OPERATOR DIGEST

OCTOBER 2017 | NUMBER 134

EOCP

Quarterly Newsletter of the Environmental Operators Certification Program – BC/Yukon

INNOVATION

NANAIMO'S NEW SOUTH FORK WATER TREATMENT PLANT

Nanaimo's South Fork Water Treatment Plant takes advantage of its location to reduce energy costs. **P4**

Overview of plant floor - strainers, distribution channel and membrane tanks.

RES'EAU

A new community-circle model is improving water in small, rural and Indigenous communities.

P7

NEW EXAMS!

New, improved, standardized format starts January 2018! These operators are just glad to be done.

P 14

SALARY SURVEY RESULTS

Lots of data to pore over showing where salaries are highest.

P 15

OPERATOR DIGEST

The **Operator Digest** is the official newsletter 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 inquiries 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
FACEBOOK: EOCPBCY
TWITTER: @EOCPBCY

Publications Mail Agreement No. 41498030

The Environmental Operators Certification Program is a charter member of the Association of Boards of Certification and is a registered society with more than 4,500 active members.

MESSAGE FROM THE DIRECTORS AND STAFF

EOCP

We have been super busy at the EOCP this past year completing projects planned in 2016/2017, and organizing for 2018 – we don't know where the year has gone!

Rob Fleming, Chair

Kalpna Solanki, CEO

What have we been up to?

1. Our IT system comes into effect in November. Prior to that, we will be sending out information to ensure you are not caught off-guard when you first log into the new system.
2. Roll-out has begun on the new facility classification models. Pilot studies have already been completed around BC, and you will hear from us soon on getting your facility classified.
3. We have new exams in place for Small Water Systems (SWS), Small Wastewater Systems (SWWS), Bulk Water Delivery (BWD), and (Operator in Training) OIT. Some features of these exams:
   a. SWS and SWWS each have 50 questions, and are available in paper, web-based, and oral formats;
   b. BWD has 50 questions, and is available in paper and web-based formats;
   c. OIT has 100 questions and will be available in paper and web-based formats. This new OIT exam will be an all-in-one exam that replaces the previous four versions that the EOCP offered. This new all-in-one exam will be available as of 1 January 2018.
4. In terms of exams, for all four disciplines, for Levels I to IV, we will be switching over to new standardized exams as of 1 January 2018. In mid-December we will send out additional information to you about these new exams.
5. Our goal, as always, is to do what we can to ensure that people in British Columbia and Yukon have safe drinking water, and safe wastewater management. With that in mind, we are working more closely with our stakeholders to ensure facilities are appropriately classified, and Operators have the opportunity to get the training they need for certification:
   a. Our CEO is the new chair of the Canadian Water and Wastewater Operators Certification Committee;
   b. Our Board Chair is now a Director on the Board of the Associated Boards of Certification;
   c. Our CEO is now involved with the BC provincial Drinking Water Leadership Council where a framework is being developed to outline how the EOCP and provincial Drinking Water Officers can collaborate more effectively;
   d. We are collaborating with RES'EAU in an effort to better support small water systems in small communities.
6. SAVE THE DATE: Last but by no means least, our survey results on an EOCP Special Event indicated that you want us to organize an Operator Conference, and YES, we can do that for you! **Mark your calendars for an Operator Tradeshow and Conference to be held 9-11 September 2018 in Vancouver.** More details will be sent out in the New Year.

Our sincere thanks to all of you who work so conscientiously to further the work of Environmental Operators in BC and Yukon. If you're in the neighbourhood of our office in Burnaby, please stop by to say "hello"!

Rob Fleming, Chair
Kalpna Solanki, Chief Executive Officer

OPERATOR PROFILE

Dylan Phillips

Operator in Training

Dylan scouring the intake for one of the water systems to ensure there is adequate water.

How did you become an Operator in Training?

I was approached by Warren Brown and was asked if I'd be interested in becoming a water operator and I gladly accepted his offer. I'm currently being trained on the job by our main water operator. I started working as an trainee four months ago in a small water system, and I work on nine systems – the main system utilizes surface water as a source and has a slow sand filter and chlorination; the rest of the systems use groundwater that is chlorinated.

What do you most enjoy about the work?

What I enjoy most is working with each small water system and making sure the water is consumable for my community. I was surprised by how fast I was able to catch on with each system, but I am also quite surprised on what is needed from source of water, to water treatment, to distribution.

What do you find most challenging about your work?

What I find challenging is informing tenants to limit their water usage, especially during fire season. I wish that people would know that being an operator is great career opportunity. I am 21 years old, and I feel like I have a wonderful career opportunity, and I would definitely encourage others my age to get into the water industry.

Can you tell me about any initiatives you have been involved with?

An initiative I'm involved with is the Point of Entry (POE) project which treats water from a surface water source in remote locations and delivers potable water to each individual home. Currently there are five POEs for a pilot project, and there is potential for expansion of POE use if the pilot project is successful. I am involved with basic system checks including cleaning of UV sleeves, as well as monitoring of nominal and absolute filters.

What are some opportunities in the field of Environmental Operator?

Some opportunities I have had and enjoyed so far was seeing all our small water systems and operating our Nickyeah water system. Doing small maintenance to our POE systems. There are lots of opportunities in the field depending on where you work and what types of systems they have in place.

What do you do when you aren't working?

When I am not working I like to play video games, baseball, and spending time with family and friends.

What else can you tell us about working as an Environmental Operator?

Working for my community is great, and I feel like I am appreciated in my community. It is overwhelming to have this position and I'm honored to be where I am.

