parameters. Since there has been no systematic analysis conducted before for these parameters in treated water at the WTP, it is recommended to:
 - Conduct a full metal scan¹ (for total concentrations) quarterly in the first two years of the Water Licence applied; the analysis frequency then can be reduced to annually (alternatively in warm seasons and cold seasons) if the metals are within the regulatory required ranges and the determined metal concentrations do not have significant variations; and
 - Conduct a anion scan² quarterly in the first two years of the Water Licence applied; the analysis frequency then can be reduced to annually (alternatively in warm seasons and cold seasons) if the anions are within the regulatory required ranges and the determined anion concentrations do not have significant variations.

Generally speaking, the purpose of monitoring the dissolved metals (such as Aluminium, Iron, Calcium, and Manganese) in drinking water is to study the effects of these dissolved ions on the performance of some specific treatment units (such as membrane filtration, softening and coagulation). Therefore, monitoring these dissolved metals does not have significant meaning for the current treatment process at the WTP. If the total concentrations of metals can achieve the regulatory requirements, it may not be necessary to routinely monitor the dissolved metals.

¹ Including Aluminium, Arsenic, Antimony, Barium, Boron, Calcium, Cadmium, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Nickel, Potassium, Silver, Sodium, Zinc, etc.

² Including Chloride, Cyanides, Fluoride, Nitrates, Nitrites, Phosphates, Sulphates, etc.

3.1.6 Potable Water in Distribution Systems

The Water Licence does not mention the requirements for the monitoring of potable water in potable water distribution systems. Due to the possibility that treated water supplied by the WTP could be contaminated in potable water distribution systems, it is also important to monitor the quality of potable water in distribution systems. The following parameters are suggested to be monitored:

- Temperature and pH. These two basic water quality parameters are usually related to many important reactions of water chemistry. It is recommended to monitor them at least weekly;
- Free chlorine residual and/or total chlorine residual concentration. This is an important parameter indicating the residual disinfection ability of the potable water in distribution systems. It is recommended to monitor this parameter at least weekly;
- THM and HAA concentrations. Sometimes, due to the presence of some organics (TOC) in treated water, significant amounts of THMs and/or HAAs could be generated in distribution systems after a long contact time of the organics with chlorine. It is recommended to monitor the THM and HAA concentrations at least annually;
- Turbidity. It is used to monitor the possibility of potable water in distribution systems contaminated by surface runoff and it is suggested to monitor the potable water turbidity at least weekly; and
- Fecal coliform, total coliform and HPC. These parameters are used to monitor the potable water in distribution systems contaminated by human and animal fecal wastes. Quarterly determination of these parameters is recommended to protect the public from these microbiological threats.

Table 3.3 summarizes the parameters which are recommended to be monitored in potable water distribution systems of the City.

Table 3.3 Treated Water (In Distribution Systems) Monitoring Parameters and Frequency

Recommended Parameters	Recommended Monitoring Frequency
Temperature	Weekly
pH	Weekly
Free and/or total chlorine residual	Weekly
THMs concentration	Annually
HAAs concentration	Annually
Turbidity	Weekly
Fecal coliforms	Quarterly
Total coliforms	Quarterly
HPC	Quarterly

3.2 Wastewater Monitoring Criteria

3.2.1 Influent to the WWTP

Only a primary treatment process is operated at the City of Iqaluit's WWTP currently and domestic sewage is the major wastewater treated at the WWTP. In order to achieve the discharge requirements required by NWB, a secondary biological treatment process may be added to the WWTP in the future. To protect the wastewater treatment process from damage, especially microorganisms in secondary treatment process, and to ensure that contaminants contained in wastewater influent are under the design loading rate of treatment facilities, some important influent parameters are usually monitored in the routine operation of most WWTPs. **Table 3.4** lists the parameters required by the Water Licence and recommended by Earth Tech to be monitored in the influent of the City's WWTP.

Table 3.4 WWTP Influent Monitoring Parameters and Frequency

	Required By Water Licence	Earth Tech's Recommendation
Biological Parameters		
Biochemical oxygen demand	Annually	Quarterly
Total coliforms	Annually	Quarterly
Fecal coliforms	Annually	Quarterly
Nutrient Parameters		
Ammonia nitrogen	Annually	Quarterly
Nitrate nitrogen	Annually	Not recommended
Nitrite nitrogen	Annually	Not recommended
Total phosphorus	Annually	Quarterly
Orthophosphate	Annually	Not recommended
Other Parameters		
Total suspended solids	Annually	Quarterly
Temperature	Annually	Biweekly
Conductivity	Annually	Not recommended
pH	Annually	Biweekly
ICP Parameters		
A full metals scan (total conc.)	Annually	Not recommended
Site Specific Parameters		
Chlorinated paraffins	Annually	Not recommended
LC50 Bioassay	Annually	Not recommended
New Added Parameters		
COD	N/A	Annually
TKN	N/A	Annually

As shown in **Table 3.4**, the Water Licence requires the WWTP to monitor these listed parameters in its influent annually. Based on the current operating condition and future development of the WWTP, the following recommendations, as presented in **Table 3.4**, are suggested for the WWTP:

Parameters not recommended: Nitrate nitrogen, Nitrite nitrogen, Orthophosphate, Conductivity, ICP metals, Chlorinated paraffins and LC50 bioassay.

The concentrations of $\text{NO}_3\text{-N}$, $\text{NO}_2\text{-N}$ and orthophosphate in wastewater are usually used to monitor the nitrification, denitrification and phosphorus removal processes in a microbiological treatment process for nutrient removal. As described previously, it is just a primary treatment process operated at the City's WWTP, and there are no significant microbiological activities expected to occur during this phase. So, currently to monitor these three parameters in wastewater influent has no meaning. However, after the WWTP is upgraded to a secondary treatment process with biological nutrient removal sectors, these parameters may need to be monitored routinely based on some samples collected in relevant microbiological cells. Conductivity in influent usually is not a concern for wastewater treatment and it can be ignored in normal conditions. Metals, especially some heavy metals, have significant adverse effects on microorganisms in secondary biological treatment process. To keep microorganisms healthy and ensure the WWTP is running properly, Environment Canada has regulated the contaminant limits of industrial waste (including various metals) discharged to municipal sewers. In addition, the Department of Sustainable Development, Environmental Protection Service, Nunavut, also published detailed requirements on the industrial wastewater discharged to local sewage systems. However, for the current primary treatment process, it is not essential to routinely monitor the concentrations of various metals in the influent of the WWTP. Similarly, chlorinated paraffins and LC50 bioassay, though they may need to be monitored in the effluent of the WWTP to protect the receiving water from toxic contaminations, do not affect the current treatment process significantly and presently are not recommended for routine monitoring in the influent of the WWTP.

Quarterly monitored parameters: Total coliform, Fecal coliform, BOD₅, Ammonia nitrogen, Total phosphorus and TSS.

No regulations specifically limit the numbers of total coliforms or fecal coliforms present in the influent of a WWTP; however, in order to have a basic understanding of the influent quality and performance of the wastewater treatment facilities, it is recommended to monitor these two parameters in the influent routinely at the City's WWTP. Since the numbers of total coliforms and fecal coliforms in wastewater could vary significantly in different seasons, the City of Iqaluit should monitor these parameters quarterly instead of annually. BOD₅, ammonia nitrogen and total phosphorus are some important parameters indicating the organic and nutrient concentrations contained in wastewater; however, they do not have significance for the current primary physical treatment process of the WWTP. In consideration of the future upgrade of the WWTP, it would be better to routinely collect the influent BOD₅, $\text{NH}_3\text{-N}$ and TP data from now on for the design and operation of future secondary biological treatment process. TSS is another important parameter for the influent quality of WWTP, and it may significantly affect the performance of both primary and secondary treatment processes. Therefore, it is recommended to be monitored quarterly.

Biweekly monitored parameters: Temperature and pH.

These two basic water quality parameters are easy to measure and important to the operation of a WWTP. For example, both temperature and pH can affect the microorganism behaviours in a biological treatment process; also, the wastewater temperature and pH can be significantly related to the corrosion of plumbing fixtures of the primary treatment process. Therefore, it is recommended to monitor these parameters on a biweekly basis.

Other recommended parameters: COD and TKN.

Chemical oxygen demand (COD) is used to measure the oxygen equivalent of the organic material in wastewater that can be oxidized chemically using dichromate in an acid solution. Total Kjeldahl nitrogen (TKN) is the total of the organic and ammonia nitrogen in wastewater. Both COD and TKN in the influent wastewater do not have significant meanings for the current primary treatment process. However, the concentration of COD, combined with the influent BOD₅, is usually used to evaluate the possibility of wastewater treatment by biological means. TKN, combined with NH₃-N, usually can be used for the estimation of organic nitrogen loading in wastewater, which is important to biological nutrient removal process. Therefore, it is recommended to monitor these two parameters in the influent wastewater annually for the design and operation of future biological treatment process applied at the WWTP.

3.2.2 Effluent from the WWTP

As indicated by Nunavut Water Board Reasons for Decision including Record of Proceedings dated May 2006, Sewage Treatment Plant Investigation dated December 2002 and City of Iqaluit Wastewater Treatment Plant Completion Study dated October 2003, the effluent of the City's WWTP, with the current primary treatment facilities, is hard-pressed to achieve the limits of discharge quality required by NWB. Also, there is a concern that the WWTP effluent which is being discharged to receiving water may not comply with the Fisheries Act. Based on the requirements of the Water License issued by NWB and the current operating condition of the WWTP, the monitoring parameters and frequency of sampling for the WWTP effluent are recommended and summarized in Table 3.5. The reasons for recommendations of these parameters are discussed after the Table.

