

OPERATOR DIGEST

SUMMER 2022 | NUMBER 153



Quarterly Magazine of the
Environmental Operators
Certification Program—BC/Yukon

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OPERATOR DIGEST

The **Operator Digest** is the official magazine of the **Environmental Operators Certification Program**.

Submissions for publication in the Digest are welcome. Please email them to the EOCP office at eocp@eocp.ca

Changes of address, annual dues, Continuing Education Requirements, exam applications, as well as general enquiries about the program should be addressed to:

Environmental Operators Certification Program

201 – 3833 Henning Drive,
Burnaby, BC V5C 6N5

PHONE: 604 874 4784

FAX: 604 874 4794

TOLL FREE: 1 866 552 3627

EMAIL: eocp@eocp.ca

WEB: www.eocp.ca

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Staff

Kalpna Solanki, President and CEO
ksolanki@eocp.ca

Kim Eames, Director of Operations
keames@eocp.ca

Stephanie Hall, Exam Specialist
shall@eocp.ca

Heather Reynolds, Administrative Specialist,
hreynolds@eocp.ca

Chandana Sundar, Technical Specialist,
facilities@eocp.ca

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OPERATOR PROFILE

Darcy Austin

Terra Water Systems

How did you become an

Operator? While I was pursuing a hockey career as a young adult, I had the opportunity to work several summers in the Public Works department in the small municipality I grew up in. When my hockey career came to a close, I took the experience I had gained in the summers and looked for employment in the Public Works field. In the beginning I was able to work for several small municipalities, including my hometown, that allowed me to start obtaining my Water and Wastewater certification in all four disciplines. I then continued to pursue opportunities as a Water and Wastewater Operator and through some life circumstances I ended up transitioning to the private sector of the industry the last ten years.

How long have you been an

Operator? Approximately 22 years both in the public and private sector.

What are your core functions?

Ensuring the safe and efficient operation of a package Water Treatment and Wastewater Treatment Plant, and the small distribution and collection systems in between the plants and camp.

What is your typical day? A typical day onsite would include completing safety documentation first thing in the morning and grabbing my distribution water sample. I would then head out and check the MBR WWTP which includes checking tank levels, pump and blower pressures, Membrane TMPs, lab testing, and cleaning the inlet screen.

I then walk around the camp and check two lift stations, back up generator, fire pumphouse and distribution pumphouse. Then I drive over to the PWTP and check storage levels, start production and do lab testing and check RO and NF pressures.

At 9:30 I attend the camp safety meeting and then go back to my office and send out my daily reports.

The rest of the day up until about 5:30 includes monitoring both the treatment plants, performing preventative maintenance work. After the storage

levels are full at the PWTP I complete a manual raw and permeate flush on the NF system. After supper between 7-8 pm I'll do an evening check of the WWTP and Distribution pumphouse and call it a day.

What do you most enjoy about the work? I enjoy being able to troubleshoot problems and looking for ways to optimize the plants I operate. I have enjoyed the transition to the private sector at this stage of my life as a two weeks on/ two weeks off schedule provides flexibility and a nice work/life balance.

What are some challenges you face?

In many cases you are the only Operator onsite at these remote locations and your only operational support is by phone. Also, at some sites we can be 1½ hrs or more from the nearest city so getting parts during an emergency can be tough.

Can you speak of any highlight in the past year?

Through my company I was able to attend a mini conference in Minneapolis put on by Suez where I got to tour the factory where they manufacture RO membranes and cartridge filters. I also recently passed my Wastewater Treatment Level III exam.

What advice do you have on how to have a successful career as an

'Operator Profile' continued on page 13



MESSAGE FROM THE DIRECTORS AND STAFF



Dear Friends,

July is always an interesting time at the EOCP – in terms of the board and the staff team – with several changes. We have been busy, and this is what we have been up to:

1. At the board level, according to the Constitution and Bylaws, the new officers of the board are elected. Whilst Chris Kerman moves from his position as Chair-Elect to Chair, the other newcomers to officer roles are:
 - a. Chair-Elect: Tara Macrae
 - b. Treasurer: Natasha Cvenkel
 - c. Secretary: Rob Birtles



Chris Kerman



Kalpna Solanki



James Galbraith, CWP CWWP

2. As we did last year, we are working with Operators to ensure their profile has up-to-date contact information. This year, there was a prize draw for a skookum new iPad which was won

by James Galbraith of West Kelowna – however he may not be able to keep it for long as his kids have ‘liberated’ it from him!

