

## OPERATOR COMPETITIONS

**H**ere's a chance for operators to show their skills in a team format in the Top Ops or Pump Tear Down challenges. Once again the BC Water & Waste Association is sponsoring the friendly competitions at their Annual Conference, which this year will be held in Whistler from April 30th to May 3rd.

The two competition categories are the Top Ops and the Pump Tear Down. This year there will be the opportunity for Small Systems operators to compete in both challenges, as well as operators who work in Class I to IV facilities.

In the Top Ops competition, each team has three members (all from the same utility or individuals can enter and teams will be formed) that compete in a fast passed, skill testing question and answer format. The questions are derived from the EOCP question databank. Three teams compete against each other as a moderator poses questions with the first team correctly answering earning a point. However, an incorrect answer loses the team a point. It is fast paced and fun to participate and watch.

The Pump Tear Down competition will have separate categories – the large pump tear down and the small pump tear down. In the large pump tear down, teams of three operators work together partially taking apart and rebuilding a Flygt dry submersible pump. In the small pump



Pump Tear Down Challenge

teardown, operators work on a hypochlorite injection pump. In both challenges, the teams are provided with all the required tools and information – just bring your personal protective equipment.

The initial rounds of the Top Ops and Pump Tear Down Challenges will be held on Sunday, April 30th with the finals held on Monday, May 1st. The awards and trophies will be presented the following day at noon.

Check the BCWWA website ([www.bcwwa.org](http://www.bcwwa.org)) or call them at 604 433-4389 for their special Conference operator rates and for information on entering one of the operator challenges.

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## Environmental Operators Certification Program

The BC Operators Digest is the official newsletter of the Program. Submissions for publication in the Digest are welcome and may be sent to the Editor:

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Business card sized advertisement space is available at \$50.00 per issue or \$175.00 for four issues. GST and PST included. For other sized advertisements, please contact the Editor.

The Environmental Operators Certification Program is a charter member of the Association of Boards of Certification, and is a Registered Society with over 3,000 active members.

### 2005/2006 BOARD OF DIRECTORS

**Joe McGowan** – Chairman  
**Leo Albrecht** – CEU Assessment  
**Don Gare** – Secretary, Newsletter  
**Eric Jackson** – Treasurer  
**Bob Smith** – Education  
**Mike Gosselin** – Facilities Classification  
**Scott Fry** – Director  
**Pat Miller** – Director  
**Ron Johnson** – Director

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## 2006 CERTIFICATION BOARD ELECTIONS

This year's Nominating Committee members are Don Gare and Mike Gosselin.

There are five positions on the Board to be filled by three operators, one government representative and one education representative. Each position is for a two-year term. The following candidates have been nominated:

Operators: Scott Fry  
Pat Miller

Government Representative: Ron Johnson

Education Representative: Bob Smith

The Nominating Committee invites further nominations from the membership. Each nomination shall be supported by a minimum of three (3) certified operators and shall be submitted no later than March 24, 2006 by mail to:

EOPC Nominating Committee  
201 – 3833 Henning Drive  
Burnaby, B.C. V5C 6N5

Or by fax to (604) 874-4794

Ballots with instructions will be mailed to operators on April 13, 2006. Returned ballots must be mailed to:

EOPC  
201 – 3833 Henning Drive  
Burnaby, B.C. V5C 6N5

The deadline for the receipt of ballots is May 4, 2006.

## CALLING RETIRED MEMBERS...

Former Board Director and retired operator, Dave McLean is looking to have any retired operators in the lower mainland (or other retired BC operators) join him for lunch and a facility tour in early June. A good time to meet and talk shop or just B.S.! The plan is to have retired operators get together over lunch and then tour a local wastewater treatment or water treatment plant around the Abbotsford or Chilliwack area. The EOPC will spring for the lunch – who said there's no such thing as a free lunch! So call Dave at 604 850-7795, or Don at 604 740-5695, or the EOPC office at 604 874-4794; or check the EOPC website to see when the lunch get together will be. See you then!

## BOARD BUSINESS BRIEFS

Board Meeting – January 21, 2006, EOCP Office, Burnaby

Directors present: Joe McGowan (Chair), Eric Jackson, Bob Smith, Leo Albrecht, Don Gare, Mike Gosselin, Pat Miller, Scott Fry, Ron Johnson, Executive Director Bill Hyslop.

- Joe McGowan welcomed Ron Johnson as the Government Representative Director replacing Bernie Taekema on the Board.
- The Chair reported that work on the Memorandum of Understanding (MOU) with the Ministry of Health is ongoing. Likewise the Executive Director will begin work on a MOU with the Ministry of Environment.
- Opertech Consulting Ltd. has spent time at the EOCP office as part of their work with the rewrite of the 16 core exams – Levels I to IV in water distribution, water treatment, wastewater collection and wastewater treatment.
- Pat Miller reported gave an update on the Top Ops & Pump Tear Down Competitions at the upcoming BCWWA Conference. EOCP Directors will be judges and Eric Jackson will be the moderator.
- The Directors and the Executive Director reported on the status of each of the twenty-five Business Plan Projects. Many of the projects are in draft form and after review can be adopted at the May 2006 EOCP meeting. Some of the projects will be a longer process that will continue for 2006. The EOCP Constitution will be amended once the projects are completed in order to incorporate many of the new policies.
- Mike Gosselin reported that 70 new facilities (which includes 30 small water systems) have been classified since the October 2005 EOCP meeting. Mike also updated the Board on an Approved CEU Course List which he will complete soon.
- The first Bulk Water Delivery exam was given in December to 12 people in Yukon.
- The Board recommended contracting or hiring an accredited accounting person or company to carry out the EOCP accounting and payroll functions.

## OPERATOR'S QUESTION

**QUESTION:** "Why do people attending a training course need to apply two weeks beforehand to the EOCP to write the exam; and why can't they just apply at the course and write the exam?"

**ANSWER:** The certification examination is not a course completion exam. If there is a training course requirement for a particular category (such as Small Systems) it is "an approved training course" not any particular training course.

Eligibility to write a certification examination is based primarily on hands-on experience; this combined with high school, post secondary education, training courses, and supervision (DRC) experience determines whether an individual is qualified to write any particular examination. It is the EOCP policy that the individual must be qualified in all other ways before they may write the exam and it takes time for the EOCP office staff to confirm all aspects of each application.

In many cases, people take training courses who are just getting started in the field and are not yet eligible to be certified or work in a related capacity such as a supervisor, government regulator, or consultant who have no hands-on experience but have a reason to gain the knowledge from the course.

*If an operator has a question concerning operator certification of facility classification; please send it along to the Editor or the EOCP office and we will have a Director or staff person answer your question.*

### SEEN IN MARYLAND

The state of Maryland offers organizational plates to any non-profit organization that submits a petition with 50 signatures, and the Water and Waste Operators

Association of Maryland did that in 1998. The plate is only available to verified WWAOM members. A spokesperson with the Maryland motor vehicle department says the state has 800 different organizational plates.



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## Plant Profile:

# Kamloops Centre for Water Quality



An Outside View of the Kamloops Centre for Water Quality

## Membrane Technology Ensures Water Safety

### HISTORY OF WATER TREATMENT IN KAMLOOPS

The waters of the North and South Thompson Rivers that meet in Kamloops, British Columbia, have long influenced settlement in this growing city. Surrounded by sprawling arid grasslands and rolling mountains, the confluence of the rivers has drawn people to its banks ever since the native, seminomadic Secwepemc people gathered there to trade goods and enjoy the pristine waters. The native fur trade attracted the first European settlers to this area and the gold rush of the 1850s brought the railway, which facilitated the rapid expansion of the city.

For generations, the river has always provided aboriginals and the early settlers with an abundance of pure, safe drinking water. As the trading post became a settlement, and the settlement grew to be a city, the river began to show signs of decline, and many residents became concerned about the river's water quality.

In the early 1940s the City of Kamloops began chlorinating the municipal water supply to reduce the risk of illness from water-borne pathogens. Until recently, pre-screening and chlorination were the only treatments that the City provided for the drinking water supply. However, as the population of

the City and the surrounding area continues to grow, the increasing activities along the watershed are adversely affecting the river water quality. Forestry, agriculture, mining, recreation, construction, and transportation are all producing an increase in the sediment and pollutants from point and non-point sources that are entering the river.

### SOUTH THOMPSON RIVER TURBIDITY SPIKES

Typically every spring, this city of 82,000 people observes silted debris washing down the South Thompson River, causing turbidity spikes in the range of 30 to 50 NTU, and in the past have peaked to over 500 NTU. Although the problem is usually short lived, the prior chlorination system used could not remove the suspended solids from the water.

In the past the City advised residents to boil water for additional protection whenever turbidity rises above 5 NTU and also compensated by increasing the chlorination levels in the distribution system to combat rising turbidity events. But troubling outbreaks of water-borne illnesses in nearby communities left many Kamloops residents wondering if they were at risk of a similar occurrence.

## COMMITTEE LOOKS FOR SOLUTIONS

In 1997, the City formed the Committee on Drinking Water Quality to specifically address the water quality issue. During the Committee's review process the Thompson Health Region applied new conditions to the City's operating permit for potable water production. The changes required the City to reduce potable water turbidity to below 1 NTU 95% of the time, eliminate at least 99.9 percent of *Giardia* and *Cryptosporidium*, and maintain trihalomethane concentrations below 100 µg/l.

The Committee continued with developing strategies to ensure compliance with the new operating conditions and issued a final report in January 2000. Several options were examined by the Committee that included improvements to the watershed to reduce pollutants and sediment in the river, development of alternative water sources from the Clearwater River or a new groundwater source, purchasing water from a neighboring aboriginal band, and the construction of a new water treatment plant.