NANAIMO'S award winning South Fork Water Treatment Plant

By Bill Sims, AScT, PTech, South Fork Water Treatment Plant

At the turn of a tap, we receive one of the world's most precious resources. Water is essential to our health and vital to our growing community. We can, however, take it for granted and barely give it a thought until we are threatened with the possibility of drought or water quality problems. Fortunately, the new South Fork Water Treatment Plant takes care of the quality, and residents' conservation efforts have built a good defence against drought.

The Journey!

From high in the Beaufort Mountain range of central Vancouver Island to the faucet, the City of Nanaimo's water system is a complex, sophisticated operation. Great care in delivering our most precious resource - the journey begins with rainfall and snowmelt that flows through streams and rivers in the forested watershed of the South Fork of the Nanaimo River. The protected watershed covers an area of over 200 square kilometres – two and a half times the size of the City itself! The City captures winter precipitation in Jump Lake and holds it for release during the summer period when water demand is highest. It is released downstream to the venerable South Fork Dam where water is bypassed to the Nanaimo River to ensure fish habitat and recreation is preserved. The water destined for the taps flows by twin pipelines, using no energy but

Bill Sims at the Laboratory Sample Taps.

gravity, to the Water Treatment Plant. All water flowing to Nanaimo passes through the filters in this state-of-the-art facility. The Water Treatment Plant filters particles down to one ten-millionth of a metre producing water delivered to residents that is clear, fresh, and very safe to drink.

From the Water Treatment Plant, water is carried through pipelines to reservoirs around the City. This is accomplished mostly by gravity and a few small pump stations to the higher areas. This puts critical volumes of water close to where the demands are and provides storage for firefighting. From the reservoirs, drinking water is delivered through more than 600 kilometres of pipe networks. Water is tested hundreds of times per year to ensure that the water received from the environment and the water delivered to residents consistently exceeds world class standards. The system is planned, designed, built, and operated to meet the community's needs now and well into the future. The Water Treatment Plant has sufficient capacity to handle up to 117 million litres per day – enough for more than 150,000 people.

Why a new facility?

Construction started on the City of Nanaimo's South Fork Water Treatment Plant in May 2013, and the plant began operation in December 2015. The impetus for the design and development of a new facility was due to new regulations whereby the Vancouver Island Health Authority adjusted the City's Operating Permit to require filtration (also known as 4-3-2-1 Treatment Policy):

- 4-log (99.99%) removal of viruses that may be in the water
- 3-log (99.9%) removal of pathogenic organisms (cryptosporidium and giardia lamblia) that may be in the water
- 2 forms of treatment: filtration and disinfection by chlorine
- 1 NTU maximum turbidity in finished water

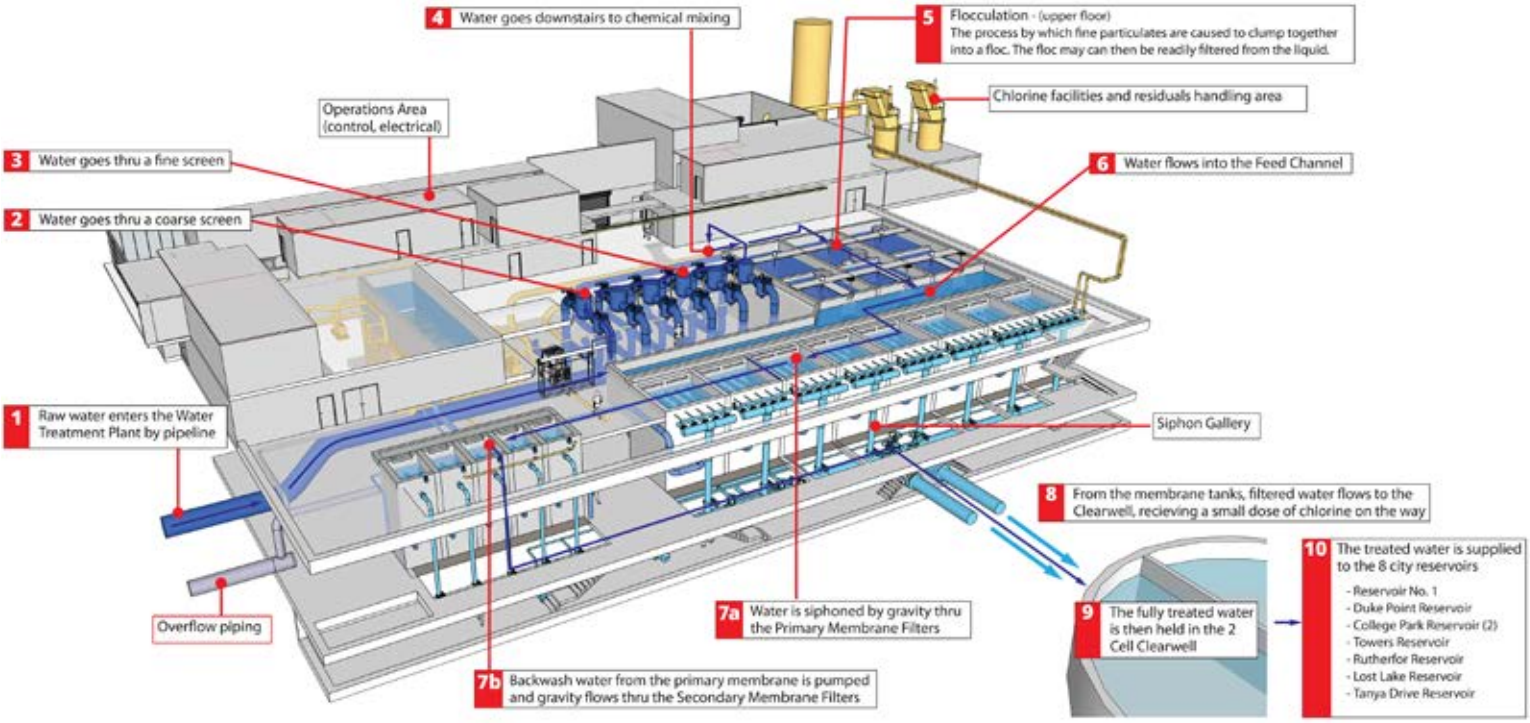
This new facility is innovative and effective:

- Membrane filters remove particles down to 0.1 micron – one ten-millionth of a metre, smaller than most bacteria
- Two stages of filtration recover more than 99% of the water that passes through the plant – very highly efficient
- Largest plant in Canada siphoning water through the membranes by gravity, saving in excess of $60,000 per year in power costs
- The plant has capacity to filter up to 117 Million Litres per day – enough for 150,000 people.
- Currently providing between 30 million (winter) and 60 million (summer) litres per day to 91,000 citizens
- Almost all the waste from the treatment process is handled on site – the liquid waste is discharged to the engineered wetlands, and the solid waste (sludge) is used as a topsoil amendment by a local company
- The structure can accommodate future growth. Building materials are designed with 75-year life span

5 Engineered wetlands take liquid waste.

7 Primary and secondary membrane filters being installed. They remove .1 micron particulates and protazoa, including *Crytosporidium* and *Giardia.*

8 Chlorine Injection Points and Clearwell Feed.



Above, Shane Wood, WT III EOCP Certified Operator, at the plant's SCADA system.

Right, Jaymie Miller, WT IV WD IV EOCP Certified Operator, conducting tests

INTERESTING FACTS

- Nanaimo has had household meters since the 1970s and full-cost accounting since the early 1990's
- The population of Nanaimo has grown but total daily flows have remained at early 1990's levels, due to an excellent water conservation publicity campaign
- Nanaimo is growing at a rate of approximately1.5% per year, and while the plant currently serves a population of 92,000, it is designed for expansion to serve a population of up to 140,000
- The water treatment system relies on gravity flow – from watershed to treatment plant to population served – thus reducing energy costs and increasing lifespan of the membrane filters
- Water from membrane cleaning and residuals processing goes to a wetland system that supports a diverse eco-system including amphibians and birds
- Solids from the residuals process are used as a soil enhancer and are blended with soil at a nearby facility
- Thanks to the filtration plant, the City of Nanaimo avoided 70 days of boil water notices in 2016 alone
- Many of the trades that worked on the project were local; the site varied between 20 and 90 workers at any given time
- Nanaimo's water consumption rates are among the lowest in Canada: residential use is less than 225 litres per person per day
- The plant uses chlorine in very small doses (less than 1.0 mg/L) to keep the water disinfected. Chlorine use is down over 40% since the filtering
- The project won an Award of Merit at the 2017 Association of Consulting Engineering Companies of BC
- Permanent staff of five highly qualified and EOCP certified Water Treatment Plant Operators
- The twin panels by Snuneymuxw artist James Johnny depict the Raven and Salmon, which are abundant in the neighbourhood of the plant, along with the Man Within, representing the Snuneymuxw people, upon whose traditional territory the plant sits

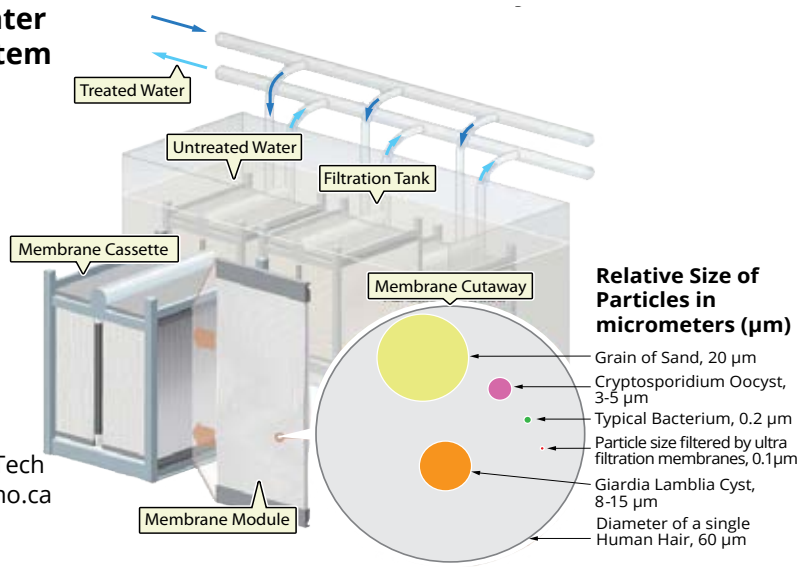
Costs and funding sources

Overall project budget $72.5 Million (including design ($10M), pipeline installation ($9 M), construction ($51M), contingency)

Funding sources

- Grants from Canada: $26 M (Community Works, Building Canada Funds)
- Grants from British Columbia: $10 M (BC-Building Canada, Strategic Priorities Funds)
- Development Cost Charges and User rates: $14 M

Inside the water filtration system



Questions?