3. Although things are opening up in terms of pandemic related restrictions, we are still encumbered by situations where a location is not available for an exam session. In such cases, the EOCP staff will travel to invigilate exam sessions.
4. We have reached out to Operators and facilities because:
 - a. More than a thousand Operators are no longer certified either because they have not completed the CEUs needed and/or have not paid their membership dues;
 - b. Facilities have expired classifications. Facility classifications need to be completed every five years or when there are significant changes to processes.
5. We have also recently updated our Constitution and Bylaws to protect the role of the Operators, and also to be able to better handle situations where Operators are not abiding with the

expectations of them as professionals.

6. Work continues on our hybrid conference – a conference ‘Designed for Operators by Operators’ that has a full program with three concurrent streams over two days as well as a tradeshow. We are thrilled to have as our keynote speaker, Leah Goldstein, considered to be a ‘kick ass motivator’. One would have to be motivated to complete a 4,800 km bike race across the US in 11 days!

We continue working with various BC provincial agencies to see what we can do in terms of improved response to disasters that affect critical water and wastewater infrastructure. We recognize that some communities have already been affected by floods, and our hearts and thoughts go out to all those affected.

Chris Kerman, Board Chair
Kalpna Solanki, President and CEO

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Tanks under construction

BRAND-NEW WATER TREATMENT FACILITY IN NORTH CEDAR, SOUTH OF NANAIMO

By Kalpna Solanki CPHI(C) BSc MBA

During a recent visit to Nanaimo for a board meeting and facility tour, I had the opportunity to fit in an additional tour, that of a brand-new water treatment facility in North Cedar, which is south of Nanaimo. The North Cedar Improvement District

Jason Crossley and John Lewis



was incorporated in 1959 and is responsible for providing waterworks, fire protection, and street lighting to properties within the district's boundaries. The original water system was constructed in 1960 whilst the new water system covers approximately 30 square kilometers and provides potable water to approximately 1,273 accounts. In 2009 the district boundaries were expanded and now the District provides fire protection to 2,153 properties.

The source of the water for this community is three GARP wells in close proximity to the Nanaimo River. The North Cedar Improvement District operates under a permit issued by Vancouver Island Health Authority and the District was in non-compliance with the 2016 terms and conditions on the operating permit. As such, the District was required to construct a new water treatment facility. This project began in 2021 and by May 2022 both the treatment plant and reservoir were online.

The new facility was designed by Associated Engineering, site preparation was by Hazelwood Contracting, and Maple Reinders constructed the water treatment facility and reservoir. The facility has two treatment trains, each one capable of treating 31.5 Litres/second, or 5,000 m³ per day which is more than adequate for the current demands of 2,200 m³ per day during periods of hot weather.

The first process involves adding of soda ash and ClearPAC 180, a high alumina (Al₂O₃) content polyhydroxyl aluminum chloride, as a coagulant. The mixture then is filtered through an anthracite and sand filter. The filters are backwashed every 5,000 minutes using a blower. Polymer for the liquid train is available but is not used as it is not needed. The turbidity level is usually quite low, with it being 0.1 NTU during my visit there in May. Subsequently,