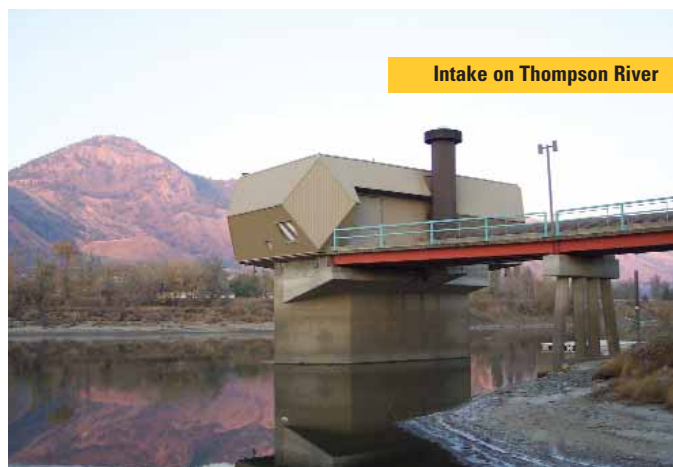
The Community Advisory Committee recommended that a new water treatment plant would be the best solution for Kamloops to ensure a stable, long-term, high quality water supply. The Committee also recommended that membrane filtration should be further investigated as an option to a conventional, sand filtration plant.

Pilot studies of four leading membrane systems were conducted during 2000, and the results were presented to city council in May 2001. The results showed that membrane filtration could provide higher quality water to the City, and was easier to operate than a conventional sand filtration plant. The study also showed that the capital cost of constructing a new membrane filtration water treatment plant would be about the same as that of a conventional plant.

## MEMBRANES SELECTED

In September 2001 the Kamloops city council selected membrane technology as the best solution for the new plant, and a year later, in September 2002, awarded ZENON Environmental Inc. with the contract to supply immersed, low-pressure ultrafiltration membranes for the project. ZENON was selected over three other membrane suppliers after a detailed review process which, in addition to the pilot testing, also included company experience and qualifications, product quality, and project lifecycle costs.

Construction of the new \$48.5 million Kamloops Centre for Water Quality Treatment Plant (KCWQ) began in April 2003 and construction was complete by the end of December 2004. The plant is now Canada's largest low-pressure, enhanced coagulation membrane water treatment plant and will be capable of supplying up to 160 MLD (42.3 MGD) of clean drinking water to the community, regardless of the turbidity in the raw river water.



Intake on Thompson River



Zenon Membrane Pilot Plant



Membrane Cassette



## LEADERSHIP IN SUSTAINABLE DESIGN

In addition to providing a safe drinking water supply, the new water treatment plant demonstrates the City's leadership in water conservation and environmental stewardship. The facility is designed and constructed according to Leadership in Energy and Environmental Design (LEED) criteria to reduce the environmental impact of the construction and operation of the plant.

Water conservation measures are in place throughout the facility. The development of a green roof will reduce run off and absorb heat while overflow from the roof and the porous pavement in the west parking lot will be redirected to a constructed wetlands. Grey water from the plant processes will eventually provide irrigation to city parks and an adjacent sports field. Even the building itself incorporates recycled materials in the concrete, aluminum, insulation, and drywall, just to name a few.

## THOMPSON RIVERS UNIVERSITY WATER EDUCATION AND RESEARCH CENTRE

Thompson Rivers University (TRU) has partnered with the City of Kamloops, and Zenon Environmental to form the TRU Water Education and Research Centre located inside the Kamloops Centre for Water Quality. This facility consists of a double classroom and two laboratories designed for instrumentation and science/research activities. The TRU Water Education and Research Centre will accomplish a variety of research goals and will provide much needed training opportunities throughout the entire water industry in addition to facilitating national and international collaborations.

Thompson Rivers University is in the final stages of developing a two year associated diploma program in Water Treat-

ment Technology that will provide operations staff the option of pursuing up to 180 Continuing Education Units (CEU's) exclusively in the water treatment field. This unique program will utilize numerous delivery formats, including distance, and in some cases enhance courses with an onsite practical component, that will be offered at the Kamloops Centre for Water Quality.

The program is designed to be flexible and meet the provincial requirements of those already practicing in the water treatment industry, as well as those interested in entering the profession of water treatment.

Some operators currently in the field may only want to meet the continuing education unit requirements (CEU's) defined by various regulatory agencies. To accommodate these operators, each major course will consist of a series of smaller modules. An operator has the flexibility to choose which module they wish, to achieve specific CEU targets. These credits can be applied later towards the Water Treatment Technology Program.

## RESEARCH

The ability to conduct research in the new TRU facility will allow the on-going collaborations with the City of Kamloops to be expanded, and provide new opportunities to work on issues important to our community and others. It will also serve as a centre for research collaboration with other Canadian and International organizations.

This facility will provide a focus area for future research projects and opportunities involving collaborations between TRU faculty and students. In addition, will provide benefits to the local region, and could well extend nationally and internationally.



Blower Room



Primary Permeate Room



Hypochlorite System



Treated Water Header

## PLANT OPERATION

The City's new membrane ultrafiltration WTP pumps water from the South Thompson River to a low lift pumping station for screening and coagulant addition to aid in the removal of total organic carbon (TOC). The removal of TOC minimizes the formation of any chlorination byproducts such as trihalomethanes which are suspected carcinogens. Six flocculation tanks will mix the incoming water for several minutes to facilitate floc formation and then release it to the membrane process tanks.

The flocculated water flows by gravity into membrane process trains. The plant is equipped with 12 process trains; however, water production is handled by 11 trains to enable one train to be removed from production for maintenance cleaning.

ZeeWeed(r) membrane cassettes are immersed directly into the process tanks. Thousands of membrane fibers hang loosely in each membrane cassette and a slight vacuum is applied to the end of each membrane fiber to draw water through microscopic pores and into the hollow fibers. With a nominal pore size of 0.04  $\mu\text{m}$ , the membranes form a physical barrier to suspended solids and provide greater than 4-log removal of pathogens such as *Giardia* and *Cryptosporidium*. Rejected particles remain in the process tank.

The Kamloops Centre for Water Quality incorporates a two-stage filtration process that enhances the recovery of potable water from the river. This second stage has six trains of ZeeWeed UF membranes and can treat up to 12.5 MLD (3.3 MGD) of reject water from the first stage. Any reject water from the secondary stage is currently being returned to the headworks of the plant and mixed with the incoming raw water for further processing. This configuration enables the plant to recover 99 percent of potable water from the river and also substantially reduces the cost of raw water pumping and waste streams to the sewer system. In the final step, chlorine is added as a disinfectant, prior to releasing the water to the municipal distribution system.

## PLANT OPERATIONS UPDATE – 1 YEAR LATER

The Kamloops Centre for Water Quality “officially” opened and started producing water full time February 18th, 2005. The following day, an open house was set up to allow the general public a tour of the new facility. While official counts were not made, it was estimated that over 3000 people showed up for a tour of the new facility. Attendance numbers were so large, that a second open house was held on April 23, 2005 to accommodate the overwhelming interest from the general public in this new facility.

## SEPTEMBER 2005 WATER QUALITY PARAMETERS

	Apparent Colour (PtCo units)	pH	Hardness (mg/L)	Conductivity ( $\mu\text{S}/\text{cm}$ )	Turbidity (NTU)	Temp ( $^{\circ}\text{C}$ )	Total Suspended Solids (mg/L)
<b>Raw</b>	17	7.85	38.0	53.14	1.50	16.7	3.2
<b>Finished</b>	< 1	7.93	37.8	61.04	0.01	17.5	0



To date (January 2006), over 23 billion litres of water have been produced by over 10 million individual membrane fibers immersed in 18 tanks at the Kamloops Centre for Water Quality. Turbidity has been undetectable and the online laser turbidity instruments remain fixated at their lowest measuring limit. A unique feature of this facility is the ability at any time to check the integrity of the entire membrane system. Sensitivity is so accurate, that a single fiber breach can be detected and repaired within hours. To date, none of the fibers producing potable water have experienced any breaches.

The facility is operated and staffed 24 hours a day, 365 days a year, consisting of 5 operations staff and one supervising Crewleader. The Kamloops Centre for Water Quality is a Class IV facility; is one of the most technologically advanced water treatment facilities in Canada and has high academic recruitment standards for all staff. All operations staff must also obtain mandatory EOCP Water Treatment Level III certification as a condition of employment.

### FUTURE EXPANSION

The Kamloops Centre for Water Quality has been constructed with community growth in mind and, when required, additional membrane cassettes can be added individually to the process tanks to increase output capacity to a total of 200 MLD (52.8 MGD). Each process train currently holds six membrane cassettes, but space is provided for eight cassettes, enabling water production capacity to be increased incrementally as necessary.