Table 3.5 WWTP Effluent Monitoring Parameters and Frequency

	Required Frequency by Water Licence	Earth Tech's Recommendation
Biological Parameters		
Biochemical oxygen demand	Bi-monthly	Quarterly
Total coliform	Bi-monthly	Quarterly
Fecal coliform	Bi-monthly	Quarterly
Nutrient Parameters		
Ammonia nitrogen	Bi-monthly	Quarterly
TKN	N/A	Quarterly
Nitrate nitrogen	Bi-monthly	Not recommended
Nitrite nitrogen	Bi-monthly	Not recommended
Total phosphorus	Bi-monthly	Quarterly
Orthophosphate	Bi-monthly	Not recommended
Other Parameters		
Total suspended solids	Bi-monthly	Quarterly
Temperature	Bi-monthly	Quarterly
Conductivity	Bi-monthly	Not recommended
pH	Bi-monthly	Quarterly
ICP Parameters		
A full metals scan (total conc.)	Quarterly	Annually
Site Specific Parameters		
Chlorinated paraffins	Annually	Annually
LC50 Bioassay	Annually	Annually

Quarterly monitored parameters: BOD₅, Total coliforms, Fecal coliforms, Ammonia nitrogen, Total phosphorus, Total suspended solids, Temperature and pH.

The effluent BOD₅ and total suspended solids are two important parameters which are usually required by regulatory authorities to meet certain discharge qualities. Currently, a primary mechanical treatment process is operated at the wastewater treatment facility. Normally, a primary treatment process has a certain capacity to physically remove the influent BOD₅ and TSS and the treatment efficiency is usually very stable under certain operating conditions. So, these two parameters are recommended for monitoring at a quarterly basis. In addition, the existing treatment process is expected to have a minor capacity for the removal of ammonia nitrogen, total phosphorus, fecal coliforms and total coliforms; however, it is necessary to routinely determine these parameters as they provide information on nutrients and pathogens discharged from the WWTP to receiving water bodies. As these parameters in influent have been recommended to be monitored routinely, it is recommended to monitor them in effluent less frequently (quarterly) than bi-monthly required by the Water License.

Temperature and pH are two easily measured and commonly monitored parameters at most wastewater treatment facilities. A WWTP effluent with unacceptable temperature and pH values usually causes adverse effects on the plants and animals in receiving water bodies. To ensure the effluent temperature and pH are in normal ranges, the City should monitor these two parameters quarterly.

Annually monitored parameters: Full metal scan, Chlorinated paraffins and LC50 bioassay.

Some metals, especially heavy metals, may have significant adverse impacts on microorganisms and aquatic organisms. The chlorinated paraffins are classified as toxic to aquatic organisms and have been recognized as a possible carcinogen to humans. An LC50 bioassay is usually used to reflect the toxicity of wastewater to aquatic organisms. As these parameters were not monitored during previous operation of the WWTP, it is absolutely necessary to monitor these parameters to ensure the effluent quality can achieve the requirements of *Fisheries Act*. However, the primary wastewater treated at the WWTP is domestic sewage and under normal conditions, there is low probability that domestic wastewater will contain such high levels of toxic contaminants. Therefore, in this report, these parameters are recommended for monitoring on an annual basis. If there are no significant such toxic contaminants detected in the effluent, the monitoring frequency can be reduced based on a reasonable basis.

Not recommended parameters: Nitrite nitrogen, Nitrate nitrogen, Orthophosphate and Conductivity.

Although these parameters, such as NO₂-N, NO₃-N and PO₄-P, are very important for a biological nutrient removal treatment process, they do not have significant meanings for the currently operated mechanical treatment process at the WWTP. The parameter of conductivity is not a very important parameter for the effluent quality of a WWTP and it is not routinely monitored at most WWTPs. In addition, as a full metal scan of the wastewater effluent is recommended to be conducted on an annual basis, this report does not recommend routine monitoring of the effluent conductivity.

3.3 Landfill Monitoring Criteria

The current Water License only includes some general requirements for the landfill runoff and it does not address specific monitoring parameters and frequency. According to *Nunavut Water Board: Reasons for Decision Including Record of Proceedings* dated May 2006, there was a concern regarding environmental contamination by runoff from the landfill facility. This file documented that the City would propose a weekly sampling frequency for pH, Electrical conductivity, metals, BTEX, and Fractional hydrocarbon analysis and a monthly sampling frequency for phenols, PAHs and PCBs; when the drainage improvements are complete, the sampling frequency would be reduced to monthly for pH, Electrical conductivity, metals, BTEX, and Fractional hydrocarbon analysis and annually for phenols, PAHs and PCBs.

From 2004 to 2007, some samples were collected from the runoff of the landfill site and parameters such as BOD₅, TOC, nutrients, solids, anions, and metals were analyzed. Based on the comparison of these sampling reports, it can be concluded that:

Some parameters (BOD₅, TSS, and some metals) of the landfill runoff in detention pond significantly exceed the MWWWE guidelines, and the direct discharge into environment from the detention pond may need to be controlled; and

The quality of runoff in retention pond is significantly better than that in detention pond; most of the parameters in retention pond are within the MWWWE guidelines except for total iron, manganese and zinc concentrations which slightly exceed the guidelines.

Based on the historical sampling results and NWB's requirements, the monitoring parameters and frequency for the landfill runoff are recommended as shown in **Table 3.6**. The reasons for the monitoring recommendations are discussed in following paragraphs.

3.3.1 Monitoring Parameters In Detention Ponds

According to *Iqaluit Landfill Improvements* dated August 2006, detention ponds of the landfill facility are primarily used to collect the landfill "on-site" runoff and protect the "off-site" runoff from contamination. With a short retention time in detention ponds, the collected "on-site" runoff streams are directed to the retention pond where the wastewater is cleaned by holding for a long retention time. From this point of view, the "on-site" runoff collected in detention ponds is similar to the raw wastewater of a WWTP. Since the waste streams are treated primarily in the retention pond, some basic parameters are recommended for annual monitoring of the "on-site" runoff collected in detention ponds.

3.3.2 Monitoring Parameters In Retention Pond

The wastewater held in the retention pond has been annually discharged to the environment. It is important to ensure the discharge quality of the wastewater is within the regulatory requirements. Therefore, more detailed water quality parameters in the retention pond are recommended for routine monitoring. As BTEX and PCBs are concerns in the leachate of the landfill facility, it is also necessary to routinely monitor these two parameters. It is recommended to monitor these parameters before the discharge of each year. If the wastewater in the retention pond is discharged more than once per year, it is also necessary to monitor these parameters before each discharge.

Table 3.6 Landfill Runoff Monitoring Parameters and Frequency

Earth Tech's Recommendation	
Detention Ponds	
pH	Annually
Turbidity	Annually
Total suspended solids	Annually
BOD ₅	Annually
COD	Annually
TOC	Annually
Retention Pond	
pH	Annually
Turbidity	Annually
Total suspended solids	Annually
BOD ₅	Annually
COD	Annually

Earth Tech's Recommendation	
TOC	Annually
Ammonia nitrogen	Annually
TKN	Annually
Total phosphorus	Annually
Full Metal Scan + Hg	Annually
Total coliform	Annually
Fecal coliform	Annually
BTEX	Annually
PCBs	Annually

3.3.3 Monitoring Parameters for Sewage Sludge

The current Water License does not include requirements for the sludge monitoring with regard to parameters and frequency. Since sewage sludge treatment is an inherent part of the landfill management, sampling and testing should be required as part of the sludge management plan.

Table 3.7 Sewage Sludge Monitoring Parameters and Frequency

Earth Tech's Recommendation	
pH	Twice during summer
Total solids	Twice during summer
TKN	Annually
Total phosphorus	Annually
Full Metal Scan	Every second year
Total coliforms	Annually
Fecal coliforms	Twice during summer