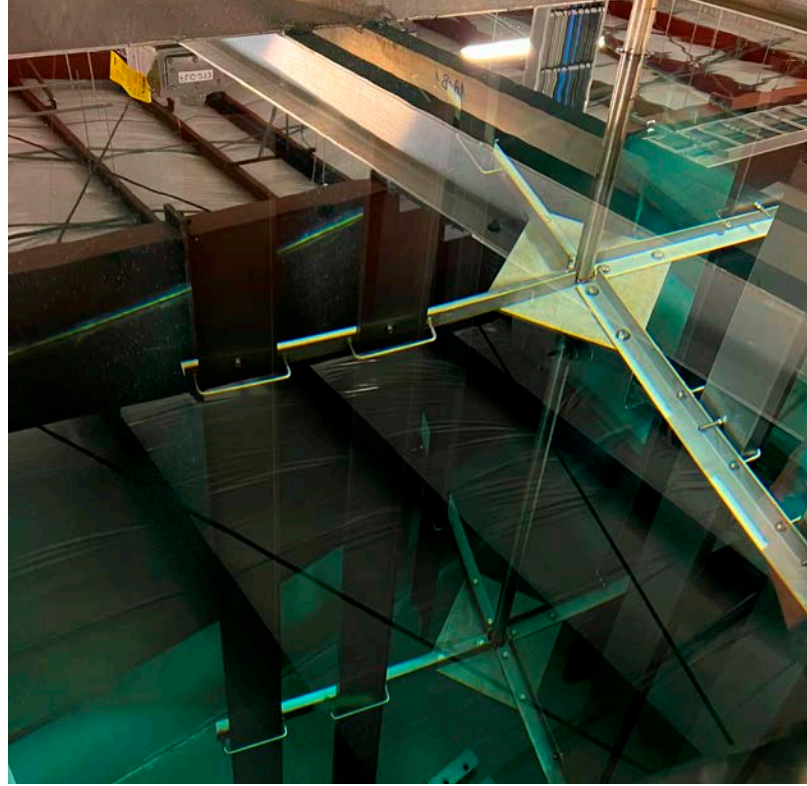


4 ML treated water reservoir

there is UV treatment. As a final step, 12% sodium hypochlorite is added for disinfection, to enable the mandated residual of 0.8 ppm of chlorine in the distribution system.

There is backup power via a 450 kW diesel powered generator. At the site are also a 4,000,000 L reservoir of treated water as well as an additional tank with a capacity of 135,000 L to hold the backwash water. The backwash water is fed to the front of the process and goes through an inclined plate settler at a rate of 10% of flow. The residual goes into a hopper. The initial idea was to discharge the residual to the sanitary sewer. However, the

450 kW Backup Generator



Mixing Chamber

Regional District of Nanaimo was not supportive of this. Whilst there is little residual produced, the final disposal method for it needs to be determined.

The total cost for this system was \$5,500,000 with the funds coming from the North Cedar Improvement District's own savings as well as a bank loan.

This new treatment facility enables the NCID to meet the requirements of the Health Authority's operating permit and will accommodate the expected population growth of the community over the next 30 years.

UV Treatment



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RISING UP

Moving Source Protection Planning to a Regional Scale

By Marta Green, P.Geo., Senior Hydrogeologist,
Associated Environmental Consultants



Figure 1: Delineating capture zones help to understand land uses that could impact water quality in a well. Left to right: Dave Hayward, R.P.Bio., Jacques Groenewald, P.Geo., Marta Green, P.Geo., and Dr. Brian Guy, P.Geo. Photo: Jimmy Kokaji.

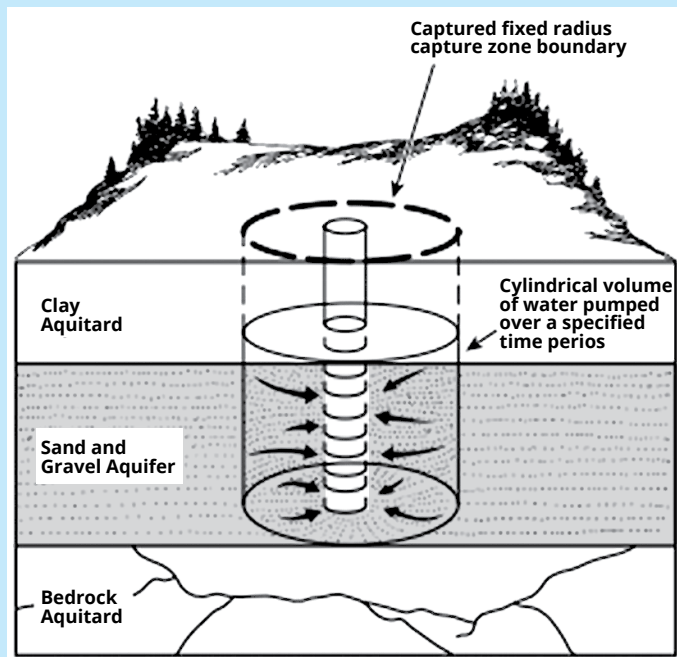


Figure 2: Delineating “capture zones”, or the area on land within which rain and snowmelt will recharge aquifers over a certain timeframe, depends on the properties of the aquifer, such as its porosity, and gradient. Simpler equations for capture zones can also be used for small water systems, such as the calculated fixed radius method for a given time of travel (usually specified as one-year, five-year or ten-year periods). (reproduced from Ministry of Environment, available at: [step2.pdf \(gov.bc.ca\)](https://step2.pdf.gov.bc.ca))



Author Bio: Marta Green, P.Geo., is a Technical Specialist in Hydrogeology with Associated Environmental Consultants based in Vernon, BC. Marta’s expertise focuses on groundwater supply development, and watershed science including drinking water source protection planning and environmental impact studies. Marta has 20 years of experience working for municipal, agricultural, industrial, and commercial clients across BC and Yukon. Marta is the treasurer of the BC Ground Water Association, and a past member of the BCWWA Drinking Water Committee.