*By Brian Comerford, Utilities Manager, City of Kamloops (bcomerford@kamloops.ca) and*

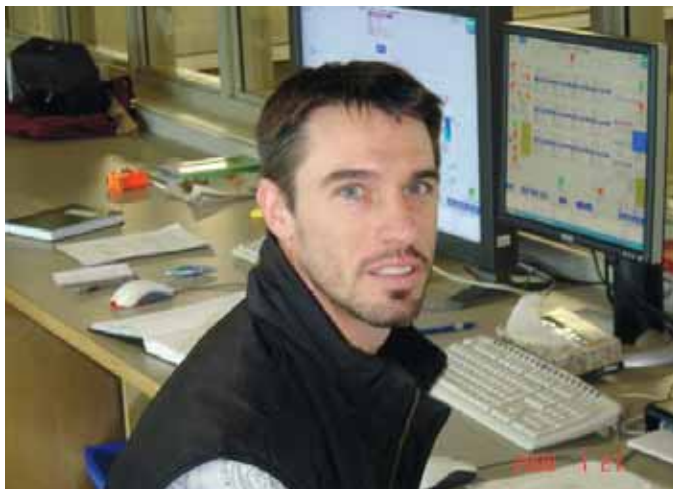
*David P. Teasdale, BASc, Level IV WTPOP, Treatment Plants Manager, City of Kamloops (dteasdale@kamloops.ca)*

*For questions on the Thompson River University Education and Research Centre please contact:*

*Steve Benoit, Program Coordinator*

*sbenoit@tru.ca; Phone: 1 (250) 314-6749*

## OPERATOR PROFILE – MIKE FIRLOTTE



In 1997, Mike was accepted into the Water Quality Technology Program at Okanagan University College. During his co-op work terms, Mike was employed at the RDN Hammond Bay Wastewater Treatment Plant. He graduated in 2000. In 2001, Mike started a position as a Water Treatment Operator for the City of Medicine Hat. He returned to BC in 2003 to start a position as Environmental Technician for the Regional District of the Okanagan Similkameen.

With the opening of the Kamloops Centre for Water Quality in 2005, Mike started in the position of Operator III and worked his way to his current position as Crew Leader of Water Treatment. His daily duties at the Kamloops Centre for Water Quality include the supervision of the plant and the operation staff. Mike enjoys doing home improvements to his house and riding the streets of Kamloops on his Harley Davidson.



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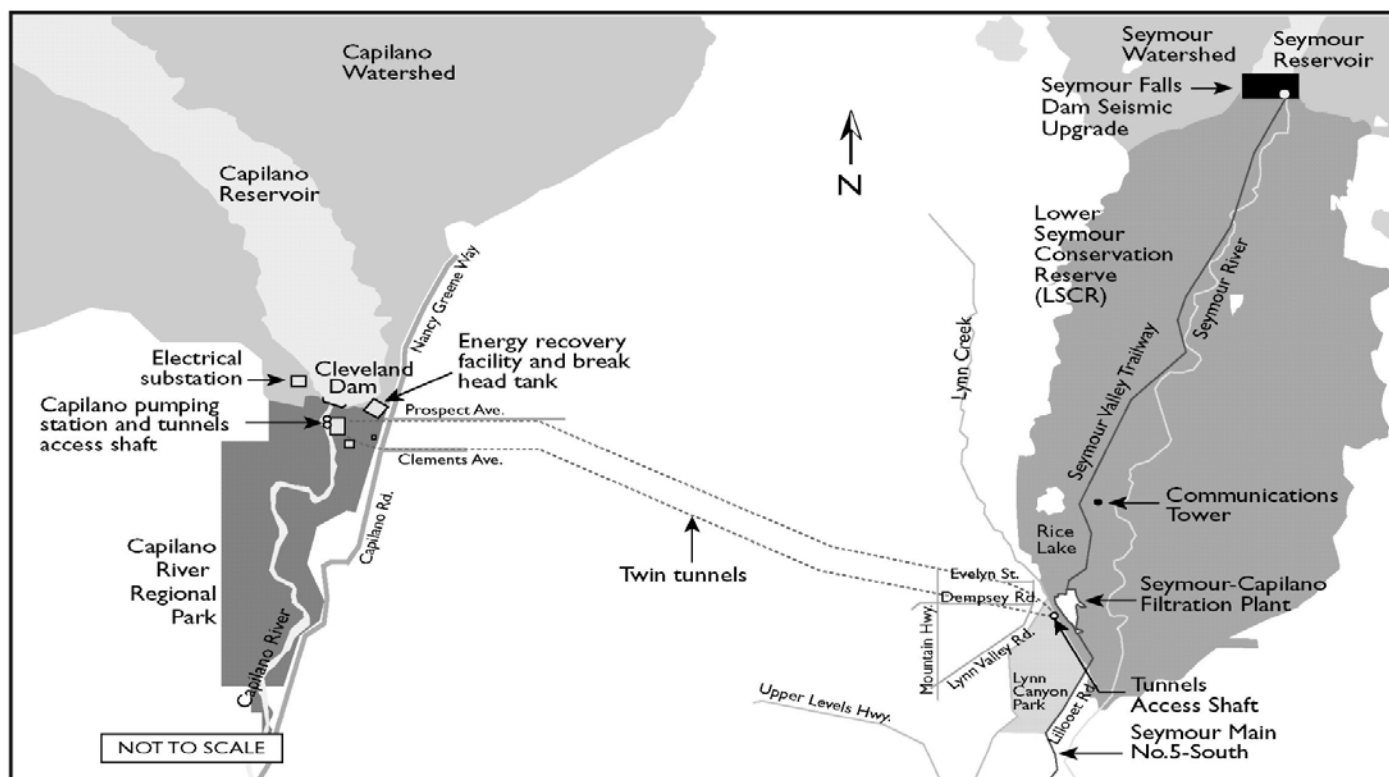
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# Seymour-Capilano Water Filtration Project



Water from the Capilano Reservoir will be pumped through a 3.7-metre-diameter tunnel to the filtration plant in the LSCR. From there, the water will be filtered and disinfected, and returned to Capilano by gravity through a parallel tunnel of the same size. The twin tunnels will be approximately 7.2 kilometres long and 160-640 metres underground.

Greater Vancouver's drinking water comes from reservoirs in three watersheds – Seymour, Capilano and Coquitlam – located in the North Shore Mountains. From there it is conveyed by regional water mains to member municipalities for distribution to homes, businesses and industry.

The Seymour-Capilano Water Filtration Plant will treat water from both the Capilano and Seymour sources. The plant is being constructed in the LSCR (Lower Seymour Conservation Reserve). In order to treat water from two sources at one plant, water will be conveyed between Capilano and Seymour through underground twin tunnels.

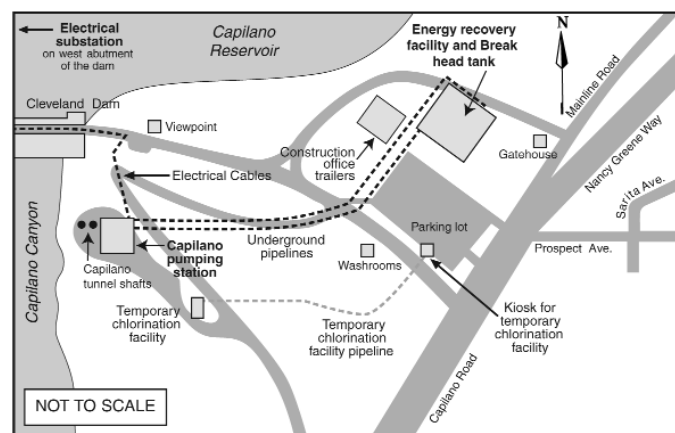
## SEYMOUR-CAPILANO DRINKING WATER FILTRATION PROJECT EXPECTED TO BE COMPLETED AT THE END OF 2008

The Seymour-Capilano Filtration Plant will filter up to 1.8 billion litres of water per day, from both the Seymour and Capilano sources. The filtration plant facilities at Seymour, together with the adjacent clearwells (underground water storage reservoirs), the overflow pond and two stormwater ponds, will encompass a space of approximately nine hectares. When the project is completed, all construction sites will be fully restored. For example, approximately 75 percent of the filtration plant site in the LSCR will be replanted with native species.

Facilities related to the filtration plant will be required at both sources. They include:

### Capilano side

- pumping station (16,000 horsepower) directly below Cleveland Dam will pump Capilano source water to the filtration plant



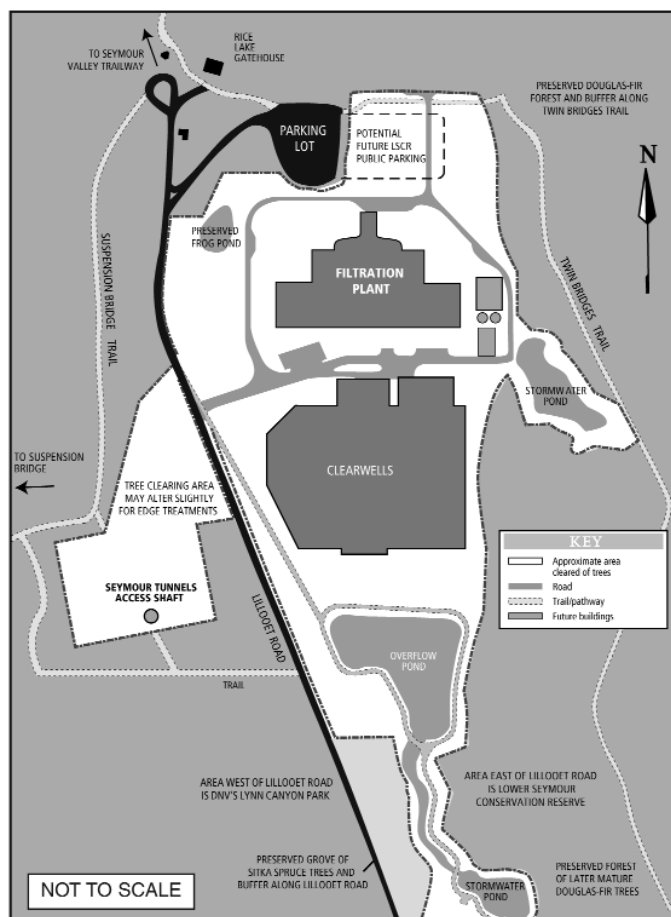
Location of Seymour-Capilano Filtration Project facilities in Capilano River Regional Park.