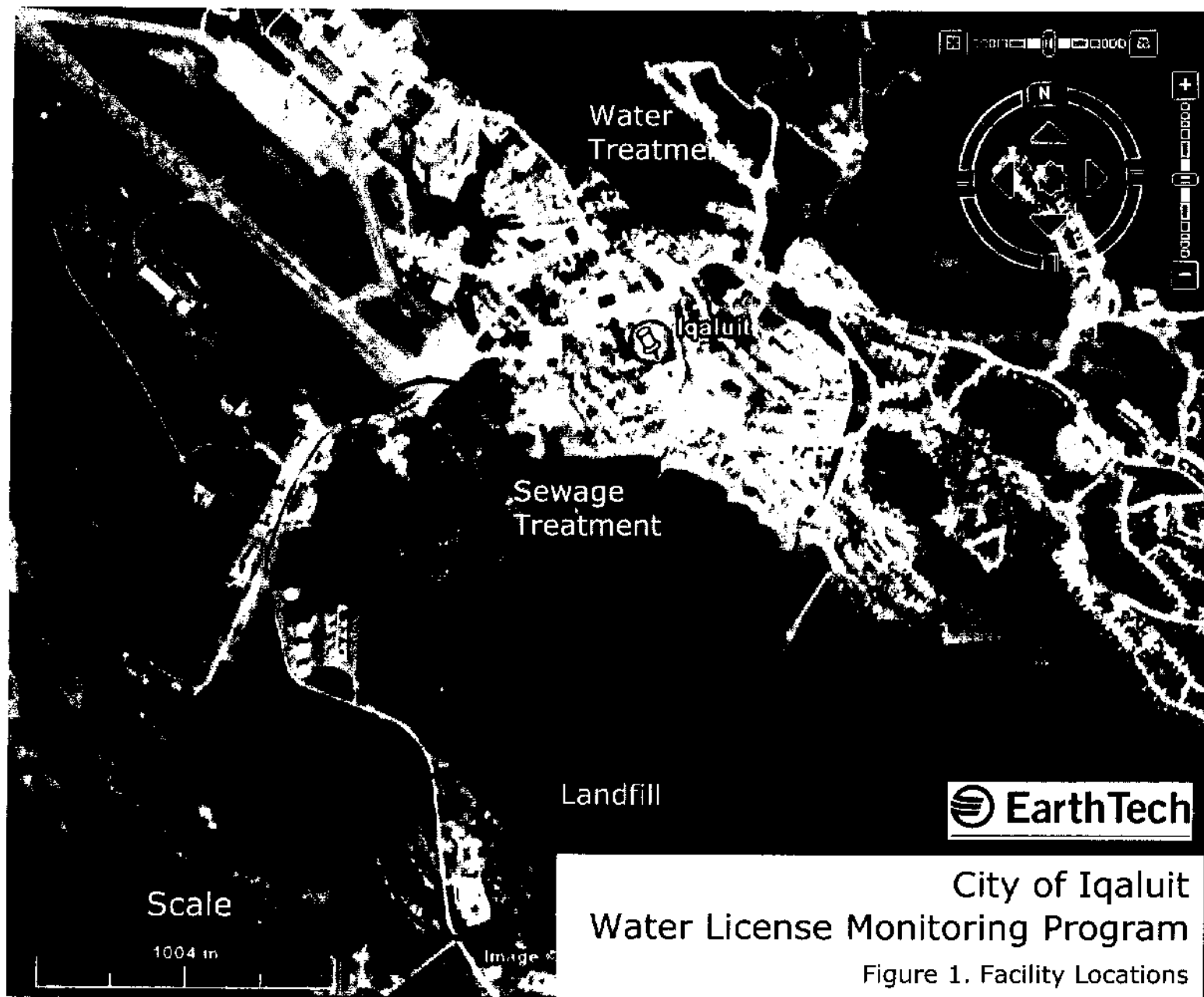
4.0 BUDGET FOR SAMPLING

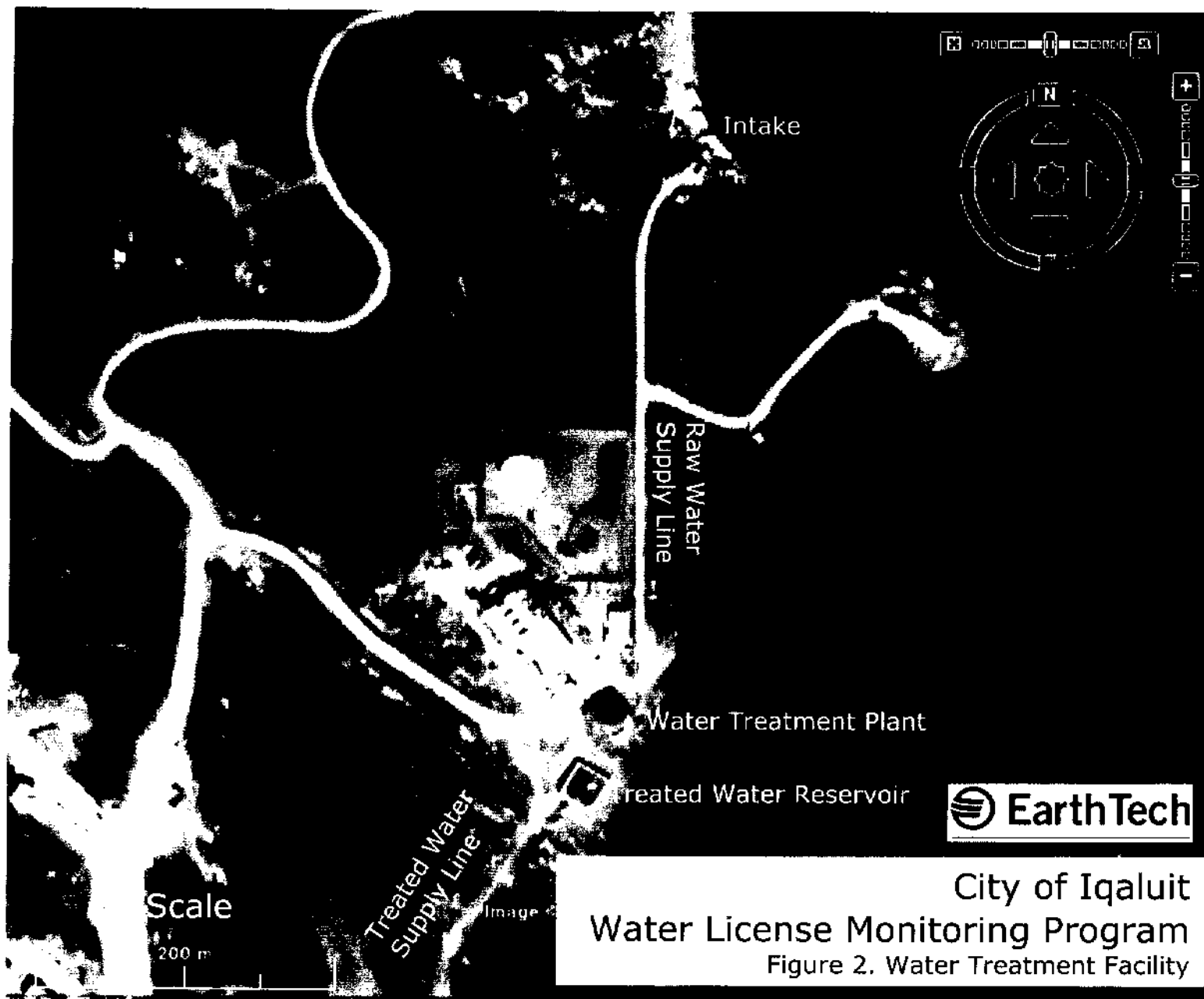
Based on the monitoring parameters and sampling frequency recommended in the previous section, the sampling cost per year is estimated and summarized in **Table 4.1**. It should be noted that:

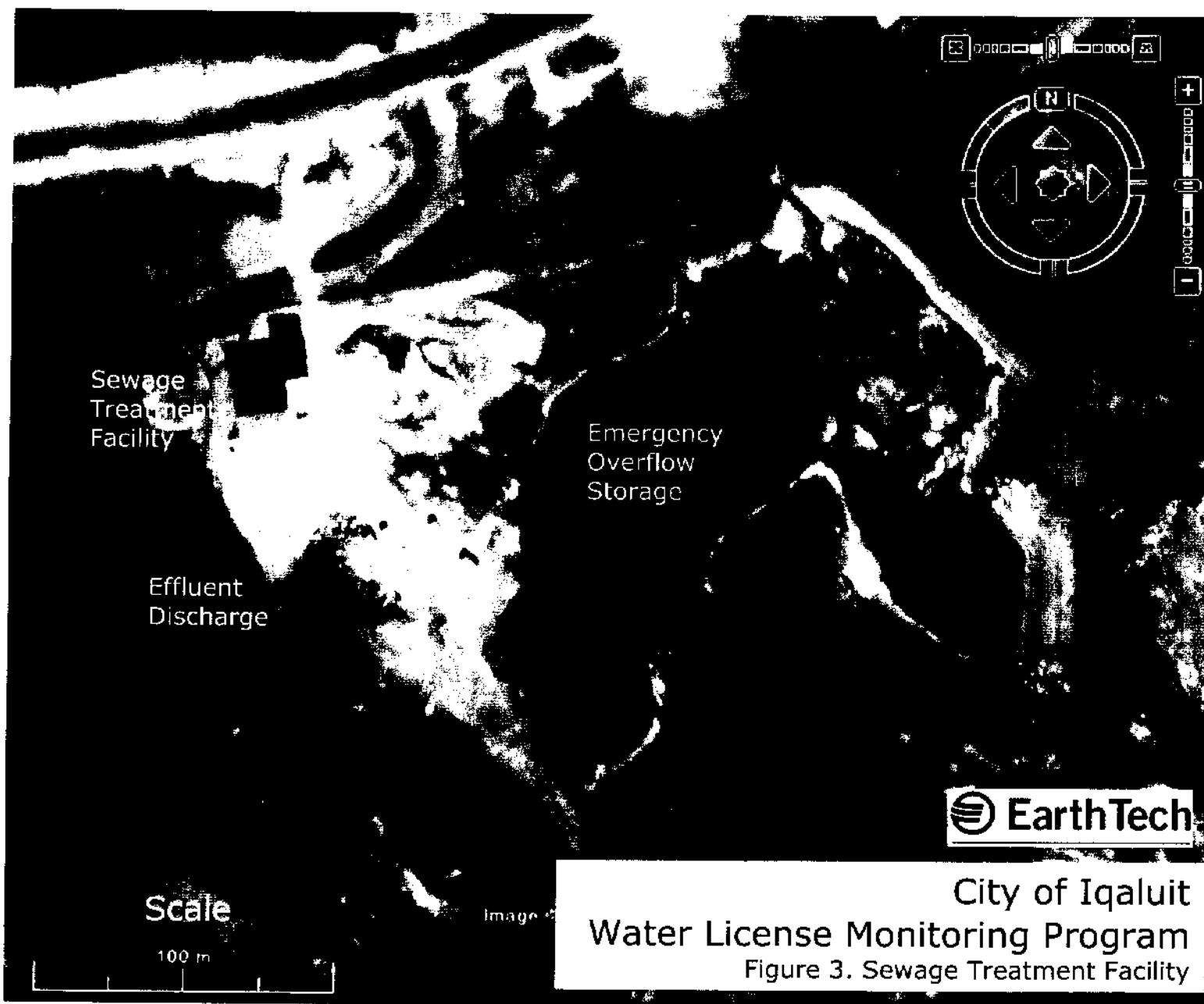
- The budgetary cost is primarily based on cost information provided by Bodycote Testing Group (Ottawa). Sampling bottles, coolers, freezer packs and forms would be provided at no additional cost;
- "Temperature" of all samples should be determined immediately on-site;
- It is assumed that a total of 100 hours of manpower is required to collect and send all samples every year and \$40.00 per hour is used for the estimation of manpower cost; and
- The shipping cost of sampling supplies and samples mainly depends on the weight and/or the volume of the shipment. Due to the variation of the amount of samples collected each time, the shipping cost will also vary significantly; therefore the cost presented is for budgeting purposes only.