Bill Sims, AScT, PTech
Bill.Sims@nanaimo.ca
250-756-5302

Collaboration of Operators, Industry, Government, Contractors and Universities. L–R: Doug Grossler (Lillooet Contracting Ltd), Irfan Gehlen (KWL), Warren Brown (EOCP Certified Operator, Lytton First Nation), Jim Brown (EOCP Certified Operator, Lytton First Nation), Ted Molyneux (INAC), Madjid Mohseni (UBC), George Thorpe (BI Pure Water)

RES'EAU

Achieving socially and technologically sustainable outcomes in drinking water systems for small, rural and Indigenous communities

By Candace Cook, Jim Brown, Danny Higashitani and Madjid Mohseni

Canada has made several well-publicized commitments toward achieving universal access to clean drinking water in small communities over the past few years, but a clear roadmap — and even consensus on what success will look like — remains elusive. Conflicting agendas and attitudes, disparate goals and baked-in biases have so far resulted in a failure to embrace the notion that issues in drinking water quality are directly connected to broader health and social challenges.

In short, the narrative has been about water, when what relevant players are really talking about, or ought to be, is community health and wellbeing. Our experience working with small communities has taught us that only the stakeholders who truly embrace this new paradigm will drive innovation.

RES'EAU-WaterNET is the Natural Sciences and Engineering Research Council of Canada's (NSERC) strategic response to society's changing expectations about what research and development (R&D) partnerships should deliver. We work in partnership with many other public and private organizations to deliver local solutions to drinking water issues faced by small, rural and indigenous communities (SRCs). We are also engaged in the development of policies in support of sustainable drinking water supply to deliver on social, economic and environmental goals. This modern multifunctional role represents a significant change from the traditional economic role of the water industry, which has traditionally been primarily about technology production and economic growth. The new role is more service-led, with water regarded as the life of a community.

Strategy is a major preoccupation for many of us working in the water space. It links us and the small rural community ecosystem's concept of supply and demand, and it is meant to identify where we want to be and how we think we can get there. However, the context of national strategy is shaped by the whys -- whether these policies and programs are justifiable solely to those directly affected, or whether these investments must be defended in terms of their impact on the economy, technology or another outcome that will benefit the majority of Canadians. This calls for an innovative method for reconciling these two views.

Strategy states where we want to be and how we think we can get there. It is meant to identify who we should target as customers, what solutions we should offer and how we should deliver them to those customers. However, the context of national policies and strategy is shaped by the whys – why should we invest in small and rural communities, whether these investments and policies are justifiable solely to those directly affected, or whether these investments must be defended in terms of their impact on the economy, technology or another outcome that will benefit the majority of Canadians. This calls for an innovative method for reconciling these two views.

Over the past several years, our work with small, rural and remote communities has shed light on ways water stakeholders can achieve this reconciliation. RES'EAU has focused its efforts on producing new knowledge derived from the perspectives of various actors with different levels of cultural awareness (e.g. urban culture, rural culture, production culture, financial culture, indigenous culture and academic culture). This problem-solving collaboration, which we call the **Community Circle**, attempts to systematically capture and weigh all relevant considerations within the ecosystem so that decisions can be made based on a deeper understanding of the issues the community is trying to solve.

Under this community-centric approach, scientific, technological and academic communities play an integral role by

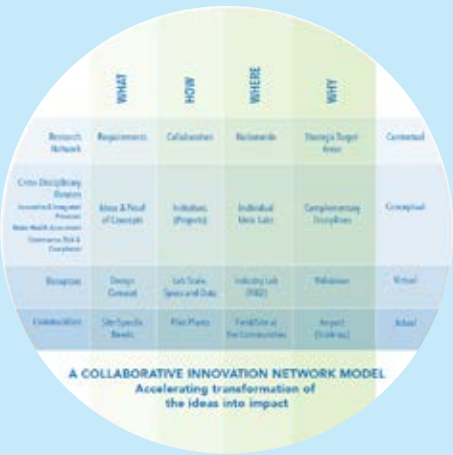
re-examining underlying assumptions upon which doubts about the viability of small water systems are built, and assess their plausibility. Concepts such as risk, health, efficiency, affordability, acceptability, market space/profitability, economies of scale and size, demand and the community's size must be revisited through the lens of this new paradigm. The Community Circle model suggests a number of ways to overcome the unintentional dysfunctional implications that stem from partial understanding of the innovation process by improving the dialogue among stakeholders, achieving a more balanced view of the whole innovation process. This includes the mechanisms for the development, diffusions and adoption of the benefits of innovations in the water sector.

In practice, adoption of an innovation will depend on interactions between adopters with different perceptions of benefits and

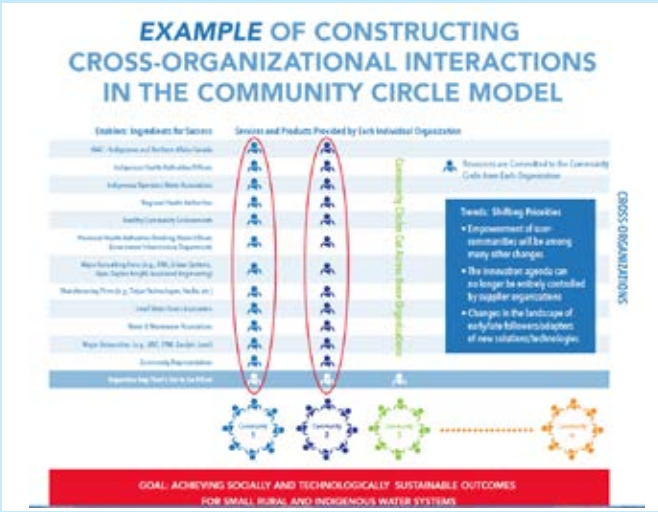
The RES'EAU Community Circle Model

The RES'EAU Community Circle is an award-winning and globally unique precision problem-solving model for drinking water in small, rural, and indigenous communities that proposes the customization of solutions, with decisions, practices, technologies and services being tailored to the individual community.