# Seymour-Capilano Water Filtration Project

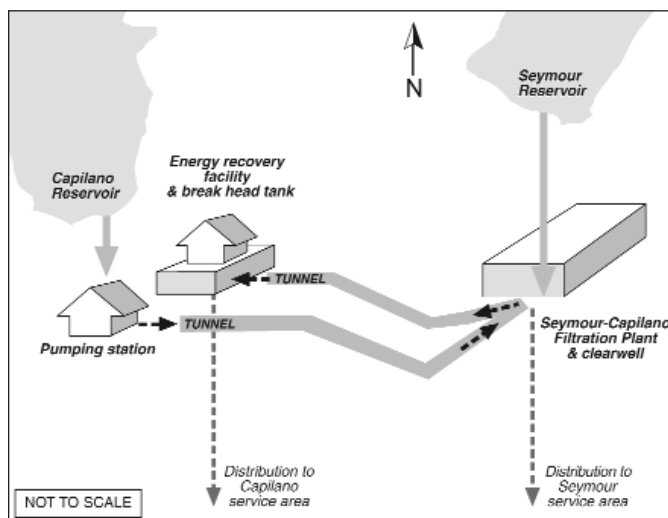
- energy recovery facility and break head tank located directly north of the parking lot will reduce water pressure returning to Capilano from the filtration plant, and recover energy in the process
- electrical substation, located west of Cleveland Dam, will power the pumping station
- twin tunnels, each 7.2 kilometres long and 3.7 metres in diameter, will convey Capilano source water to and from the filtration plant in the LSCR.

## Seymour side

- filtration plant, located in the LSCR near the Rice Lake gate, off Lillooet Rd., will treat water from the Capilano and Seymour sources
- clearwells for water storage, located adjacent to the plant, will store treated water for distribution
- twin tunnel access shaft, located across Lillooet Rd. from the filtration plant, deep in the rock under Lynn Canyon Park, will convey Capilano water to and from the plant.



Preliminary Seymour-Capilano Filtration Plant layout to be located in the LSCR.



This diagram shows how the plant will filter both Seymour and Capilano source water.

## HOW WILL THE WATER FILTRATION PLANT WORK?

Water from the Seymour Reservoir will be piped via an existing 2.3-metre-diameter water main to the plant near Rice Lake, where it will be filtered and disinfected prior to entering the distribution system. The reservoir is approximately 11 kilometres north of the plant. Water from the Capilano Reservoir will be pumped to the plant through a 7.2-kilometre-long, 3.7-metre diameter tunnel. An electrical substation has been constructed on the west abutment of the Capilano Reservoir to power the pumping station. The water will be filtered, disinfected with ultraviolet (UV) light and chlorine, and temporarily stored in the clearwells (see map on page 2). The treated water will then return to Capilano, by gravity, through a parallel tunnel for distribution. To learn more about the twin tunnels, please see the GVRD Fact Sheet: Filtration Plant Twin Tunnels (2004).

An energy recovery facility and break head tank (located near the Capilano River Regional Park public parking lot) will recover energy from the water in the gravity-fed tunnel (Seymour is at a slightly higher elevation than Capilano) and reduce the pressure of the water before it reaches the distribution system. The recovered energy will produce electricity, which will be used by the GVRD or sold to B.C. Hydro. When construction is complete, the sites will be replanted with native vegetation.

# CERTIFICATION QUIZ – WATER TREATMENT

These questions are representative of those found in actual certification exams.

1. **The aeration process tends to decrease all of the following except?**
  - A. carbon dioxide
  - B. dissolved oxygen
  - C. hydrogen sulfide
  - D. volatile organic chemicals
2. **Turbidity in water can be caused by**
  - A. adequate filtration
  - B. dissolved gases
  - C. inadequate baffling
  - D. unsettled particulate matter
3. **Fluoride is generally added to public water supplies to**
  - A. aid in disinfection
  - B. reduce pipe corrosion
  - C. help prevent contamination
  - D. protect the dental health of young citizens
4. **A method used to soften water is**
  - A. aeration
  - B. sedimentation
  - C. ion exchange
  - D. adsorption
5. **Breakpoint chlorination is achieved when**
  - A. free ammonia can be tasted in the water
  - B. no chlorine residual is detected
  - C. the strong chlorine taste at the plant did not persist in the distribution system
  - D. when chlorine dosage is increased, a corresponding increase in residual is detected
6. **A zeolite softening unit will replace calcium and magnesium ions with \_\_\_\_\_ ions.**
  - A. fluoride
  - B. iron
  - C. sodium
  - D. sulfur
7. **The type of corrosion caused by the use of dissimilar metals in a water system is**
  - A. caustic corrosion
  - B. galvanic corrosion
  - C. oxygen corrosion
  - D. tubercular corrosion
8. **Chlorine reacts with nitrogenous compounds to form**
  - A. ammonia nitrate
  - B. free chlorine
  - C. chlorinated hydrocarbons
  - D. chloramines
9. **The main characteristic of raw water that enables algae to grow**
  - A. presence of copper sulfate
  - B. low pH
  - C. high hardness
  - D. presence of nutrients
10. **What happens when lime is fed to water for corrosion control?**
  - A. alkalinity is decreased
  - B. CO<sub>2</sub> does not change
  - C. turbidity is decreased
  - D. pH is increased
11. **The chlorine gas feed rate is usually controlled by adjusting the**
  - A. water flow to the injector
  - B. valve on the chlorine cylinder
  - C. pressure in the chlorine cylinder
  - D. rotameter control valve
12. **Hardness in water is caused by**
  - A. dissolved minerals
  - B. high pH
  - C. low turbidity
  - D. alkalinity
13. **Which of the following can cause taste and odors in a water supply?**
  - A. dissolved zinc
  - B. algae
  - C. high pH
  - D. low pH
14. **A disease that can be transferred by water is**
  - A. gonorrhea
  - B. malaria
  - C. mumps
  - D. typhoid
15. **4-log removal means \_\_\_\_\_ percent removal/inactivation.**
  - A. 99.9
  - B. 99.99
  - C. 99.999
  - D. 99.9999

(Answers on page 18)



# Think Safety!

## SEWER ENTRY GUIDELINES

Municipal and other sewer maintenance workers face conditions that may be immediately dangerous to life when they enter sewer systems for repair or maintenance. Knowledge of the dangers involved, training in safe work procedures, and the correct use of safety equipment are essential to reducing the number of accidents that occur during working in confined spaces.

**At higher concentrations (150-200 ppm) the odour of H<sub>2</sub>S may not be detected since the gas affects the sense of smell.**

## RESPONSIBILITIES

Everyone has a responsibility for health and safety at the work site – the facility owner, employer, supervisor and worker must all do their part. The supervisor shares the employer's responsibility of making sure that workers under the supervisor's direction perform work safely. The worker must be adequately trained and equipped for the job, aware of any hazards, and are able to deal with the hazards properly. Workers are responsible for carrying out their work in a manner that does not endanger them or their fellow workers and must follow safe work procedures and use the equipment provided to complete the job safely.

## SEWER HAZARDS

Of the various hazards that may be present in sewers, gases and vapours are particularly dangerous because most of them have no warning properties. Gases and vapours found in sewers can be both toxic and explosive, invisible and often odourless.

In addition, there is the constant danger of oxygen deficiency. Gases that displace oxygen can create an oxygen deficient atmosphere within the sewer, as can chemical and biological reactions – a situation that gives no warning of its potentially deadly effect. Under certain circumstances, harmful substances may be released into the sewer system. This may occur accidentally as a result of a chemical spill. Sometimes chemicals such as gasoline, oil, paint and solvents are flushed down the sewer as a means of disposal even though the law does not allow it. Bacteria and viruses are present in sewers and may be capable of causing disease. Worker must take precautions to avoid infection.

All of these situations may be immediately dangerous to life but give little or no warning of their existence.

## OXYGEN DEFICIENCY

Oxygen may be displaced by other gases and vapours, creating an oxygen deficient atmosphere. Chemical action may also result in oxygen being used up. An example is the rotting of organic matter such as sewage by the action of bacteria. A combination of this and other processes can lead to a reduction of the total oxygen content of the air in the sewer to less than the minimum required for performing work. The minimum oxygen requirement is 19.5 percent by volume. Below this level, air supply respiratory protective equipment (breathing apparatus) is required.

## HYDROGEN SULPHIDE (H<sub>2</sub>S)

A gas commonly found in sewers, H<sub>2</sub>S can be created by the decomposition of organic matter. Concentrations as low as 1 ppm have a characteristic smell of rotten eggs. At higher concentrations (150-200 ppm) the odour of H<sub>2</sub>S may not be detected.

**Gases and vapours found in sewers can be both toxic and explosive, invisible and often odourless.**

Type of Hazard	Explosive	Odour	Lighter or Heavier than Air	Action
Oxygen deficiency	No	No	n/a	Asphyxiant
Hydrogen Sulphide (H <sub>2</sub> S)	Yes	Yes, Rotten Egg	Heavier	nerve gas, deadly poison
Carbon Monoxide	Yes	No	almost the same as air	Asphyxiant, deadly poison
Methane	Yes	No	Lighter	Asphyxiant
Gasoline Vapours	Yes	Yes	Heavier	Asphyxiant

## Think Safety!

ed since the gas affects the sense of smell. Concentrations of  $H_2S$  in excess of 500 ppm will cause unconsciousness in a few seconds. If the victim is not immediately removed to fresh air, death quickly follows.