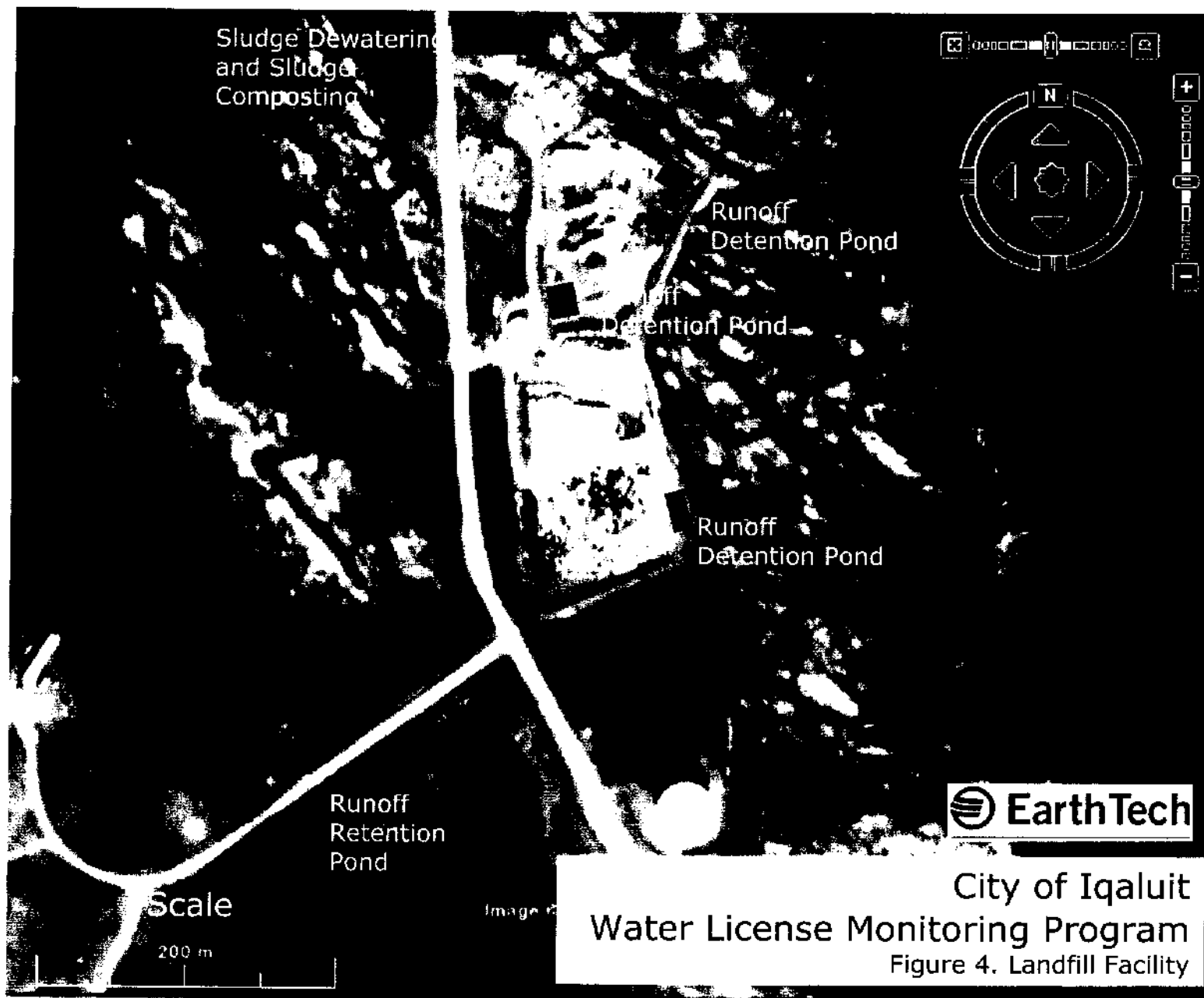
Table 4.1 Budgetary Costs For The Monitoring

		Sampling cost
1. Sample Analysis Budget		
1.1	Drinking Water	
	WTP Raw water	\$ 4,500
	WTP Treated water	\$ 3,500
	Distribution system	\$ 2,000
	Sub-total	\$ 10,000
1.2	Wastewater	
	WWTP Influent	\$ 1,000
	WWTP Effluent	\$ 1,000
	Sub-total	\$ 2,000
1.3	Landfill	
	Detention pond	\$ 200
	Retention pond	\$ 800
	Sludge	\$ 1,000
	Sub-total	\$ 2,000
2. Other costs		
	Manpower	\$ 4,000
	Sampling supplies	No extra cost
	Shipping	\$ 2,000
3. Total sampling cost		\$ 20,000