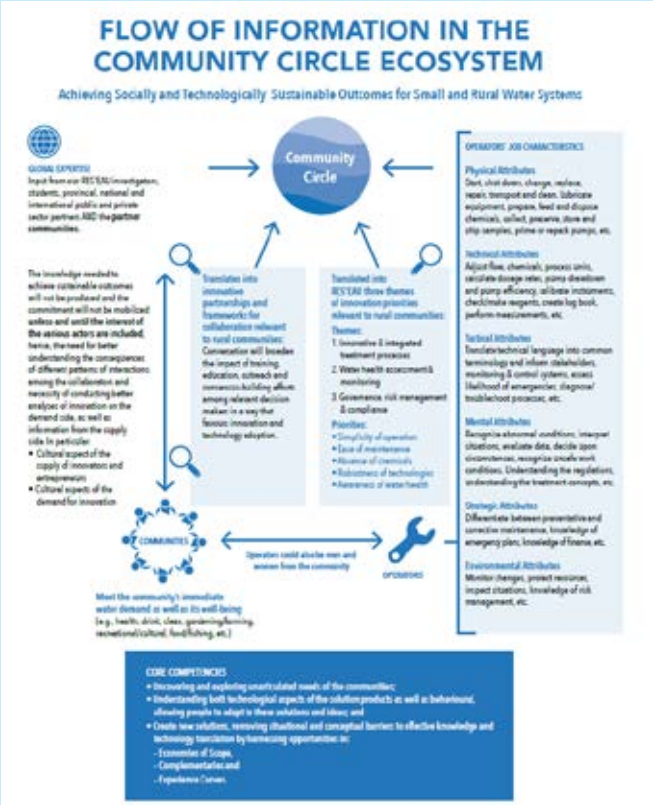
COMMUNITY CIRCLE



This model takes the research program out of the lab and into the real world, incorporating communities, Operators and all stakeholders' expertise and insight at the earliest stages of the problem-solving process. Students/researchers are working closely with communities to understand the limitations and constraints they face. Together, they identify research priorities and design and execute research to produce knowledge and integrated game-changing solutions. These findings are then validated by industry so that they can be readily diffused and adopted. This approach is paving the way in defining a vibrant market space for innovative solutions specific to small and rural settings. These solutions will be piloted in collaboration with both public and private sector partners and, according to guidelines set out by regulatory agencies, either at public sector facilities and/or subsequently in actual communities. Successful solutions will then be scaled up through partnerships with national and international strategic programs, or by industry partners.



This model allows for participants from every part of the water community to bring their individual concerns and experiences together to explore questions such as: What matters to us as users, Operators, engineers, regulators, decision makers and as a community? And why does it matter? How can we begin to create authentic connections and relationships with others, particularly across the different interests and divisions in the water community? How do we change the water community conversation from one of negotiation to one of dialogue? The aim is to develop new conversations free of the cynicism and resignation inherited from the past and to create new possibilities for a future in which everyone has a place and is valued.



To construct this new ecosystem it is essential to understand how user communities can contribute to the innovation process, and how private and public organizations can harness those contributions. Removing barriers to participatory R&D for the latter and reframing the way they look at water problems so that they see the big picture – from identifying a problem to the adoption and diffusion of solutions – is no small feat. For too long, innovation for rural communities has been rooted in outsiders simply ticking boxes on a list of perceived needs, with little or no input from a community. The research community's traditional fixation on creating novel inventions with little regard for affordability, applicability, acceptability, and sustainability has also hindered progress.

risk, and developers with an emphasis on advantages, availability of data, feedback and reduction of barriers to use.

By placing Operators at the heart of the innovation cycle and incorporating research insights at the earliest stages of problem solving, the Community Circle model cuts across the different challenges specified above.

However, it is not enough to make Operators aware of the need for better technologies and processes. Community members, municipal leadership, provincial/territorial and federal governments all must understand the need as well, as their buy-in will ultimately influence whether or not a new technology is adopted.

These additional criteria identify institutional barriers and capture site-specific experiences that highlight successes and failures in introducing new solutions to small communities. The core value of Operator/community participation in water innovation processes is now widely appreciated in academia and in some governmental funding organizations. Yet, industry has been slow to adopt the approach in part because such adoption would necessitate a significant re-prioritization of how firms organize and distribute their resources, particularly with respect to gathering information about communities' needs and preferences and its application to solution development.

However, there are two main barriers in achieving the knowledge exchange necessary among all relevant partners:

First, lack of supporting mechanisms to facilitate participation of the Operators (and end-users) at scientific and professional events and meetings that investigate water issues related to small systems; i.e., travel expense, conference registration fees and session contents (not being at an appropriate level) have been mentioned when we discuss the matter with Operators and end-users. Many Operators possess the skills and tools necessary to re-design, adapt or modify the existing technologies to meet their needs. Their contributions should be viewed not simply as critics or evaluators of product but rather as co-designers.