### CARBON MONOXIDE

This is a colourless, odourless and deadly gas. It is the product of incomplete combustion, and the most common source is the exhaust of gasoline and diesel engines. If such engines must be operated near an open sewer, precautions must be taken to ensure that exhaust gases are directed away from the opening. Exposure to concentrations exceeding 50 ppm may result in a worker experiencing ringing in the ears, nausea, headaches and sleepiness. The effects become increasingly severe as the concentration and duration of exposure increase. Unconsciousness and death may follow unless immediate rescue is undertaken.

### METHANE (NATURAL GAS, $CH_4$ )

Explosion is the main danger associated with methane because it is flammable. It may be released from a leak in a gas line, but can also be a by-product of backed-up or sluggish sewers. This gas will also displace oxygen to below the point necessary to maintain life, acting as an asphyxiant.

### GASOLINE VAPOURS

Gasoline is sometimes found in both sanitary and storm sewers. It may be from leaking underground storage tanks or the illegal disposal of gasoline into the sewer system. Gasoline vapours, even in small amounts, can be a fire and explosion hazard. Gasoline vapour is a respiratory irritant and acts as an anesthetic agent when inhaled. The most common physical effects due to excessive exposure are symptoms of intoxication, headaches, blurred vision, dizziness and nausea. Concentrations exceeding 2,000 ppm are intoxication within 5 to 10 minutes.

### DISEASE HAZARDS

The potential for illness from contact with viral, bacteria, or parasitic microorganisms in sewage is real, but fortunately is reasonably limited. For those workers exposed to sewage, the most serious viral risk is hepatitis and the most serious bacterial risk is tetanus. Intestinal parasites, although undoubtedly present, have never been identified as a problem for workers exposed to sewage who follow safe work practices.



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**FLOW-LEVEL-GAS DETECTION-DISINFECTION-TELEMETRY**

# NEW MEMBERS AND UPGRADES

**Congratulations to the following new operators and those operators who have upgraded their certification level.  
July 1, 2005 to November 30, 2005**

CERT. NO.	NAME	CITY	CERT. NO.	NAME	CITY
5528	Abel, Jason	SWS <i>Ft. McMurray, AB</i>	4805	Christiansen, Erick	WT I <i>Terrace, BC</i>
5554	Abriel, Tony	SWS <i>Kitimat, BC</i>	3438	Chu, Alfred	WT II <i>Coquitlam, BC</i>
5475	Adams, Geronimo	SWS <i>Ashcroft, BC</i>	5653	Clement, Cory	MWWT I <i>Vernon, BC</i>
5475	Adams, Geronimo	SWWS-L <i>Ashcroft, BC</i>	5555	Combs, Sharon	SWS <i>Terrace, BC</i>
5506	Aiken, Jonathan	WT I <i>Kitimat, BC</i>	5662	Comeau, Brent	SWS <i>Vernon, BC</i>
3527	Alexander,	WWC II <i>North Vancouver, BC</i>	5443	Cooper, David	WWC I <i>North Vancouver, BC</i>
5548	Anderson, Darren	OIT WD <i>Hudson's Hope, BC</i>	5501	Cortese, Benjamin	OIT WWT <i>Tatla Lake, BC</i>
5600	Androlick, Mark	WWC I <i>Kamloops, BC</i>	5531	Corvec, Mederic	SWS <i>Pink Mountain, BC</i>
5476	Ante, Mike	SWS <i>Courtenay, BC</i>	5647	Couling, Kyle	OIT WD <i>Parksville, BC</i>
5477	Austin, James	SWS <i>Courtenay, BC</i>	5509	Coverdale, Brian	WT I <i>Kitimat, BC</i>
4642	Bachmann, Roland	WT I <i>Kitimat, BC</i>	5550	Craig, Robert	WD I <i>Campbell River, BC</i>
4642	Bachmann, Roland	IWWT I <i>Kitimat, BC</i>	3104	Crandell, Ronald	WD II <i>Rossland, BC</i>
5585	Bahnman, Jeffrey	SWS <i>Cultas Lake, BC</i>	3143	Currie, William	WD II <i>Nanaimo, BC</i>
1630	Baker, Curtis	WD II <i>Ladysmith, BC</i>	5624	Daley, David	SWS <i>Uchuelet, BC</i>
4366	Baytaluke, Harold	MWWT I <i>Sparwood, BC</i>	5658	Daugert, Sylvan	WWC I <i>Massat, BC</i>
5529	Bell, Gregory	SWS <i>Ft. Nelson, BC</i>	3707	Davenport, Leslie	SWWS-M <i>Kelowna, BC</i>
1176	Bennett, John	WD I <i>Masset, BC</i>	1952	De Jong, Harold	WD II <i>Fort Nelson, BC</i>
5586	Benson, Craig	SWS <i>Maple Ridge, BC</i>	5631	de Montreuil, Henry	SWS <i>Gibsons, BC</i>
5602	Bentz, Warren	WT I <i>Kamloops, BC</i>	1073	DeJong, Paul	WT I <i>Kitimat, BC</i>
5633	Berg, Dale	SWS <i>Chetwynd, BC</i>	5480	Delrio, Jim	SWS <i>Port Alberni, BC</i>
5530	Berggren, Corey	SWS <i>Fort Nelson, BC</i>	5616	DeMarcos, Jon	SWS <i>Kamloops, BC</i>
5464	Billy, Herbert	SWS <i>Lillooett, BC</i>	5625	Derby, Allan	SWS <i>Comox, BC</i>
5650	Birch, Korey	OIT WWT <i>Penticton, BC</i>	5470	Dergousoff, Wallace	WD I <i>Grand Forks, BC</i>
5660	Blundell, Neil	SWS <i>Vernon, BC</i>	5533	Desjarlais, Richard	SWS <i>Moberly Lake, BC</i>
5478	Bolch, Mike	SWS <i>Powell River, BC</i>	5546	Dewhurst, Calvin	SWS <i>Comox, BC</i>
5676	Bolton, Andrew	SWS <i>Haisla, BC</i>	5637	Dezamits, Derek	SWS <i>Burns Lake, BC</i>
5094	Botwright, Mark	OIT WT <i>North Vancouver, BC</i>	3127	Di Stasio, Tony	WT I <i>Coquitlam, BC</i>
5507	Boudreau, Steven	WT I <i>Kitimat, BC</i>	5502	Doiron, Simon	OIT WWT <i>Kelowna, BC</i>
5634	Boulton, Ronald	SWS <i>Fort Nelson, BC</i>	1280	Dove, Alan	WD III <i>North Vancouver, BC</i>
5612	Boyd, Dwayne	SWS <i>Armstrong, BC</i>	5377	Dubois, Gilbert	SWWS-L <i>Armstrong, BC</i>
5605	Boyles, Diana	SWS <i>Peachland, BC</i>	1019	Dunham, Matt	SWS <i>Deroche, BC</i>
1867	Boyles, Terence	WT II <i>Cobble Hill, BC</i>	4792	Eby, Tawn	WWC I <i>Courtenay, BC</i>
5661	Bracewell, Kenneth	SWS <i>Vernon, BC</i>	5568	Eng, Sam	IWWT I <i>Burnaby, BC</i>
4643	Brady, Jeremy	WT I <i>Kitimat, BC</i>	5654	Evans, Garry	MWWT I <i>Westbank, BC</i>
5479	Brauer, John	SWS <i>Sointula, BC</i>	5613	Evdokimoff, John	SWS <i>Blind Bay, BC</i>
5515	Bredin, Patrick	SWS <i>Prince George, BC</i>	5663	Fallis, Lawrence	SWS <i>Lake Country, BC</i>
5516	Brown, Scott	SWS <i>Burns Lake, BC</i>	5664	Famenoff, John	WD I <i>Kelowna, BC</i>
4191	Bruno, Tommaso	WWC I <i>Vancouver, BC</i>	5572	Fanning, Lisa	SWS <i>Creston, BC</i>
4807	Bucknell, Dillon	MWWT I <i>100 Mile House, BC</i>	5439	Farquhar, Brian	WD I <i>North Vancouver, BC</i>
5503	Burdett, Gregory	WD I <i>Port Coquitlam, BC</i>	5534	Fenwick, Devin	SWS <i>Fort Nelson, BC</i>
3144	Burow, Philip	WD II <i>Parksville, BC</i>	5665	Fisher, Joseph	WD I <i>Kelowna, BC</i>
5574	Burrell, Ross	SWS <i>Nelson, BC</i>	3228	Flamond, Terry	WWC I <i>Kelowna, BC</i>
5635	Campbell, Bradley	SWS <i>Chetwynd, BC</i>	5606	Fletcher, Barbara	SWS <i>Okanagan Falls, BC</i>
5532	Campbell, Dean	SWS <i>Fort St. John, BC</i>	5330	Florencio, Edgardo	WD II <i>Kitimat, BC</i>
5508	Campbell, Tom	WT I <i>Kitimat, BC</i>	5471	Forgie, Brent	WD I <i>Maple Ridge, BC</i>
5604	Carew, Jordan	SWS <i>Fort Nelson, BC</i>	5518	Fossberg, Hildur	SWS <i>Quesnel, BC</i>
5599	Carusi, Agostino	WWC I <i>Kamloops, BC</i>	5666	Francis, Dave	WD I <i>Kelowna, BC</i>
3815	Castagna, Marco	WD III <i>Surrey, BC</i>	5679	Frank Mark, R	SWS <i>Westbank, BC</i>
5442	Catania, Paul	WWC I <i>Burnaby, BC</i>	5667	Frank, Heather	WD I <i>Nanaimo, BC</i>
5603	Chamberlin, Judith	WT I <i>Kamloops, BC</i>	2031	Fred, Gerald	SWS <i>Port Alberni, BC</i>
1720	Chapman, Dean	WD II <i>Grand Forks, BC</i>	5453	Freels, Joslyn	SWS <i>Merritt, BC</i>
5573	Cherry, David	SWS <i>Nelson, BC</i>	5465	Frenkel, Klaus	SWS <i>Sorrento, BC</i>