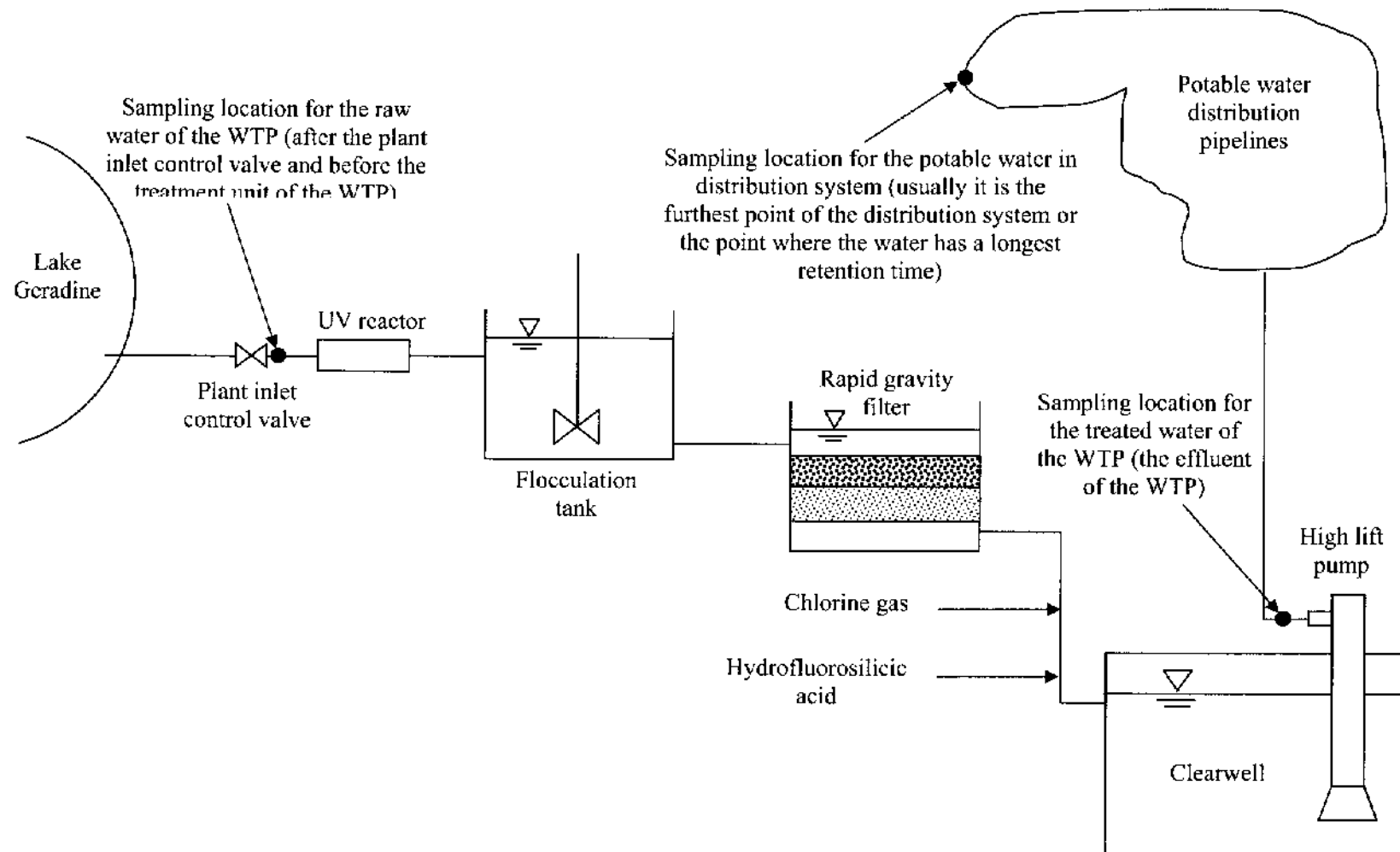




APPENDIX A

**SAMPLING LOCATIONS FOR THE
WATER TREATMENT FACILITY**

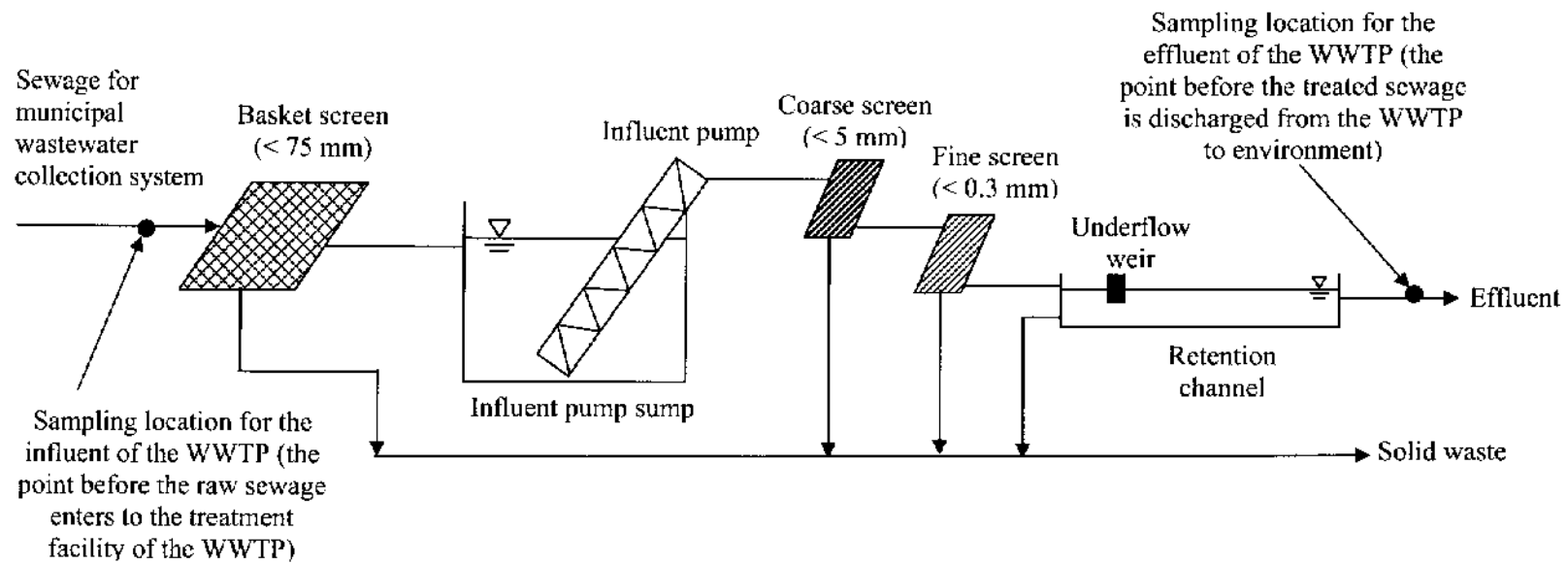
Schematic sampling locations for the Water Treatment Facility



APPENDIX B

**SAMPLING LOCATIONS FOR THE
SEWAGE TREATMENT FACILITY**

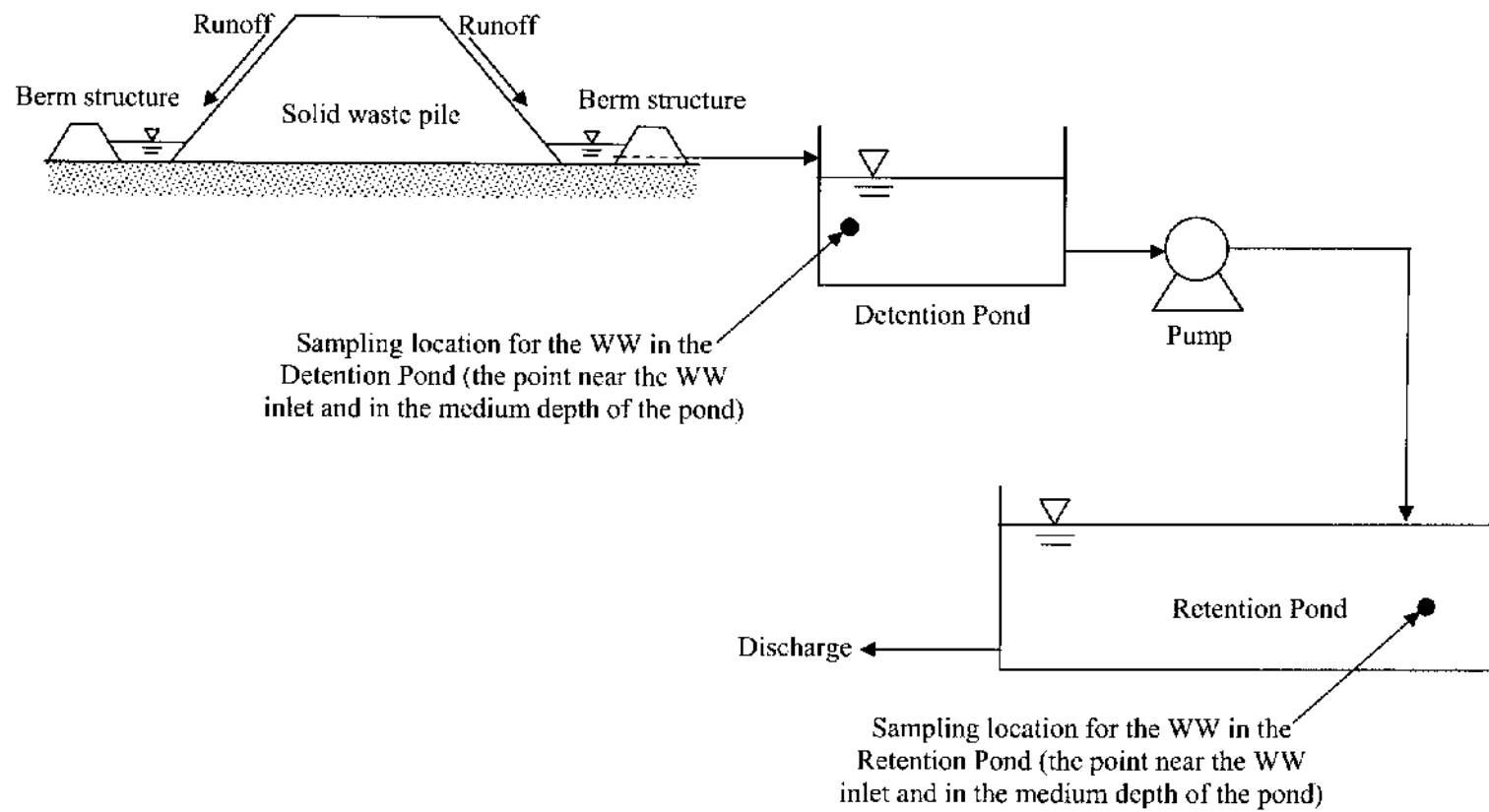
Schematic sampling locations for the Sewage Treatment Facility



APPENDIX C

**SAMPLING LOCATIONS FOR THE
LANDFILL FACILITY**

Schematic sampling locations for the Landfill Facility



Appendix E

West 40 Landfill Drainage Management Review

Canadian Environmental Quality Guidelines Summary Table

Canadian Environmental Quality Guidelines Summary Table

Users are advised to consult the Canadian Environmental Quality Guidelines introductory text, factsheet, and/or protocols for specific information and implementation guidance pertaining to each environmental quality guideline.