Second, lack of a small-community-relevant sustainability metrics supporting ready buy-in by all partners for a particular solution. Traditionally, technologies are being evaluated based on the degree they meet specific regulations or resolve specific technological problems (e.g., removing specific contaminant) and not the degree they meet end-users and utility needs, especially for small communities.

Since community circle groups started meeting, boil water advisories have been lifted off two reserves. Clockwise from the left: Warren Brown, Candace Cook, Madjid Mohseni, Amanda Spinks, Rosalin Miles, Chief Janet Webster, Rita Manual, Ted Phillips, Dylan Phillips, Casey Neathway, Grant Robertson, Bryan Phillips.

First Nations Operators at RES'EAU Research Labs at UBC.

The Community Circle model — through building new partnerships, providing opportunities for the various parties to meet, creating dynamic participation, ensuring that there are shared topics to relate to — enables designers to question the taken-for-granted assumptions embedded in the conventional problem-solution management frameworks.

The model not only acknowledges the implicit importance of questions such as, "Who should be consulted? How to engage with them to maximize their contribution? How to translate their insight into products?" but also recognizes underlying questions concerning, "How do we involve different

public and private organizations without limiting their areas of control and expertise?

How does the Community Circle approach become championed within their organizations?" The deployment of the Community Circle model is itself often an exercise in organizational change, bringing diverse stakeholders together who sometimes challenge each other with very different perspectives on the issues. There is not always a short-term commercial gain from its use, particularly if viewed solely in terms of economic metrics.

The fieldwork and piloting involved in the Community Circle model is not a question of one particular technology; it is best described as a way to draw fresh boundaries that enable us a brief look at how other people and cultures might view the world.

With actors' minds as open as possible to put themselves where they can be as surprised as possible, only then they are able to see beyond their taken-for-granted, unarticulated conceptual distinctions, providing the most comprehensive understanding of the contexts of use in small rural communities.

Automated systems are most effective during normal operation. When it comes to trouble shooting, often manufacturers' support staff become the Operator/user of these systems, reading, adjusting, installing, connecting, replacing, servicing and cleaning them. To prepare for these unexpected situations we have to think about the relationship between the technology and the Operators' physical and mental practices. Operators in small rural communities see, touch, feel, hear, smell, walk in the field and often act on hunches working around the system, and it is crucial for them to see the process as a whole, not to just rely on automated technologies. Hence, the solutions should be structured carefully using the Operators' point-of-view.

The figures above outline how Operators' six general performance components relate to the network's three research themes. It is virtually impossible to isolate each subcomponent from the others when it comes to operating, diagnosing and solving any problems in water systems. However, separating them for the purpose of providing more details as to how each theme empowers Operator performance makes the concept more easily understood. For the sake of simplicity, the timeframes and Operators' ability/certification level at which each component becomes seriously stressed have been omitted.

It is essential to understand not only the contribution that users/Operators can make to innovation process and how this contribution can best be harnessed, but also the potentials and constraints that exist within the public and private organisations and how realistic these approaches may be to implement. The Community Circle Model has proved the possibility of overcoming the management difficulties in achieving socially and technologically sustainable outcomes for the small and rural communities.

There are many barriers to success in solving small community water problems, but RES'EAU-WaterNET's experience has been that meaningful partnerships and constant, open communication and knowledge sharing can pave the way forward. Operators in these settings need mentorship and support for career management, education and certification so that they can rise to the new challenges their role requires. Productive partnerships can ensure in turn that Operators are empowered as catalysts for change within their ecosystems, and strong advocates for their community's health.

NETWORK YOUR WAY TO CEU FULLFILMENT

OPERATOR CONTINUING EDUCATION (CEU) DAY & TRADE SHOW

Date: December 12, 2017
Location: Anvil Centre, New Westminster
Price: BCWWA Member / Non-member - $199 / $319
CEUs: 0.6

No time to complete in-class courses but need to reach your CEU fullfillment by the end of the year? Join the BCWWA for this one-day event, featuring 0.6 CEUs, four education streams and a myriad of opportunities to network and get your hands on equipment.

Register before the early bird pricing deadline on November 1.

DELIVERING THE OPERATOR TRAINING YOU WANT, THE WAY YOU WANT IT

IN-CLASS

We offer regional schools throughout the year to ensure you have consistent access to operator certification and skills development.

ON-DEMAND

Is training not currently scheduled in your area? Ask us about our custom training programs. Our instructors will come to your site and deliver a course to your group on a schedule that fits your needs.

ONLINE

This is the most cost effective and flexible way to prepare for your certification – at your own pace. Even though courses are online, you gain the same knowledge and earn the same CEUs.

Register today at **bcwwa.org**

PHONE 604.433.4389
EMAIL education@bcwwa.org

BCWWA
BC WATER & WASTE ASSOCIATION

BUILDING SUSTAINABLE SMALL WATER SYSTEMS IN BC

By BC Water & Waste Association

Approximately 15 per cent of the people living in British Columbia rely on a small water system to deliver water to their home. These individuals and families, most of whom are living in rural or remote communities, depend on small water systems to protect their health, quality of life, and the environment. However, these systems experience more water quality advisories than large systems, and often struggle to maintain their water system's infrastructure due to financial and operational challenges.

In recent years, there have been a number of reports that have reviewed the state of small systems in BC. These reports point to the need to build capacity among small water system owners so that they make informed decisions that improve the financial sustainability, operational resiliency, and safety of their systems.

To help address the many risks facing small water systems and the communities they serve, the BC Water & Waste Association (BCWWA) launched a pilot project in 2015, with funding from the BC Ministry of Health, to help build the financial and managerial capacity of small water systems in BC. The project involved developing and delivering workshops, webinars, and coaching sessions, aimed at communicating the legal responsibilities and risks to system owners and operators, teaching them to assess their system's level of capacity, and encouraging them to take action to improve their system.