# NEW MEMBERS AND UPGRADES

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July 1, 2005 to November 30, 2005**

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5592	Friesen, Daniel	SWS	Hope, BC	5493	Jack, Timothy	SWS	Vernon, BC
5468	Froese, Lynda	SWS	North Vancouver, BC	5669	Jeremy, Jewitt	WD I	Lumby, BC
5504	Furtado, Rick	WD I	Burnaby, BC	5547	Johnson, Timothy	SWS	Powell River, BC
4197	Galway, Colin	WWC I	Surrey, BC	4339	Jones, Thomas	WD II	Qualicum Beach, BC
5575	Garbula, Gregory	SWS	Crawford Bay, BC	3611	Jorgensen, Bruce	MWWT II	Maple Ridge, BC
5553	Gardner, Calem	WD I	Squamish, BC	5445	Jozo, Attila	WWC I	New Westminster, BC
4760	George, Edgar	WD I	Kitkatla, BC	5620	Kaegi, David	SWS	Revelstoke, BC
5481	Gilbert, James	SWS	Maple Bay, BC	5639	Kalk, Orrin	SWS	Chase, BC
5450	Gilleland, Richard	SWS	Salt Spring Island, BC	5571	Keely, Ronald	SWS	Kamloops, BC
5578	Goodwin-Wilson, Ralph	SWS	Nelson, BC	5163	Kelly, Joe	WD I	Abbotsford, BC
3464	Grant, James	WD II	Victoria, BC	5607	Kenneway, Bruce	SWS	Castlegar, BC
5617	Grant, Randy	SWS	Castlegar, BC	5484	Kentfield, Lynda	SWS	Coquitlam, BC
5467	Gray, Laureen	OIT WT	Farmington, BC	5500	Kerr, Christopher	OIT WD	Terrace, BC
4384	Greenwood, Michael	WWC II	Victoria, BC	5485	Kerr, Daniel	SWS	Gold River, BC
5432	Grieve, Douglas	SWS	Nelson, BC	5556	Kerr, Graham	SWS	Terrace, BC
3548	Griffith, Lionel	MWWT II	Richmond, BC	1945	Kimble, Willard	WT I	Surrey, BC
3964	Grill, Martin	MWWT II	Nelson, BC	5608	Klashinsky, Curtis	SWS	Castlegar, BC
5626	Gurr, Kenneth	SWS	Gabriola Island, BC	5621	Kommnick, Friedhelm	SWS	Cherryville, BC
1897	Gustafson, Darrell	WD II	Fort Nelson, BC	5579	Kootnikoff, Michael	SWWS-M	Nelson, BC
5482	Gwynne, Geoffrey	SWS	Nanaimo, BC	5579	Kootnikoff, Michael	SWS	Nelson, BC
5636	Hale, Leslie	SWS	Chase, BC	5651	Kreutz, thomas	OIT WWT	Surrey, BC
1710	Hall, Brent	WT II	Surrey, BC	3216	Kylmala, Senja	WT I	Richmond, BC
5570	Hall, Sharron	SWS	Charlie Lake, BC	5520	Kyncl, Roger	SWS	Southbank, BC
5598	Hall, Trevor	SWWS-L	Waglisla, BC	5505	Lamoureux, Bryce	WD I	Port Coquitlam, BC
5629	Halverson, Wayne	SWWS-M	Chase, BC	5678	Langner, Lorne	SWS	Boston Bar, BC
5619	Hamm, Joseph	SWS	Vernon, BC	1971	Larsen, Davin	SWS	Qualicum Beach, BC
5559	Hamoline, Paul	SWS	Grand Forks, BC	5521	Lasure, Robert	SWS	Prince George, BC
3692	Hanna, Keith	SWWS-M	Celista, BC	5561	Lawrence, Keith	SWS	Christina Lake, BC
4337	Hansen, Dave	WD II	Comox, BC	5452	Legg, Bryan	SWS	Brittannia Beach, BC
5444	Harrington, Randy	WWC I	Burnaby, BC	5536	Lesmeister, Blaine	SWS	Edmonton, AB
3523	Harry, Ernest	WD II	Powell River, BC	5510	Li, Hengshan	WT I	Burnaby, BC
1731	Harvey, Bill	WD III	Garibaldi Highlands,	5593	Lidvall, John	SWS	Lake Errock, BC
5569	Harwood, Christine	SWS	Hudson's Hope, BC	5641	Lindenberger,	SWS	Fort Fraser, BC
5668	Hawthorne, Scott	WD I	Saanichton, BC	5458	Lowe, Jay	WD I	Burnaby, BC
4498	Heidt, Dustin	WT I	Port Coquitlam, BC	5461	Lussin, Emily	OIT WWT	Whistler, BC
5587	Hemsworth, Bevan	SWS	Vancouver, BC	5461	Lussin, Emily	MWWT I	Whistler, BC
5335	Henderson, Leonard	WD II	North Delta, BC	5589	MacDonald, Rory	SWS	Langley, BC
5535	Herman, Robert	SWS	Fort St. John, BC	5618	MacGillivray, Randy	SWS	Vernon, BC
5588	Herrera, Alberto	SWS	Surrey, BC	5622	MacLeod, John	SWS	Mara, BC
5638	Herrmann, Edward	SWS	Swansea Point, BC	4497	Macrae, Tara	WT I	Sun Peaks, BC
3279	Hill, Ian	WWC I	Revelstoke, BC	4856	Malakoff, Dan	WWC I	Kelowna, BC
5582	Hill, tim	SWS	Slocan, BC	5683	Maloku, Tahir	WT I	Vancouver, BC
5655	Holt, James	MWWT I	Campbell River, BC	5486	Manering, Rob	SWS	Denman Island, BC
5581	Honey, Ronald	SWS	Kaslo, BC	1265	Manson, Donald	WT II	Revelstoke, BC
5451	Hope, Lisa	SWS	Hope, BC	5522	Marchbank, Roy	SWS	Prince George, BC
5627	Horvat, Frank	SWS	Pender Island, BC	3291	Markel, Marvin	WD III	Vernon, BC
5457	Hounsell, Christopher	OIT WWT	Campbell River, BC	1628	Marleau, Lyle	WWC I	Terrace, BC
5483	Hucaluk, Brian	SWS	Pender Island, BC	3453	Marsden, Gary	MWWT IV	Creston, BC
4124	Hutchinson, Gerry	WD II	Nanaimo, BC	5719	Marshman, Jacob	MWWT I	Salmon Arm, BC
5560	Idler, Ross	SWS	Christina Lake, BC	5538	Mattson, Karl	SWS	Rolla, BC
4210	Inkster, Richard	WD I	Terrace, BC	5524	Maurer, Robert	SWS	Smithers, BC
5519	Isaak, Stephen	SWS	Williams Lake, BC	5652	McCormick, Edward	OIT WWT	Midway, BC

# NEW MEMBERS AND UPGRADES

**Congratulations to the following new operators and those operators who have upgraded their certification level.  
July 1, 2005 to November 30, 2005**