		Water Quality Guidelines for the Protection of Aquatic Life					
		Freshwater			Marine		
		Concentration (µg/L)	Concentration (µg/L)	Date	Concentration (µg/L)	Concentration (µg/L)	Date
Chemical name	Chemical groups	Short Term	Long Term		Short Term	Long Term	
1,1,1-Trichloroethane CASRN 71556	Organic Halogenated aliphatic compounds Chlorinated ethanes	No data	Insufficient data	1991	No data	Insufficient data	1991
1,1,2,2-Tetrachloroethene PCE (Tetrachloroethylene) CASRN 127184	Organic Halogenated aliphatic compounds Chlorinated ethenes	No data	110	1993	No data	Insufficient data	1993
1,1,2,2-Tetrachloroethane CASRN 79345	Organic Halogenated aliphatic compounds Chlorinated ethanes	No data	Insufficient data	1991	No data	Insufficient data	1991
1,1,2-Trichloroethene TCE (Trichloroethylene) CASRN 790106	Organic Halogenated aliphatic compounds Chlorinated ethenes	No data	21	1991	No data	Insufficient data	1991
1,2,3,4-Tetrachlorobenzene CASRN 634662	Organic Monocyclic aromatic compounds Chlorinated benzenes	No data	1.8	1997	No data	Insufficient data	1997
1,2,3,5-Tetrachlorobenzene	Organic Monocyclic aromatic compounds Chlorinated benzenes	No data	Insufficient data	1997	No data	Insufficient data	1997

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		Water Quality Guidelines for the Protection of Aquatic Life					
		Freshwater			Marine		
		Concentration (µg/L)	Concentration (µg/L)	Date	Concentration (µg/L)	Concentration (µg/L)	Date
Chemical name	Chemical groups	Short Term	Long Term		Short Term	Long Term	
1,2,3-Trichlorobenzene CASRN 87616	Organic Monocyclic aromatic compounds Chlorinated benzenes	No data	8	1997	No data	Insufficient data	1997
1,2,4,5-Tetrachlorobenzene	Organic Monocyclic aromatic compounds Chlorinated benzenes	No data	Insufficient data	1997	No data	Insufficient data	1997
1,2,4-Trichlorobenzene CASRN 120801	Organic Monocyclic aromatic compounds Chlorinated benzenes	No data	24	1997	No data	5.4	1997
1,2-Dichlorobenzene CASRN 95501	Organic Monocyclic aromatic compounds Chlorinated benzenes	No data	0.7	1997	No data	42	1997
1,2-Dichloroethane CASRN 1070602	Organic Halogenated aliphatic compounds Chlorinated ethanes	No data	100	1991	No data	Insufficient data	1991
1,3,5-Trichlorobenzene	Organic Monocyclic aromatic compounds Chlorinated benzenes	No data	Insufficient data	1997	No data	Insufficient data	1997
1,3-Dichlorobenzene CASRN 541731	Organic Monocyclic aromatic compounds Chlorinated benzenes	No data	150	1997	No data	Insufficient data	1997
1,4-Dichlorobenzene CASRN 106467	Organic Monocyclic aromatic compounds Chlorinated benzenes	No data	26	1997	No data	Insufficient data	1997
1,4-Dioxane		NRG	NRG	2008	NRG	NRG	2008
3-Iodo-2-propynyl butyl carbamate IPBC CASRN 554065360	Organic Pesticides Carbamate pesticides	No data	1.9	1999	No data	No data	No data
Acenaphthene PAHs	Organic Polyaromatic compounds Polycyclic aromatic hydrocarbons	No data	5.8	1999	No data	Insufficient data	1999



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		Water Quality Guidelines for the Protection of Aquatic Life					
		Freshwater			Marine		
		Concentration (µg/L)	Concentration (µg/L)	Date	Concentration (µg/L)	Concentration (µg/L)	Date
Chemical name	Chemical groups	Short Term	Long Term		Short Term	Long Term	
Acenaphthylene PAHs	Organic Polycyclic aromatic hydrocarbons	No data	No data	1999	No data	No data	1999
Acridine PAHs	Organic Polycyclic aromatic hydrocarbons	No data	4.4	1999	No data	Insufficient data	1999
Aldicarb CASRN 116063	Organic Pesticides Carbamate pesticides	No data	1	1993	No data	0.15	1993
Aldrin	Organic Pesticides Organochlorine compounds	No data	0.004	1987	No data	No data	No data
Aluminium	Inorganic	No data	Variable	1987	No data	No data	No data
Ammonia (total)	Inorganic Inorganic nitrogen compounds	No data	Table	2001	No data	No data	No data
Ammonia (un-ionized) CASRN 7664417	Inorganic Inorganic nitrogen compounds	No data	19	2001	No data	No data	No data
Aniline CASRN 62533	Organic	No data	2.2	1993	No data	Insufficient data	1993
Anthracene PAHs	Organic Polycyclic aromatic hydrocarbons	No data	0.012	1999	No data	Insufficient data	1999
Arsenic CASRN none	Inorganic	No data	5	1997	No data	12.5	1997
Atrazine CASRN 1912249	Organic Pesticides Triazine compounds	No data	1.8	1989	No data	No data	No data
Benzene CASRN 71432	Organic Monocyclic aromatic compounds	No data	370	1999	No data	110	1999
Benzo(a)anthracene PAHs	Organic Polycyclic aromatic hydrocarbons	No data	0.018	1999	No data	Insufficient data	1999



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		Water Quality Guidelines for the Protection of Aquatic Life					
		Freshwater			Marine		
		Concentration (µg/L)	Concentration (µg/L)	Date	Concentration (µg/L)	Concentration (µg/L)	Date
Chemical name	Chemical groups	Short Term	Long Term		Short Term	Long Term	
Benzo(a)pyrene PAHs	Organic Polyaromatic compounds Polycyclic aromatic hydrocarbons	No data	0.015	1999	No data	Insufficient data	1999
Boron	Inorganic	29,000µg/L or 29mg/L	1,500µg/L or 1.5mg/L	2009	NRG	NRG	2009
Bromacil CASRN 314409	Organic Pesticides	No data	5	1997	No data	Insufficient data	1997
Bromoxynil	Organic Pesticides Benzonitrile compounds	No data	5	1993	No data	Insufficient data	1993
Cadmium CASRN 7440439	Inorganic	No data	Equation	1996	No data	0.12	1996
Captan CASRN 133062	Organic Pesticides	No data	1.3	1991	No data	No data	No data
Carbaryl CASRN 63252	Organic Pesticides Carbamate pesticides	3.3	0.2	2009	5.7	0.29	2009
Carbofuran CASRN 1564662	Organic Pesticides Carbamate pesticides	No data	1.8	1989	No data	No data	No data
Chlordane	Organic Pesticides Organochlorine compounds	No data	0.006	1987	No data	No data	No data
Chlorothalonil CASRN 1897456	Organic Pesticides	No data	0.18	1994	No data	0.36	1994
Chlorpyrifos CASRN 2921882	Organic Pesticides Organophosphorus compounds	0.02	0.002	2008	NRG	0.002	2008
Chromium, hexavalent (Cr(VI)) CASRN 7440473	Inorganic	No data	1	1997	No data	1.5	1997
Chromium, trivalent (Cr(III)) CASRN 7440473	Inorganic	No data	8.9	1997	No data	56	1997
Chrysene PAHs	Organic Polyaromatic compounds Polycyclic aromatic hydrocarbons	No data	Insufficient data	1999	No data	Insufficient data	1999



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		Water Quality Guidelines for the Protection of Aquatic Life					
		Freshwater			Marine		
		Concentration (µg/L)	Concentration (µg/L)	Date	Concentration (µg/L)	Concentration (µg/L)	Date
Chemical name	Chemical groups	Short Term	Long Term		Short Term	Long Term	
Colour							
CASRN N/A	Physical	No data	Narrative	1999	No data	Narrative	1999
Copper	Inorganic	No data	Equation	1987	No data	No data	No data
Cyanazine	Organic Pesticides Triazine compounds	No data	2	1990	No data	No data	No data
CASRN 2175462							
Cyanide	Inorganic	No data	5 (as free CN)	1987	No data	No data	No data
Debris							
CASRN N/A	Physical	No data	No data	No data	No data	Narrative	1996
Deltamethrin	Organic Pesticides	No data	0.0004	1997	No data	Insufficient data	1997
CASRN 52918635							
Deposited bedload sediment	Physical Turbidity, clarity and suspended solids Total particulate matter	No data	Insufficient data	1999	No data	Insufficient data	1999
Di(2-ethylhexyl) phthalate	Organic Phthalate esters	No data	16	1993	No data	Insufficient data	1993
CASRN 117817							
Di-n-butyl phthalate	Organic Phthalate esters	No data	19	1993	No data	Insufficient data	1993
CASRN 84742							
Di-n-octyl phthalate	Organic Phthalate esters	No data	Insufficient data	1993	No data	Insufficient data	1993
CASRN 117840							
Dibromochloromethane	Organic Halogenated aliphatic compounds Halogenated methanes	No data	Insufficient data	1992	No data	Insufficient data	1992
Dicamba	Organic Pesticides Aromatic Carboxylic Acid	No data	10	1993	No data	No data	No data
CASRN 1918009							
Dichloro diphenyl trichloroethane; 2,2- Bis(p-chlorophenyl)- 1,1,1-trichloroethane	Organic Pesticides Organochlorine compounds	No data	0.001	1987	No data	No data	No data
DDT (total)							
Dichlorobromomethane	Organic Halogenated aliphatic compounds Halogenated methanes	No data	Insufficient data	1992	No data	Insufficient data	1992
Dichloromethane Methylene chloride CASRN 75092	Organic Halogenated aliphatic compounds Halogenated methanes	No data	98.1	1992	No data	Insufficient data	1992