The Regional District of Okanagan-Similkameen (RDOS) and partners are completing a mapping project to support source water protection. In 2019, the Auditor General of BC concluded that the Province is not doing enough to protect drinking water and the watersheds within which drinking water is sourced. Since then, several initiatives have been launched and are underway. One example is the RDOS Drinking Water Protection Areas Project, a pilot project being completed in the South Okanagan to identify and map the areas of watersheds that act as source waters for drinking water systems.

There are almost 5,000 drinking water systems in BC, and nearly 2,000 in the Interior Health region. The quality and quantity of drinking water—surface water at a water system intake, or groundwater in a well—depends on the land uses and physical processes that occur within the contributing watershed for a surface water source or a capture zone for a groundwater source. A contributing watershed is the portion of a watershed supplying water to a drinking water intake. A capture zone is the land area within which water infiltrates into the ground and contributes groundwater to a well. Any type of land use may have an impact on the water quality of the source water. For example, the over-application of fertilizers on a farm or golf course far away from a water supply well may result in the uptake of nitrates into the water supply well if the nutrients were applied within the capture zone. Or, an improperly designed road without adequately considering surface drainage may cause erosion during extreme rainfall events that results in sediment uptake at a drinking water system intake in a downstream lake.

‘Rising Up’ continued on page 8



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'Rising Up' continued from page 7

Currently, there are no easy-to-access maps of boundaries of Drinking Water Protection Areas for the majority of drinking water systems, in particular small systems, thereby making land use planning and emergency response planning challenging. Currently, Drinking Water Protection Areas are delineated on a system-by-system basis, and typically only for large systems. Expanding this approach to delineation of dozens or 100s of systems will bring additional challenges. The RDOS pilot project involves the mapping of several Drinking Water Protection Areas at once, using a subset of systems within the RDOS boundaries, across a variety of system ownership and source water types, such as rivers, lakes, and groundwater sources. Current activities include surveying water system owners (with support from Interior Health's Drinking Water Officers and water professionals, as needed), testing ways to estimate parameters needed to define the protection areas, and developing a system for uploading the mapping information to an easily accessible GIS-based layer on the Province's iMap platform. Partners in this project include the Okanagan Basin Water Board, Ministry of Health, Ministry of Environment and Climate Change Strategy, and Ministry of Forests, Lands, Natural Resource Operations and Rural Development. Associated Environmental is the contractor supporting the implementation of the project. To learn more about the project, contact Marta Green, Hydrogeologist, Associated Environmental, at 250-545-3672.



Figure 3: Showing a cut bank that resulted in erosion leading to a turbidity event at a lake intake downstream. Extreme rain and a bare slope is often the cause of an erosion event, which can be far away from a drinking water intake and still cause an impact. Photo: RDOS staff.



Figure 4: Showing the sediment from a landslide being carried in a river. The river discharges at the lake, where a drinking water intake exists nearby. Photo: RDOS staff.



Figure 5: Aerial view of the sediment plume arriving at the lake after a small landslide upstream. Photo: RDOS staff.