A second component of the project involved developing and piloting a point-of-entry/point-of-use (POE/POU) framework. As many small water systems do not have the financial resources to build and maintain centralized treatment systems, decentralized treatment options like POE/POU may offer a less expensive way to treat and deliver safe water. This type of system places greater responsibility on the home or building owner to ensure proper function and maintenance of the devices, therefore a guide and term sheet was developed to help communities decide whether it fits their needs and level of risk tolerance.

The project was initially scoped to provide service to 40 small water systems across the province. The demand was so great that a total of 99 small water systems, serving approximately 20,000 users, participated in the pilot project. Although the participant systems represent just 2% of the total number of small water systems in BC, several key vulnerabilities that likely apply to many small systems were identified:

- Fewer than half of the participating systems have treatment systems in place to deliver water that meets BC's drinking water standards, but more than three quarters self-assessed their treatment infrastructure as "fair" or better, illustrating the lack of knowledge and perceived value of treatment infrastructure, water quality, and impact on public health.
- Many systems lack standard operating procedures and management processes, likely a result of reliance on volunteer staff.
- Many systems lack an asset management plan, which is required to ensure the long-term sustainability of the system and quality of the water provided.
- Overall, participants provided positive feedback indicating they better understood their responsibilities and the severe consequences of mismanaging their systems. They knew where to obtain insurance coverage and had started forming support networks with local small and larger systems, regional health authority staff, and local consultants and suppliers.

The BC Ministry of Health has renewed funding of the BCWWA's pilot project to continue delivering workshops, webinars and coaching services into 2018. In addition, long-term management and sustainability training for system owners is being developed as well as a shared resource strategy. The new strategy will involve developing a mutual aid program in which larger water systems will provide operational support to small water systems, enabling small systems to improve their operational and technical capacity and more experienced operators to gain formal recognition and credit towards certification.

NEW STANDARDIZED EXAMS AS OF JANUARY 2018

Exam Development Process

The new Standardized Exams have been developed through a rigorous psychometric process that began with new job analyses conducted in 2014-2015. Through this process, several thousand industry stakeholders provided input on the significance of approximately 730 job tasks. This data was analyzed to prepare new exam content outlines (Need-to-Know Criteria) reflecting the most widely performed and significant job tasks. Compared to prior editions of the Need-to-Know Criteria, the new outlines have:

- More clearly stated and streamlined job task statements;
- A fixed and clearly communicated number of calculation items per exam form;
- New information detailing the number of recall, application, and analysis level items included in each content area; and
- New information indicating the basic, intermediate, or advanced level for each statement of supporting knowledge.

More than 1,000 new items ('test questions') were written and closely scrutinized against the new Need-to-Know Criteria and best item writing practices to avoid common item flaws or bias over the course of 2016. Much of this new content was integrated into the 2017 Standardized Exams which, after extensive review and refinement, were pilot tested during the spring and summer of 2017.

Each phase of exam development was carried out by diverse committees of highly-qualified subject matter expert volunteers from across the United States and Canada, and included several EOCP Certified Operators.

An Exam for All Jurisdictions

In order to provide a standardized resource to all ABC members, address broad concerns on diverging local, state/provincial, and federal regulations, and best invest volunteer time and Association funds, the 2017 Standardized exams have been developed to serve both United States and Canadian certification programs. To accommodate this shift, weights and measures will be provided in both US Customary and metric units – see example.

Example Calculation Item

If a water reservoir 12 ft (4m) in diameter has a static water level of 21 ft (7m) what is the pressure on the bottom of the tank?

A. 6 psi (46 kPa)
B. 9 psi (69 kPa)
C. 12 psi (92 kPa)
D. 21 psi (161 kPa)

Pre-test Items and Time Limits

Each 2017 standardized exam form includes 10 extra unscored items that have not been used on previous versions of the exam. These are known as 'pre-test' items and allow ABC to gather valuable data about the new items before they are included as scored items on future exams. Pre-test items are unidentified and scattered throughout the exam to ensure candidates answer them with the same care in which they address scored items. The pre-test items are not included in the candidate's final score.

As with currently used exams for Levels I to IV, a 3-hour time allotment will be allowed for the new Standardized Exams. The 3-hour allotment is well above the testing industry's standard 2 hours for a 100-110 question exam and should allow each candidate sufficient time to complete the examination.

Supporting Materials

Supporting materials have been posted to ABC's 2017 Standardized Exam Resources webpage and include:

• Need-to-Know Criteria

With the 2017 editions of the Need-to-Know Criteria, each exam now has its own document (rather than aggregating Class I-IV information in a single document). When viewing these documents, keep in mind that for ABC's standardized exams, Class I is the lowest and Class IV is the highest.

• Formula/Conversion Tables

Updated formula/conversion tables (FCTs) are implemented with the new exams. Subject matter expert committees carefully reviewed specific and credible feedback received from programs and examinees using the prior tables, merged US and Canadian content, cross-referenced all tables for gaps and inconsistencies, and evaluated the content against the newest Need-to-Know Criteria to develop the new FCTs.

Scoring and Reporting

While the processes for scoring and reporting will remain largely the same, the standardized exams will provide updated score and mastery reports. These reports are mapped to the new Need-to-Know Criteria and offer diagnostic information about candidate performance on specific examination content areas. Candidates can utilize their score reports to determine in which exam content areas they should focus their future preparation efforts, and then consult the Need-to-Know Criteria for a complete list of testable operator job tasks included in that content area.