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		Water Quality Guidelines for the Protection of Aquatic Life					
		Freshwater			Marine		
		Concentration (µg/L)	Concentration (µg/L)	Date	Concentration (µg/L)	Concentration (µg/L)	Date
Chemical name	Chemical groups	Short Term	Long Term		Short Term	Long Term	
Dichlorophenols	Organic Monocyclic aromatic compounds Chlorinated phenols	No data	0.2	1987	No data	No data	No data
Diclofop-methyl CASRN 51338273	Organic Pesticides	No data	6.1	1993	No data	No data	No data
Didecyl dimethyl ammonium chloride DDAC CASRN 7173515	Organic Pesticides	No data	1.5	1999	No data	Insufficient data	1999
Diethylene glycol CASRN 111466	Organic Glycols	No data	Insufficient data	1997	No data	Insufficient data	1997
Diisopropanolamine DIPA CASRN 110974	Organic	No data	1600	2005	No data	Insufficient data	2005
Dimethoate CASRN 60515	Organic Pesticides Organophosphorus compounds	No data	6.2	1993	No data	Insufficient data	1993
Dinoseb CASRN 88857	Organic Pesticides	No data	0.05	1992	No data	No data	No data
Dissolved gas supersaturation CASRN N/A	Physical	No data	Narrative	1999	No data	Narrative	1999
Dissolved oxygen DO CASRN N/A	Inorganic	No data	Variable	1999	No data	>8000 & Narrative	1996
Endosulfan	Organic Pesticides Organochlorine compounds	0.06	0.003	2010	0.09	0.002	2010
Endrin	Organic Pesticides Organochlorine compounds	No data	0.0023	1987	No data	No data	No data
Ethylbenzene CASRN 100414	Organic Monocyclic aromatic compounds	No data	90	1996	No data	25	1996
Ethylene glycol CASRN 107211	Organic Glycols	No data	192 000	1997	No data	Insufficient data	1997
Fluoranthene PAHs	Organic Polyaromatic compounds Polycyclic aromatic hydrocarbons	No data	0.04	1999	No data	Insufficient data	1999



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		Water Quality Guidelines for the Protection of Aquatic Life					
		Freshwater			Marine		
		Concentration (µg/L)	Concentration (µg/L)	Date	Concentration (µg/L)	Concentration (µg/L)	Date
Chemical name	Chemical groups	Short Term	Long Term		Short Term	Long Term	
Fluorene PAHs	Organic Polyaromatic compounds Polycyclic aromatic hydrocarbons	No data	<u>3</u>	1999	No data	Insufficient data	1999
Fluoride	Inorganic	No data	<u>120</u>	2002	No data	<u>NRG</u>	2002
Glyphosate CASRN 1071836	Organic Pesticides Organophosphorus compounds	No data	<u>65</u>	1989	No data	No data	No data
Heptachlor Heptachlor epoxide	Organic Pesticides Organochlorine compounds	No data	<u>0.01</u>	1987	No data	No data	No data
Hexachlorobenzene	Organic Monocyclic aromatic compounds Chlorinated benzenes	No data	<u>Insufficient data</u>	1997	No data	<u>Insufficient data</u>	1997
Hexachlorobutadiene HCBD CASRN 87683	Organic Halogenated aliphatic compounds	No data	<u>1.3</u>	1999	No data	No data	No data
Hexachlorocyclohexane Lindane	Organic Pesticides Organochlorine compounds	No data	<u>0.01</u>	1987	No data	No data	No data
Imidacloprid CASRN 13826413		No data	<u>0.23</u>	2007	No data	<u>0.65</u>	2007
Inorganic Mercury CASRN 7439976	Inorganic	No data	<u>0.026</u>	2003	No data	<u>0.016</u>	2003
Iron	Inorganic	No data	<u>300</u>	1987	No data	No data	No data
Lead	Inorganic	No data	<u>Equation</u>	1987	No data	No data	No data
Linuron CASRN 41205214	Organic Pesticides	No data	<u>7</u>	1995	No data	No data	1995
Methoprene CASRN 40596698		No data	<u>0.09 (Target Organism Management value: 0.53)</u>	2007	No data	Insufficient data	2007
Methyl tertiary-butyl ether MTBE CASRN 1634044	Organic Non-halogenated aliphatic compounds Aliphatic ether	No data	<u>10 000</u>	2003	No data	<u>5 000</u>	2003



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		Water Quality Guidelines for the Protection of Aquatic Life					
		Freshwater			Marine		
		Concentration (µg/L)	Concentration (µg/L)	Date	Concentration (µg/L)	Concentration (µg/L)	Date
Chemical name	Chemical groups	Short Term	Long Term		Short Term	Long Term	
Methylchlorophenoxyacetic acid (4-Chloro-2-methyl phenoxy acetic acid; 2-Methyl-4-chloro phenoxy acetic acid) MCPA CASRN 94746	Organic Pesticides	No data	2.6	1995	No data	4.2	1995
Methylmercury	Organic	No data	0.004	2003	No data	NRG	2003
Metolachlor CASRN 51218452	Organic Pesticides Organochlorine compounds	No data	7.8	1991	No data	No data	No data
Metribuzin CASRN 21087649	Organic Pesticides Triazine compounds	No data	1	1990	No data	No data	No data
Molybdenum	Inorganic	No data	73	1999	No data	No data	No data
Monobromomethane Methyl bromide	Organic Halogenated aliphatic compounds Halogenated methanes	No data	Insufficient data	1992	No data	Insufficient data	1992
Monochlorobenzene CASRN 108907	Organic Monocyclic aromatic compounds Chlorinated benzenes	No data	1.3	1997	No data	25	1997
Monochloromethane Methyl chloride	Organic Halogenated aliphatic compounds Halogenated methanes	No data	Insufficient data	1992	No data	Insufficient data	1992
Monochlorophenols	Organic Monocyclic aromatic compounds Chlorinated phenols	No data	7	1987	No data	No data	No data
Naphthalene PAHs	Organic Polyaromatic compounds Polycyclic aromatic hydrocarbons	No data	1.1	1999	No data	1.4	1999
Nickel	Inorganic	No data	Equation	1987	No data	No data	No data
Nitrate CASRN 14797558	Inorganic Inorganic nitrogen compounds	No data	13 000	2003	No data	16 000	2003



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		Water Quality Guidelines for the Protection of Aquatic Life					
		Freshwater			Marine		
		Concentration (µg/L)	Concentration (µg/L)	Date	Concentration (µg/L)	Concentration (µg/L)	Date
Chemical name	Chemical groups	Short Term	Long Term		Short Term	Long Term	
Nitrite	Inorganic Inorganic nitrogen compounds	No data	60 NO₂-N	1987	No data	No data	No data
Nonylphenol and its ethoxylates CASRN 84852153	Organic Nonylphenol and its ethoxylates	No data	1	2002	No data	0.7	2002
Nutrients		No data	Guidance Framework	2004	No data	Guidance framework	2007
Pentachlorobenzene CASRN 608935	Organic Monocyclic aromatic compounds Chlorinated benzenes	No data	6	1997	No data	Insufficient data	1997
Pentachlorophenol PCP	Organic Monocyclic aromatic compounds Chlorinated phenols	No data	0.5	1987	No data	No data	No data
Permethrin CASRN 52645531	Organic Pesticides Organochlorine compounds	No data	0.004	2006	No data	0.001	2006
Phenanthrene PAHs	Organic Polyaromatic compounds Polycyclic aromatic hydrocarbons	No data	0.4	1999	No data	Insufficient data	1999
Phenols (mono- & dihydric) CASRN 108952	Organic Aromatic hydroxy compounds	No data	4	1999	No data	No data	No data
Phenoxy herbicides 2,4 D; 2,4- Dichlorophenoxyacetic acid	Organic Pesticides	No data	4	1987	No data	No data	No data
Phosphorus	Inorganic	No data	Guidance Framework	2004	No data	Guidance Framework	2007
Picloram CASRN 1918021	Organic Pesticides	No data	29	1990	No data	No data	No data
Polychlorinated biphenyls PCBs	Organic Polyaromatic compounds Polychlorinated biphenyls	No data	0.001	1987	No data	0.01	1991
Propylene glycol CASRN 57556	Organic Glycols	No data	500 000	1997	No data	Insufficient data	1997
Pyrene PAHs	Organic Polyaromatic compounds Polycyclic aromatic hydrocarbons	No data	0.025	1999	No data	Insufficient data	1999



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		Water Quality Guidelines for the Protection of Aquatic Life					
		Freshwater			Marine		
		Concentration (µg/L)	Concentration (µg/L)	Date	Concentration (µg/L)	Concentration (µg/L)	Date
Chemical name	Chemical groups	Short Term	Long Term		Short Term	Long Term	
pH	Inorganic Acidity, alkalinity and pH	No data	6.5 to 9.0	1987	No data	7.0 to 8.7 & Narrative	1996
Quinoline PAHs	Organic Polyaromatic compounds Polycyclic aromatic hydrocarbons	No data	3.4	1999	No data	Insufficient data	1999
Reactive Chlorine Species total residual chlorine, combined residual chlorine, total available chlorine, hypochlorous acid, chloramine, combined available chlorine, free residual chlorine, free available chlorine, chlorine-produced oxidants	Inorganic Reactive chlorine compounds	No data	0.5	1999	No data	0.5	1999
Salinity	Physical	No data	No data	No data	No data	Narrative	1996
Selenium	Inorganic	No data	1	1987	No data	No data	No data
Silver	Inorganic	No data	0.1	1987	No data	No data	No data
Simazine CASRN 122349	Organic Pesticides Triazine compounds	No data	10	1991	No data	No data	No data
Streambed substrate	Physical Turbidity, clarity and suspended solids Total particulate matter	No data	Narrative	1999	No data	Narrative	1999
Styrene CASRN 100425	Organic Monocyclic aromatic compounds	No data	72	1999	No data	No data	No data
Sulfolane Bondelane CASRN 126330	Organic Organic sulphur compound	No data	50 000	2005	No data	Insufficient data	2005
Suspended sediments TSS	Physical Turbidity, clarity and suspended solids Total particulate matter	No data	Narrative	1999	No data	Narrative	1999
Tebuthiuron CASRN 34014181	Organic Pesticides	No data	1.6	1995	No data	Insufficient data	1995
Temperature	Physical Temperature	No data	Narrative	1987	No data	Narrative	1996