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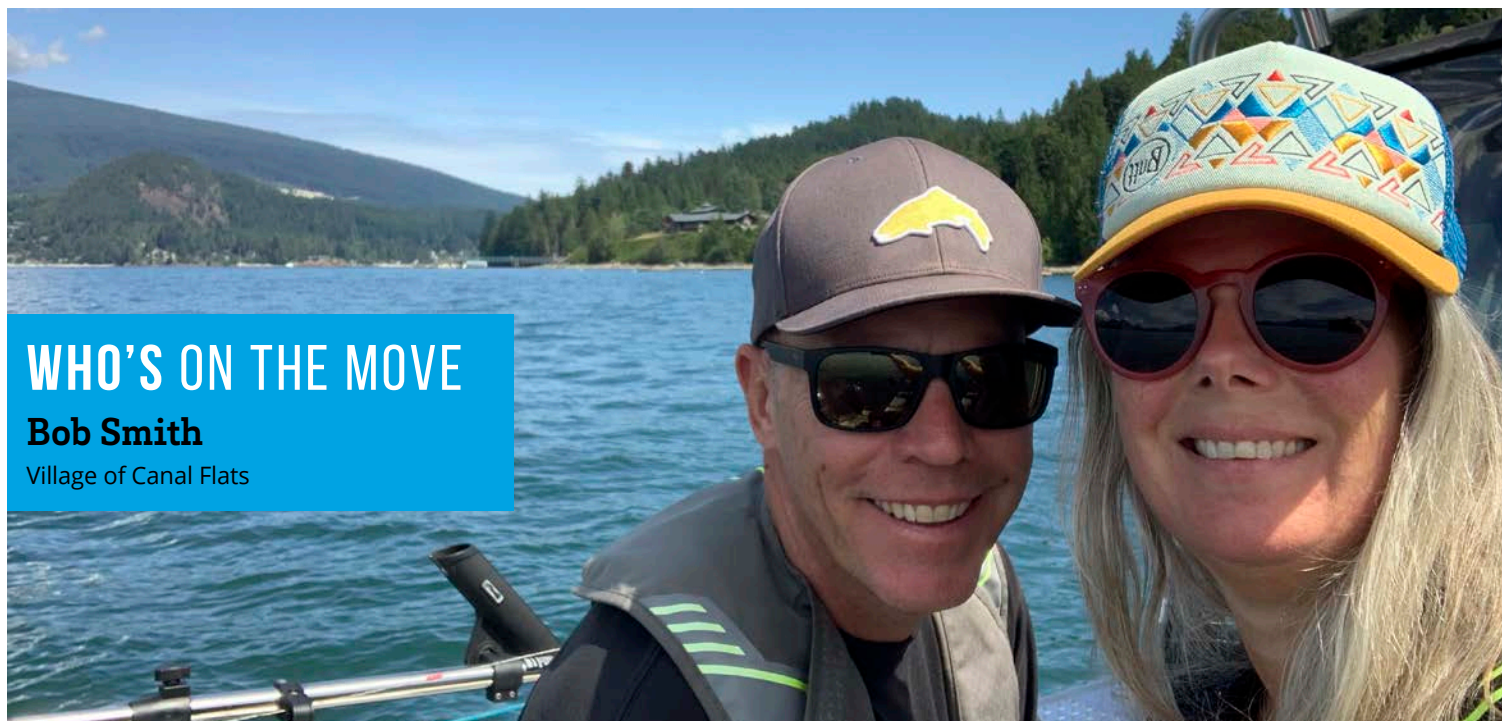
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WHO'S ON THE MOVE

Bob Smith

Village of Canal Flats

What was your first job?

Paper boy, at 11, I think. First real job was oil patch surveying.

What was your path to becoming an Operator?

I'm not actually a certified Operator, my time with EOCP has always been as a Manager.

Paper boy – Janitor – Stock boy – Survey helper (Chainman),

Oil patch – Instrumentman, Engineering – Crew Chief, Alaska Highway – Crew Chief, legal surveying and oilpatch – Survey and Engineering Technical Sales – Snowboard Manufacturer – Restaurant Co-Owner – Flower Shop Co-Owner – Engineering Tech, Municipal – Project Coordinator, Municipal – Assistant Manager Operations, Municipal – Manager of Operations/Public Works, Municipal (3 times) – Director of Public Works.

I have been working in Public Works for over 30 years.

How did you pivot from your last position to your current one?

I retired from the District of Squamish and the Village of Canal Flats was looking for a Manager of Public Works so I am working with them part time to re-structure their Public Works department.

What advice would you give to someone who is currently an Operator or considering becoming one?

Do it! I have worked with many Operators over the years, and I think that the sense of accomplishment is tough to beat in the Water and Wastewater industry. Protecting human health and the environment is pretty cool. Most of the Operators work for local governments and for the most part, are properly funded for supporting Operators through training and ensuring that their systems are running properly. Lots of jobs and opportunities in this industry too!

What are some of your goals in your new position?

To work with the Public Works team at Canal Flats to develop a new structure and specifically regarding EOCP, to get their entire department certified. As for my retired position, I plan to get a couple more renos done and then play in the beautiful Kootenays!

What has the impact of COVID-19 been on your organization?