CERT. NO.	NAME	CITY	CERT. NO.	NAME	CITY
5446	McDonell, Bill	WWC I <i>New Westminster, BC</i>	3592	Ridley, Colin	WD I <i>Hartley Bay, BC</i>
5494	McDougall, Richard	SWS <i>Pavillion, BC</i>	5455	Rieger, Garry	SWS <i>Kelowna, BC</i>
5594	McElwee, George	SWS <i>Chilliwack, BC</i>	5488	Robertson, Allan	SWS <i>Courtenay, BC</i>
5537	McGee, Robert	SWS <i>Fort St John, BC</i>	5601	Rotella, Nico	WD I <i>Port Coquitlam, BC</i>
5577	McKenzie, Aarion	SWS <i>Slocan, BC</i>	5114	Roth, Robert	MWWT I <i>North Vancouver, BC</i>
5577	McKenzie, Aarion	SWWS-L <i>Slocan, BC</i>	5644	Rouleau, Roland	SWS <i>Prince George, BC</i>
5198	McKnight, Chris	WD I <i>Klemtu, BC</i>	5576	Rousseau, Jerry	SWS <i>Crawford Bay, BC</i>
1397	McLean, Cid	WT I <i>Penticton, BC</i>	5645	Ruemper, Keith	SWS <i>Chase, BC</i>
1378	McLean, Colin	WT II <i>Mission, BC</i>	5456	Russell, Stephen	OIT WD <i>Cumberland, BC</i>
1490	McLean, Robin	WT II <i>Winfield, BC</i>	5460	Rust, Bernd	SWS <i>Sidney, BC</i>
5670	McMillan, Geoff	WD I <i>Parksville, BC</i>	5489	Ryan, Marjorie	SWS <i>Lund, BC</i>
4341	McNab, Alan	WD II <i>Comox, BC</i>	3803	Salamandyk, Earl	WD II <i>Grand Forks, BC</i>
1676	McPherson, Geordie	WD II <i>Nanaimo, BC</i>	4357	Sandberg, Lorne	IWWT II <i>Port Hardy, BC</i>
5642	McRae, Darryl	SWS <i>Clearwater, BC</i>	5473	Saran, Sukh	WD I <i>Kelowna, BC</i>
5591	McWilliams, Brian	SWS <i>Langley, BC</i>	4369	Saul, Harold	WD I <i>Mount Currie, BC</i>
4510	Measor, Shawn	MWWT II <i>Merville, BC</i>	4730	Savage, Brian	WD III <i>Maple Ridge, BC</i>
4839	Melo, Jamie	WD I <i>Penticton, BC</i>	1447	Scaber, Victor	WD II <i>Victoria, BC</i>
5643	Michell, Richard	SWS <i>Fraser Lake, BC</i>	1752	Schade, Arnold	WD II <i>Nanaimo, BC</i>
5463	Mindek, Jack	SWS <i>Elko, BC</i>	5723	Schmidt, Ferdinand	WD I <i>Creston, BC</i>
3825	Minyard, Jeffrey	WD II <i>Port Coquitlam, BC</i>	5563	Schneider, Bryan	SWS <i>Grand Forks, BC</i>
5495	Monds, Faith	SWS <i>Vernon, BC</i>	3602	Schneider, Harvey	SWS <i>Richmond, BC</i>
5496	Morgan, Stanley	SWS <i>Aldergrove, BC</i>	5513	Schooley, Stephen	WT I <i>Kitimat, BC</i>
5523	Morrow, Monty	SWS <i>Prince George, BC</i>	4516	Schooner, Percy	WD I <i>Bella Coola, BC</i>
3307	Mossop, Scott	WWC I <i>Squamish, BC</i>	5680	Schroeter, Mark	SWS <i>Osoyoos, BC</i>
5454	Muhlberger, Peter	SWS <i>Kelowna, BC</i>	665	Scott, Darren	WD I <i>Chilliwack, BC</i>
5614	Munts, Arie	SWS <i>Vernon, BC</i>	665	Scott, Darren	WT III <i>Chilliwack, BC</i>
5511	Murdoch, Ronald	WT I <i>Kitimat, BC</i>	4027	Seymour, Ernest	WD I <i>Ladysmith, BC</i>
4859	Murrell, Michael	WWC I <i>Kelowna, BC</i>	4027	Seymour, Ernest	SWWS-L <i>Ladysmith, BC</i>
5609	Nabe, Everett	SWS <i>Kaelden, BC</i>	3425	Shaheem, Zahid	WWC I <i>Port Coquitlam, BC</i>
3223	Nadasde, Wayne	WWC I <i>Kelowna, BC</i>	5539	Shannon, Howard	SWS <i>Pink Mountain, BC</i>
5682	Nasby, Aaron	WD I <i>Canoe, BC</i>	5590	Shay, Thor	SWS <i>Maple Ridge, BC</i>
5630	Neild, Jaret	SWWS-L <i>Heffley Creek, BC</i>	5540	Sheldon, Greg	SWS <i>Charlie Lake, BC</i>
5525	Nelless, Brady	SWS <i>Prince George, BC</i>	5583	Sheloff, Jeff	SWS <i>Slocan Park, BC</i>
5512	Neudorf, Kenneth	WT I <i>Kitimat, BC</i>	5648	Shepherd, Jim	OIT WD <i>Hudsons Hope, BC</i>
5499	Neville, Glen	SWS <i>Vancouver, BC</i>	4652	Silva, David	WT I <i>Kitimat, BC</i>
2060	Oliver, Kenn	WT II <i>Port Hardy, BC</i>	4652	Silva, David	IWWT I <i>Kitimat, BC</i>
3098	O'Neill, Conor	MWWT IV <i>Richmond, BC</i>	5672	Simpson, Michael	WD I <i>Victoria, BC</i>
4840	Palmer, Robert	WD I <i>Naramata, BC</i>	5541	Sirca, Rob	SWS <i>Fort St. John, BC</i>
4637	Paulson, Gary	IWWT I <i>Kitimat, BC</i>	4499	Sladen, Trevor	OIT WWT <i>Whistler, BC</i>
5610	Pearce, Michael	SWS <i>Okanagan Falls, BC</i>	5565	Slasor, Richard	SWS <i>ChristinaLake, BC</i>
5487	Peck, Richard	SWS <i>Comox, BC</i>	4346	Smele, Rodney	WD II <i>North Vancouver, BC</i>
5671	Pendergast, Keith	WD I <i>Revelstoke, BC</i>	3062	Smerychynski, Anthony	WT II <i>Vancouver, BC</i>
5580	Penson, James	SWS <i>Kaslo, BC</i>	5447	Smith, David	WWC I <i>Surrey, BC</i>
5497	Peter, Andrew	SWS <i>Lillooet, BC</i>	5557	Smith, Eugene	SWS <i>Terrace, BC</i>
5562	Peterson, Larry	SWS <i>Christina Lake, BC</i>	5542	Smith, George	SWS <i>Fort Nelson, BC</i>
5150	Phillips, Mickey	SWS <i>Vanderhoof, BC</i>	5558	Smith, Patrick	SWS <i>Terrace, BC</i>
1779	Pistilli, Ben	SWS <i>Maple Ridge, BC</i>	3787	Smith, Randall	MWWT I <i>Greenwood, BC</i>
5584	Plourder, Sylvain	SWS <i>Creston, BC</i>	5448	Soares, Paul	WWC I <i>Port Moody, BC</i>
900	Popoff, Joe	WWC I <i>Castlegar, BC</i>	4218	Soderstrom, Corey	WWC I <i>Chilliwack, BC</i>
1237	Rees, Patrick	WD II <i>Victoria, BC</i>	5462	Sommers, John	WD I <i>North Vancouver, BC</i>
5472	Reid, Donovan	WD I <i>Surrey, BC</i>	5543	Spenner, Matt	SWS <i>Arras, BC</i>
3737	Ricciuti, Daniel	WT I <i>Kamloops, BC</i>	5640	Spreng, Heiko	SWS <i>Houston, BC</i>

## NEW MEMBERS AND UPGRADES

**Congratulations to the following new operators and those operators who have upgraded their certification level.  
July 1, 2005 to November 30, 2005**

CERT. NO.	NAME		CITY	CERT. NO.	NAME		CITY
3120	Stalker, Douglas	MWWT IV	<i>Richmond, BC</i>	5459	Veitch, James	WD I	<i>New Westminster, BC</i>
5595	Stanton, Robert	SWS	<i>Chilliwack, BC</i>	1942	Villanueva, Arvel	WT III	<i>New Westminster, BC</i>
5469	Stearns, Brandon	MWWT I	<i>Kelowna, BC</i>	5449	Virginillo, Marco	WWC I	<i>Coquitlam, BC</i>
5673	Stelmack, David	WD I	<i>Chilliwack, BC</i>	5178	Wagner, Iris	WT II	<i>Kitimat, BC</i>
1180	Stepaniuk, Ronald	WT II	<i>Victoria, BC</i>	5615	Wakeham, Donald	SWS	<i>Oyama, BC</i>
5677	Stephens, Percy	SWS	<i>Greenville, BC</i>	5656	Walker, Darren	MWWT I	<i>Clearwater, BC</i>
4625	Stewardson, Geoff	MWWT II	<i>Kamloops, BC</i>	5681	Walker, David	SWS	<i>Kelowna, BC</i>
99	Stocker, Glen	WD I	<i>Parksville, BC</i>	5517	Wanhill, Andrew	SWS	<i>Terrace, BC</i>
5020	Stoelwinder, Walter	SWWS-L	<i>Fort Fraser, BC</i>	5545	Ward, Kirk	SWS	<i>Fort St. John, BC</i>
5564	Stoochnoff, Peter	SWS	<i>Grand Forks, BC</i>	5549	Watson, Geoffrey	OIT WD	<i>Halfmoon Bay, BC</i>
4109	Stowell, Christian	WD I	<i>West Bank, BC</i>	4081	Webb, Richard	WWC I	<i>Canoe, BC</i>
5674	Stringer, Dwayne	WD I	<i>Invermere, BC</i>	5551	Westendorp, Glenn	WD I	<i>Comox, BC</i>
5646	Swanson, Jeff	SWS	<i>Merritt, BC</i>	5596	Williams, Glenn	SWS	<i>Yale, BC</i>
5632	Szeles, Jared	SWS	<i>Trail, BC</i>	4212	Williams, June	WD I	<i>Granisle, BC</i>
5490	Tamboline, Grant	SWS	<i>Salt Spring Island, BC</i>	5566	Williams, William	SWS	<i>Grand Forks, BC</i>
5544	Temple, Ross	SWS	<i>Fort St. John, BC</i>	5552	Wilson, Christopher	WD I	<i>Harrison Hot Springs, BC</i>
5491	Thomas, Neil	SWS	<i>Port Alberni, BC</i>	5498	Wilson, Morris	SWS	<i>Ashcroft, BC</i>
5649	Thompson, Tony	OIT WD	<i>Lumby, BC</i>	5466	Winsor, Derrick	WD I	<i>Houston, BC</i>
4452	Tissington, Melvin	WD I	<i>Creston, BC</i>	5597	Woodrow, Frank	SWS	<i>Chilliwack, BC</i>
5514	Town, Ron	WT I	<i>Terrace, BC</i>	5675	Woytas, Vincent	WD I	<i>Kelowna, BC</i>
5526	Townsley, David	SWS	<i>Granisle, BC</i>	3395	Wright, Herbert	WD II	<i>Parksville, BC</i>
4607	Trottier, Kevin	WD I	<i>Kelowna, BC</i>	5659	Yamabe, Troy	WWC I	<i>Winfield, BC</i>
4733	Tucker, Andrew	MWWT I	<i>Whistler, BC</i>	5567	Yemm, Richard	SWS	<i>Grand Forks, BC</i>
5628	Turner, Ronald	SWS	<i>Sointula, BC</i>	5410	Zaal, John	WD I	<i>Logan Lake, BC</i>
5527	Turvey, David	SWS	<i>Prince George, BC</i>	5657	Zandvliet, Frank	MWWT I	<i>Osoyoos, BC</i>
5611	Van Roekel, Darren	SWS	<i>Westbank, BC</i>	3328	Ziefflie, Brent	SWS	<i>Mission, BC</i>
5492	Vandervelde, Barbara	SWS	<i>Richmond, BC</i>	5177	Zoglauer, Alex	IWWT I	<i>Terrace, BC</i>
5440	Vanstrepren, Sean	WD I	<i>Garibaldi Highlands,</i>				