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		Water Quality Guidelines for the Protection of Aquatic Life					
		Freshwater			Marine		
		Concentration (µg/L)	Concentration (µg/L)	Date	Concentration (µg/L)	Concentration (µg/L)	Date
Chemical name	Chemical groups	Short Term	Long Term		Short Term	Long Term	
<u>Tetrachloromethane</u> Carbon tetrachloride CASRN 56235	Organic Halogenated aliphatic compounds Halogenated methanes	No data	<u>13.3</u>	1992	No data	Insufficient data	1992
<u>Tetrachlorophenols</u>	Organic Monocyclic aromatic compounds Chlorinated phenols	No data	<u>1</u>	1987	No data	No data	No data
<u>Thallium</u>	Inorganic	No data	<u>0.8</u>	1999	No data	No data	No data
<u>Toluene</u> CASRN 108883	Organic Monocyclic aromatic compounds	No data	<u>2</u>	1996	No data	<u>215</u>	1996
<u>Toxaphene</u>	Organic Pesticides Organochlorine compounds	No data	<u>0.008</u>	1987	No data	No data	No data
<u>Triallate</u> CASRN 2303175	Organic Pesticides Carbamate pesticides	No data	<u>0.24</u>	1992	No data	No data	No data
<u>Tribromomethane</u> Bromoform	Organic Halogenated aliphatic compounds Halogenated methanes	No data	<u>Insufficient data</u>	1992	No data	<u>Insufficient data</u>	1992
<u>Tributyltin</u>	Organic Organotin compounds	No data	<u>0.008</u>	1992	No data	<u>0.001</u>	1992
<u>Trichloromethane</u> Chloroform CASRN 67663	Organic Halogenated aliphatic compounds Halogenated methanes	No data	<u>1.8</u>	1992	No data	Insufficient data	1992
<u>Trichlorophenols</u>	Organic Monocyclic aromatic compounds Chlorinated phenols	No data	<u>18</u>	1987	No data	No data	No data
<u>Tricyclohexyltin</u>	Organic Organotin compounds	No data	Insufficient data	1992	No data	Insufficient data	1992
<u>Trifluralin</u> CASRN 1582098	Organic Pesticides Dinitroaniline pesticides	No data	<u>0.2</u>	1993	No data	No data	No data



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		Water Quality Guidelines for the Protection of Aquatic Life					
		Freshwater			Marine		
		Concentration (µg/L)	Concentration (µg/L)	Date	Concentration (µg/L)	Concentration (µg/L)	Date
Chemical name	Chemical groups	Short Term	Long Term		Short Term	Long Term	
Triphenyltin	Organic Organotin compounds	No data	0.022	1992	No data	No data	1992
Turbidity	Physical Turbidity, clarity and suspended solids Total particulate matter	No data	Narrative	1999	No data	Narrative	1999
Uranium CASRN 7440- 61-1	Inorganic	33	15	2011	NRG	NRG	2011
Zinc	Inorganic	No data	30	1987	No data	No data	No data

Chemical name	Chemical groups
No Chemicals with Data	



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		Water Quality Guidelines for the Protection of Aquatic Life					
		Freshwater			Marine		
		Concentration (µg/L)	Concentration (µg/L)	Date	Concentration (µg/L)	Concentration (µg/L)	Date
Chemical name	Chemical groups	Short Term	Long Term		Short Term	Long Term	
Aluminium	Inorganic	No data	Variable	1987	No data	No data	No data
Ammonia (total)	Inorganic Inorganic nitrogen compounds	No data	Table	2001	No data	No data	No data
Arsenic CASRN none	Inorganic	No data	5	1997	No data	12.5	1997
Benzene CASRN 71432	Organic Monocyclic aromatic compounds	No data	370	1999	No data	110	1999
Boron	Inorganic	29,000µg/L or 29mg/L	1,500µg/L or 1.5mg/L	2009	NRG	NRG	2009
Cadmium CASRN 7440439	Inorganic	No data	Equation	1996	No data	0.12	1996
Copper	Inorganic	No data	Equation	1987	No data	No data	No data
Ethylbenzene CASRN 100414	Organic Monocyclic aromatic compounds	No data	90	1996	No data	25	1996
Iron	Inorganic	No data	300	1987	No data	No data	No data
Lead	Inorganic	No data	Equation	1987	No data	No data	No data
Nickel	Inorganic	No data	Equation	1987	No data	No data	No data
Nitrate CASRN 14797558	Inorganic Inorganic nitrogen compounds	No data	13 000	2003	No data	16 000	2003
Nitrite	Inorganic Inorganic nitrogen compounds	No data	60 NO₂-N	1987	No data	No data	No data
Phenols (mono- & dihydric) CASRN 108952	Organic Aromatic hydroxy compounds	No data	4	1999	No data	No data	No data

Users are advised to consult the Canadian Environmental Quality Guidelines introductory text, factsheet, and/or protocols for specific information and implementation guidance pertaining to each environmental quality guideline.

		Water Quality Guidelines for the Protection of Aquatic Life					
		Freshwater			Marine		
		Concentration (µg/L)	Concentration (µg/L)	Date	Concentration (µg/L)	Concentration (µg/L)	Date
Chemical name	Chemical groups	Short Term	Long Term		Short Term	Long Term	
Phosphorus	Inorganic	No data	Guidance Framework	2004	No data	Guidance Framework	2007
Polychlorinated biphenyls PCBs	Organic Polyaromatic compounds Polychlorinated biphenyls	No data	0.001	1987	No data	0.01	1991
Selenium	Inorganic	No data	<u>1</u>	1987	No data	No data	No data
Silver	Inorganic	No data	<u>0.1</u>	1987	No data	No data	No data
Thallium	Inorganic	No data	<u>0.8</u>	1999	No data	No data	No data
Toluene CASRN 108883	Organic Monocyclic aromatic compounds	No data	<u>2</u>	1996	No data	<u>215</u>	1996
Turbidity	Physical Turbidity, clarity and suspended solids Total particulate matter	No data	Narrative	1999	No data	Narrative	1999
Uranium CASRN 7440-61-1	Inorganic	33	15	2011	NRG	NRG	2011
Zinc	Inorganic	No data	<u>30</u>	1987	No data	No data	No data

Chemical name	Chemical groups
No Chemicals with Data	



Comments or questions? Contact us at: info@ccme.ca

Appendix F

West 40 Landfill Drainage Management Review

City of Iqaluit Landfill Runoff Wetland
Treatment Conceptual Design Report

City of Iqaluit Landfill Runoff - Wetland Treatment Conceptual Design Report

Prepared for:

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SECTION 1

INTRODUCTION

BACKGROUND

The water license No. 3AM-IQA0611 Type “A” (Valid till May 15, 2011) issued to the City of Iqaluit by Nunavut Water Board, requires that the City of Iqaluit manage, collect and monitor the runoff from the West 40 Landfill site and adjacent Sludge Management Facility.

The City of Iqaluit produces approximately 10,000 cubic meters of compacted waste, which enters the landfill annually, including residential, commercial and industrial wastes. The landfill applies a surface water management system to divert off-site surface runoff from entering the site, and collect on-site surface runoff for a controlled discharge into the environment. West 40 landfill site development relies on the local permafrost regime to provide a low permeability barrier to control the subsurface runoff.

The on-site surface runoff is comprised of contaminated surface runoff originating from the melt water from the spring freshet and runoff from summer precipitation. The surface runoff sampling results in June 2006 suggest that the landfill runoff needs to be appropriately managed, and direct discharge into the environment should be controlled. The most feasible means to manage the landfill surface runoff is to treat runoff using an engineered solution. Wetland treatment of the runoff is an appropriate option for Iqaluit because of its passive mode, low maintenance requirements, and cost effectiveness in comparison with other available technologies. This process has been successfully applied to landfill runoff treatment in Southern Canada. The precedent for northern wetland systems was established by the Town of Fort Smith landfill wetland system, which was the first instance where a wetland treatment of landfill runoff has been incorporated into a northern community water licence (2003).

PROJECT SCOPE & OBJECTIVES

Earth Tech (Canada) Inc. was retained by the City of Iqaluit in 2006 for the “Solid Waste Disposal Facility (Landfill) Improvements” project. The scope of the project was to provide engineering consulting services for the management of the landfill surface runoff. Runoff collection and storage improvements were constructed in 2006. The next phase of the project is to engineer a runoff treatment process.

The first phase of the runoff treatment work is to develop a conceptual plan for a constructed wetland to treat on-site surface runoff from West 40 Landfill site.

This report addresses the following scope and objectives:

- To confirm the seasonal on-site surface runoff volume;
- To develop a wetland treatment concept to meet discharge guidelines;
- To evaluate the financial and technical considerations for these processes;
- To provide recommendations for the City of Iqaluit to implement a runoff treatment solution.

This report documents the conceptual level assessment of landfill runoff generation and wetland treatment suitable for the cold climate conditions. To assist with the completion of this report, the following background information was reviewed. The other documents cited in the report are listed in the Section References.

1. The average weather condition during 1971 to 2000 from Environment Canada (Appendix A).
2. The historical runoff quality parameter data and current water sampling data (Appendix B).
3. The Guidelines for the Discharge of Treated Municipal Wastewater in the Northwest Territories, 1992.
4. Nunavut Water Board Water Licence: City of Iqaluit, No.3AM-IQA0611 TYPE "A", issued by Indian and Northern Affairs Canada (INAC).