It was stressful on the Public Works team in Squamish, but we developed strategies to deal with the challenges and came to work every day to ensure the public were safe.

What do you do in your spare time?

My usual, snowboarding, boating, fishing, hiking, motorcycling, traveling, and I've added house renovations, gardening, and golf. Spending more time with my dad who just turned 90 in May too!

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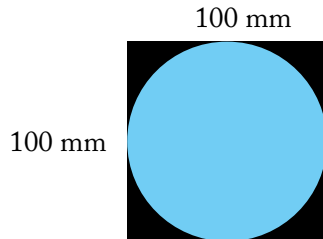


MATH FOR OPERATORS

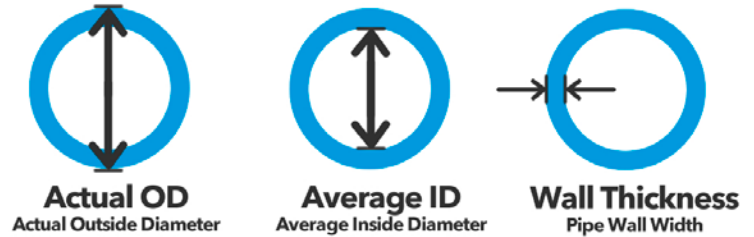
Cylinder/Pipe Volumes (Area x Height) or (Area x Length)

By Chris Kerman, ASCT PO CWWP

It's always good to return to the basics! If you study the EOCP formula sheet you will see there are a couple of options for calculating the Area of a circle. The most familiar for us is probably $A = \pi r^2$. If you then look at the ABC formula sheets on the EOCP website (exam preparation) you will see another option. $A = 0.785d^2$. I prefer this formula when calculating the Volume in a pipe because pipe diameters are given on my drawings and since you don't have to calculate the radius, one math step is eliminated. What is 0.785 and where does it come from? If you draw a square that is 100 mm by 100 mm (4" X 4") and then draw a circle inside the square so that the edges of the circle just touch the edges of the square the circle will occupy 78.54% of the total Area of the square. The diameter of that circle is the same as the length or width of the square, 100 mm (4").



In the real world the circle is the inside diameter of your pipe. Pipes have an inside and outside diameter (ID and OD), the difference between the two is the pipe wall thickness or schedule. For example, a 100 mm (4") ID Schedule 40 PVC pipe has an OD of 114.3 mm (4.5"). Depending on the pipe material, once the pipe size is 350 mm (14") and larger the OD is true for the pipe size given. A 450 mm (18") PVC pipe has a 450 mm (18") OD. The ID will be reduced with the increasing thickness of the pipe wall. This could lead to a significant reduction in the expected Volume if the pipe wall is really thick and/or the run of pipe is over a long distance. For smaller diameter pipes you can be pretty confident



using the pipe size given, for larger pipes you can not. Reference online pipe dimension charts with your pipe material, pipe size, and the schedule to get the true ID for your calculations.

Using the formulas provided, let's calculate the Volume for 500 m of 300 mm (12") PVC pipe.

$$V \text{ of a cylinder} = A \times H \quad A = 0.785d^2 \quad H = 500 \text{ m}$$

Solve for Volume in m^3 .

Our units must match, so first we convert the diameter from mm to m.

$$d = 300\text{mm} \times \frac{1 \text{ m}}{1000 \text{ mm}} = 0.3 \text{ m}$$

$$A = 0.785(0.3 \text{ m})^2 = 0.785(0.09 \text{ m}^2) = 0.07065 \text{ m}^2$$

Height and length are interchangeable as pipes are cylinders. We can insert 500 m for our height/length of pipe.

$$V = 0.07065 \text{ m}^2 \times 500 \text{ m} = 35.325 \text{ m}^3$$

We have about 35 m^3 of water in our pipe.

A very simple and useful calculation.
Until next time, Happy Operating!

MEET THE EOCP'S NEW BOARD EXECUTIVE

Along with welcoming three new directors to the board, in accordance with the Constitution and Bylaws, the new executive was elected by the board of directors.