## NEWLY CLASSIFIED OR UPDATED FACILITIES

Facility No	Facility Name	July 1, 2005 to November 30, 2005	Classification / Level	City/Province
192	Alexis Creek Water Distribution System		SWS	Alexis Creek, BC
1312	Balfour Irrigation District Small Water System		SWS	Balfour, BC
1302	Beaver Creek Campground and Day Use Area Small Water System		SWS	Trail, BC
1356	Belcarra BSPS Small Water System		SWS	Belcarra, BC
1355	Birchbank Picnic Grounds Small Water System		SWS	Trail, BC
1288	Blanket Creek Campground and Day Use Area Small Water System		SWS	Revelstoke, BC
1316	Camp McLanlin Small Water System		SWS	Abbotsford, BC
1301	Champion Lakes Campground and Day Use Area SWS		SWS	Fruitvale, BC
1014	Chehalis First Nation Small Water System		SWS	Agassiz, BC
1331	Christina Waterworks System		WD II	Christina Lake, BC
213	City of Fort St John – North Lagoons		MWWT I	Fort St John, BC
210	City of Fort St John – South Lagoons		MWWT II	Fort St John, BC
428	City of Trail Water Treatment Facility		WT III	Trail, BC
1315	Coquihalla Toll Plaza Wastewater Treatment Facility		MWWT II	Coquihalla, BC
1328	Cypress Provincial Park Community Water Distribution System		WD II	West Vancouver, BC
1299	Davis Creek Campground Small Water System		SWS	Kaslo, BC



## NEWLY CLASSIFIED OR UPDATED FACILITIES

Facility No	Facility Name	July 1, 2005 to November 30, 2005	Classification / Level	City/Province
233	District of Invermere Wastewater Treatment Facility		MWWT I	Invermere, BC
1358	District of Sooke Wastewater Treatment Facility		MWWT III	Sooke, BC
377	District of Sparwood Sewage Treatment		MWWT II	Sparwood, BC
1290	Dry Gultch Campground Small Water System		SWS	Radium Hot Springs,
427	Gallagher's Canyon Wastewater Treatment		MWWT II	Kelowna, BC
1323	Hallamore Lake Resort Small Water System		SWS	Clearwater, BC
1088	Hope Valley Campground Small Water System		SWS	Hope, BC
1322	Iron Mountain Store Small Water System		SWS	Maple Ridge, BC
1291	James Chabot Day Use Area Small Water System		SWS	Invermere, BC
1283	Jimsmith Lake Campground and Day Use Area Small Water		SWS	Cranbrook, BC
1310	Kispoix Water Treatment Plant		WT II	New Hazelton, BC
1309	Kokanee Creek Campground and Day Use Area Water Distribution		WD I	Nelson, BC
1303	Kokanee Glacier Cabin Small Water System		SWS	Kaslo, BC
1313	Lerika Holdings Small Water System		SWS	Mission, BC
1143	Liard River Hotsprings Provincial Campground Water Distribution		WD I	Fort St John, BC
1326	Lily Lake Strata Small Wastewater System		SWWS-M	Madeira Park, BC
1286	Lockhart Beach Campground/Day Use Area Small Water System		SWS	Creston, BC
1300	Lost Ledge Campground Small Water System		SWS	Kaslo, BC
1304	MacDonald Creek Campground/Day Use Area Small Water System		SWS	Nakusp, BC
1287	Martha Creek Campground/Day Use Area Small Water System		SWS	Revelstoke, BC
1361	Massett Regional Wastewater Treatment Plant		MWWT II	Massett, BC
1314	Midway Water Distribution System		WD I	Midway, BC
1327	Mission Hills Manor Small Water System		SWS	Mission, BC
1317	MOT Highways Weighscale – Chetwynd Small Water System		SWS	Chetwynd, BC
1318	MOT Highways Weighscale – Dawson Creek Small Water System		SWS	Dawson Creek, BC
1319	MOT Highways Weighscale – Pouce Coupe Small Water System		SWS	Pouce Coupe, BC
1284	Moyie Lake Campground and Day Use Area Small Water System		SWS	Cranbrook, BC
1359	Mt. Seymour Wastewater Treatment Facility		MWWT II	North Vancouver, BC
1146	Muncho Lake Provincial Park-McDonald Campground SWS		SWS	Muncho Lake, BC
1307	Nancy Greene Campground and Day Use Area Small Water System		SWS	Castlegar, BC
7	Norm Wood Environmental Centre		MWWT III	Campbell River, BC
1320	Rainbow Lodge Small Water System		SWS	Maple Ridge, BC
1325	Roberts Creek Co-housing Small Wastewater System		SWWS-M	Roberts Creek, BC
1306	Rosebery Campground Small Water System		SWS	New Denver, BC
523	Saanich Peninsula Wastewater Treatment		MWWT IV	North Saanich, BC
1330	Scowlitz First Nation Small Water System		SWS	Lake Errock, BC
1289	Shelter Bay (Arrow Lakes) Campground/Day Use Small Water System		SWS	Shelter Bay, BC
1360	Skidegate Band Wastewater Treatment Facility		MWWT I	Skidegate, BC
1305	Summit Lake Campground and Day Use Area Small Water System		SWS	Nakusp, BC
1308	Syringa Campground and Day Use Area Small Water System		SWS	Castlegar, BC
25	Tsulquate Wastewater Treatment Facility		MWWT III	Port Hardy, BC
1259	Tyhee Lake Campground & Day Use Small Water System		SWS	Telkwa, BC
331	Village of Cumberland Municipal Lagoon		MWWT I	Cumberland, BC
1281	Wasa Lake Campground and Campers Beach Small Water System		SWS	Wasa Lake, BC
1282	Wasa Lake Headquarters, Main/Grey/Horseshoe Small Water System		SWS	Wasa Lake, BC
412	Westridge Subdivision Wastewater Treatment Facility		MWWT I	Princeton, BC
157	Westside Regional Wastewater Treatment		MWWT IV	Westbank, BC
1285	Yahk Campground and Day Use Area Small Water System		SWS	Cranbrook, BC



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# UPCOMING EVENTS

## TRAINING OPPORTUNITIES

EVENT / COURSE	DATE	LOCATION
Water Distribution I	Feb 27 – Mar 3	Nelson
Wastewater Treatment I	Feb 27 – Mar 3	Nelson
Water Distribution II	Mar 6 – 10	Nelson
Wastewater Treatment II	Mar 6 – 10	Nelson
Small Water Systems	Mar 8 – 9	Nelson
Small Water Systems	Mar 9 – 10	Gibsons
Chlorine Handling	Mar 6 – 10	Kelowna
Water Quality for Distribution Operators	Mar 20 – 22	Richmond
Small Water Systems	Apr 4 – 5	Prince George
Cross Connection Control	Apr 3 – 7	Kamloops
Chlorine Handling	Apr 3 – 7	Kamloops
Small Water Systems	Apr 5 – 6	Kamloops
Water Distribution I	Apr 3 – 7	Kamloops
Small Water Systems	Apr 24 – 25	Vancouver
Small Wastewater Systems	Apr 26 – 27	Vancouver
Cross Connection Control	Apr 24 – 28	Vancouver
Chlorine Handling	Apr 24 – 28	Vancouver
Water Treatment I	Apr 24 – 28	Vancouver
Water Treatment II	Apr 24 – 28	Vancouver
Water Distribution I	Apr 24 – 28	Vancouver
Water Distribution II	Apr 24 – 28	Vancouver
Water Distribution III	Apr 24 – 28	Vancouver
Wastewater Collection I	Apr 24 – 28	Vancouver
Wastewater Collection II	Apr 24 – 28	Vancouver
Wastewater Collection III	Apr 24 – 28	Vancouver
Wastewater Treatment I	Apr 24 – 28	Vancouver
Wastewater Treatment II	Apr 24 – 28	Vancouver
Wastewater Treatment III/IV	Apr 24 – 28	Vancouver
Small Water Systems	May 11 – 12	Port Hardy

Please phone the BCWWA at 604 433 4389 for information on the above courses or check their website at [www.bcwwa.org](http://www.bcwwa.org).

**EOCP Annual General Meeting**  
**BCWWA Annual Conference**

**Apr 24**  
**Apr 30 – May 3**

**Vancouver**  
**Whistler**

## EOCP CERTIFICATION EXAMINATIONS

Operators wishing to write certification exams must apply to the EOCP by written application complete with job description no later than two weeks prior to the exam session. Exam fees are payable to the EOCP office before the time of writing and may be paid by Visa or Mastercard. Exam application forms can be downloaded from the EOCP web site at [www.eocp.org](http://www.eocp.org).

EOCP Office: Phone: 604 874 4784 Fax: 604 874 4794 Toll Free: 1 866 552 3627