Chris Kerman
Chair



Tara Macrae
Chair-Elect

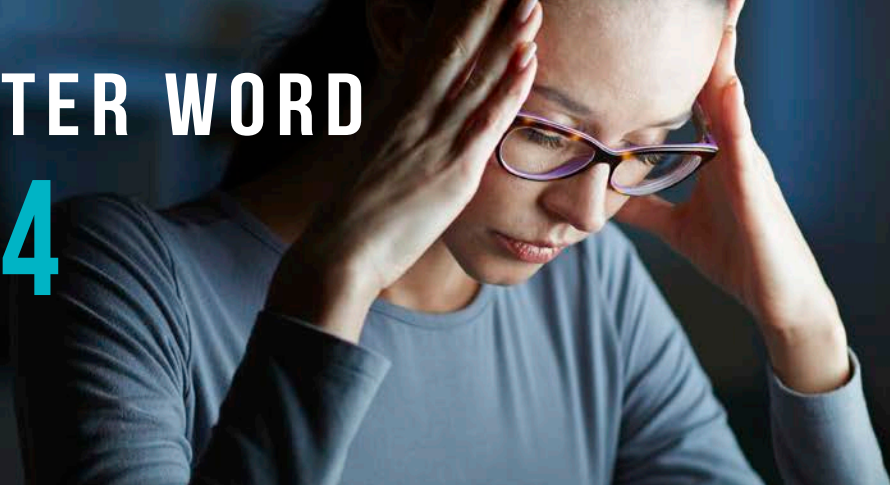


Natasha Cvenkel
Treasurer



Rob Birtles
Secretary

THAT FOUR LETTER WORD EXAM-PART 4



By Kalpna Solanki, CPHI(C) BSc MBA

Every year, we mine data in the EOCP's CRM to see how Operators are faring with all the various exams we offer.

The results for 2021 for Bulk Water Delivery, Building Water Systems, Small Systems, and OIT exams (EOCP exams) are:

Discipline	Pass Rate
BWD	57%
BWS	100%
SWS	93%
SWWS	74%
OIT	96%

For Levels I to IV (Water Professionals International (WPI)) exams):

	MU	WT	WD	WWC	WWT
I	90%	98%	85%	88%	79%
II	90%	85%	70%	81%	50%
III		75%	90%	79%	54%
IV		63%	54%	50%	40%

As usual, when there is a pass rate of less than 50%, we try to evaluate the reasons why. We continue to struggle with the low pass rate for the Wastewater Treatment Level IV exam. Whilst the pass rate has improved somewhat – it was previously 30% - we would prefer to see a higher pass rate and have been working with training providers as well as the WPI team to evaluate if additional study materials and sample exams can be

provided. In terms of the level of difficulty, these exams have been compiled by Operators who have a great deal of industry knowledge. Speaking with some of them, they indicate that Level IV exams across the board are difficult; specifically, WWT IV is the most difficult, and has the most math. However, they all are in agreement that the exams are fair.

There have been other articles written on exams and exam preparation based on research and discussions with Operators - Fall 2019, Winter 2020, Spring 2021 - and all these issues can be found at tinyurl.com/OperatorDigest

Some additional tips:

1. NTK Criteria
 - a. The EOCP advises training providers of any changes to the NTK criteria well in advance of changes taking place, and again after changes have been implemented. All training providers should be using the most up to date NTK criteria which can be found at the WPI site: www.gowpi.org/services/testing-services/need-to-know-criteria/
 - b. Operators have been advised that taking only a course will not prepare them for an exam, especially higher-level exams. A great deal of additional work needs to be completed.
2. Math is hard. Invariably, in almost every exam situation, we find that Operators have the most difficulty with math. The EOCP has therefore provided several math only resources at its website, and will provide additional links as they become available: tinyurl.com/Math-Preparation

We are fortunate that our board chair, Chris Kerman, has been providing us with sample questions for practice, and we will endeavour to continue providing as many resources as possible to ensure your success on exams.

'Operator Profile' continued from page 2

Operator? Take pride in your work and do the best job you can regardless of your position. Take every opportunity you can to learn and further your certification. Don't be afraid to ask questions.

What do you do when you aren't working? During my shift in camp, I enjoy getting to the gym, visiting with people I know and facetime family most nights.

During my two weeks off at home I enjoy spending time with family, friends, travelling, and when I can, getting a round of golf in or mountain biking.

What else can you tell us about working as an Environmental Operator? It can be very rewarding when you take ownership in your job and work hard to supply the best quality drinking water

you can and to treat the wastewater to a degree that doesn't negatively impact the environment.

Whom would you recognize as a mentor? I had two supervisors that played key roles in my success as an Operator. Chris McKenna in a small municipality I worked for and Brian Still in one of the private companies. Both empowered me to be able to successfully do my work and both supported me through both good and tough times.

Anything else you would like to add? As an Operator that works in both Alberta and BC, I have enjoyed being certified with EOCP in BC. With all the hard work EOCP has done with their database and new login system it definitely makes my life as an Operator easier.



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STATISTICS

1st April to 30th June 2022



EOCP

Environmental Operators
Certification Program

EXAM STATISTICS



313 exams
taken

114 exam
sessions

FACILITIES



44 facilities
re/classified

CONTINUING EDUCATION UNITS (CEUs)

984 Operators
submitted CEUs

1,898 CEUs were
earned

DEFINITIONS

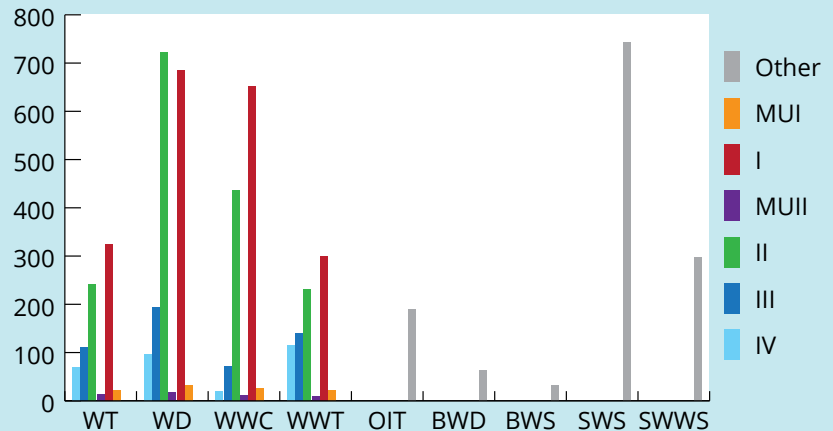
WT	Water Treatment
WD	Water Distribution
WWC	Wastewater Collection
WWT	Wastewater Treatment
OIT	Operator In Training
BWD	Bulk Water Delivery
BWS	Building Water System
SWS	Small Water System
SWWS	Small Wastewater System
MU	Multi Utility

1 January 2022 was the start of a new CEU reporting period. If you haven't submitted your CEUs for the 2020 - 2021 reporting period yet please add them to your profile or email them to eocp@eocp.ca as soon as possible.

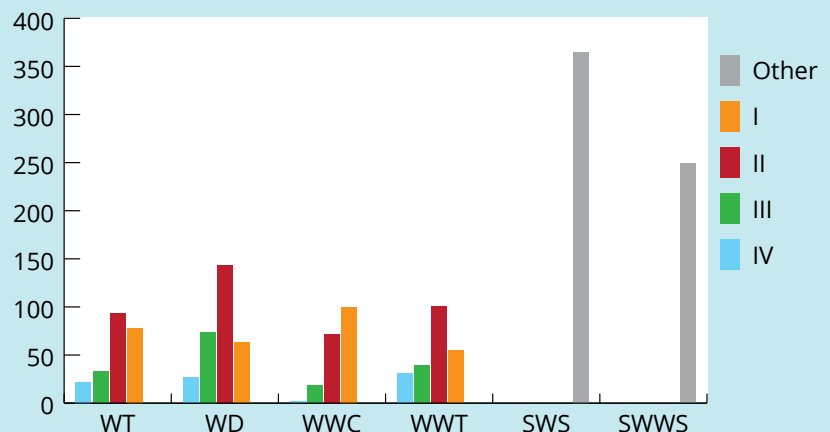
Check your Operator status by logging into your profile at <https://crm.eocp.ca/> and clicking on **ACCOUNT** to see if your 2022 dues have been paid, and **CEU** under the **LEARNING STATUS** tab to see if your CEUs have been met.

If your CEUs have not been met for the 2020 - 2021 reporting period, and/or your dues haven't been paid, your status will be red flagged and you will be listed as not certified.

Operator Certification



Facility Classification



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EOCP HYBRID CONFERENCE

Designed for Operators, by Operators

12TH TO 14TH SEPTEMBER 2022 VANCOUVER BC OR ONLINE

Re-sponse Recovery The

WATER, WASTEWATER, LEADERSHIP

COMMENTS FROM THE 2021 CONFERENCE

"I learned a lot today."

"Good information. Well done EOCP team!"

"I liked being able to choose my path."

tinyurl.com/EOCP2022