The updated mastery report offers a description of each objective area on the exam and allows candidates to analyze their performance in each area.

THE VALUE OF AN OPERATOR

2017 EOCP Certified Operator Salary Survey Highlights

by Andrea Hughes PhD and Kalpna Solanki BSc MBA CPHI(C)

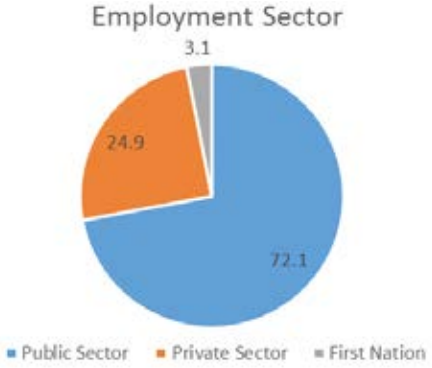
When the EOCP completed a survey of its membership in 2017, many respondents asked us to complete a salary survey. More than 550 Operators participated. Following are highlights of the data, including charts.

1. More than 50% of survey respondents have been Operators for less than 10 years:

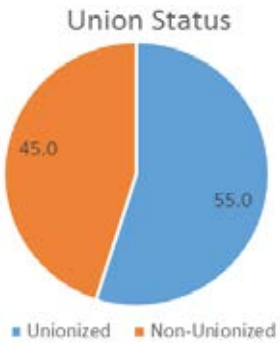
2. Almost 92% of respondents are male, which is not surprising since several previous surveys have shown that the field of Operators is predominantly male:

3. Almost 30% of respondents work in the Lower Mainland – the concentration of Operators in the Lower Mainland also correlates with the largest population centre in BC.

4. The majority of respondents work for public organizations:

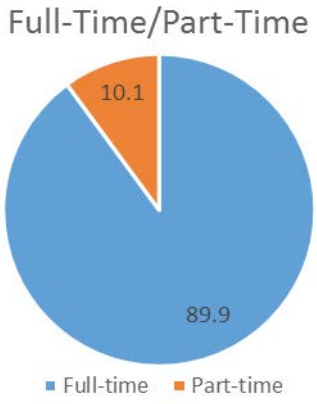


5. 55% of respondents belong to a union:

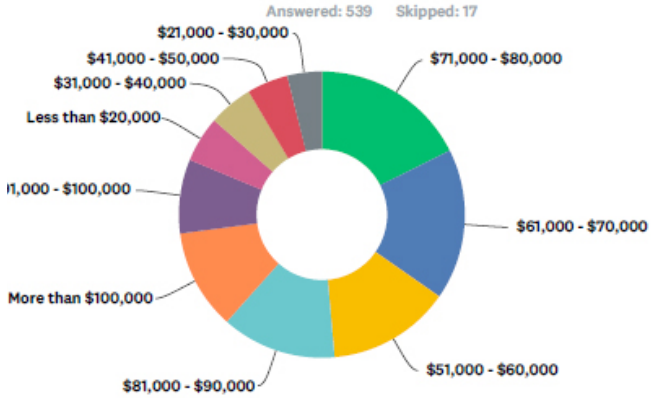


6. Certified Operators work in several capacities with most working as Operators:

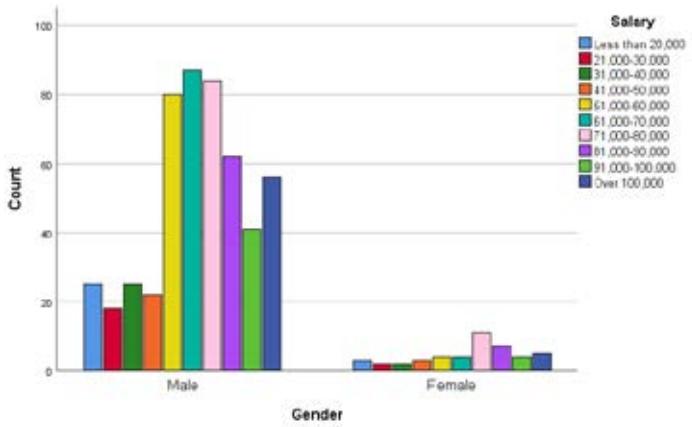
7. Almost 90% of respondents work full-time:



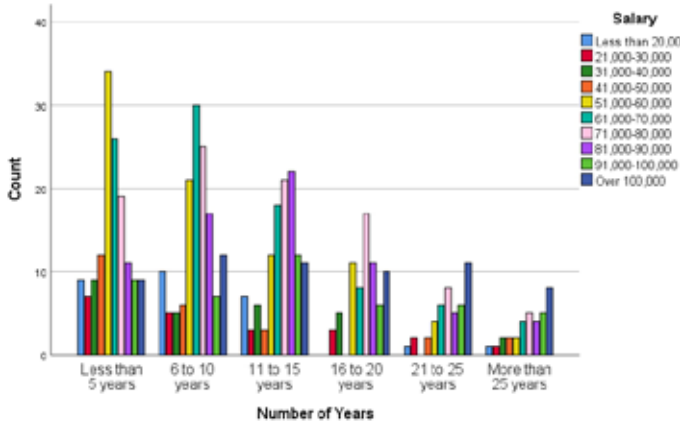
8. While some Operators make less than $20,000, and some make more than $100,000, the most dominant salary range is $71,000 to $80,000:



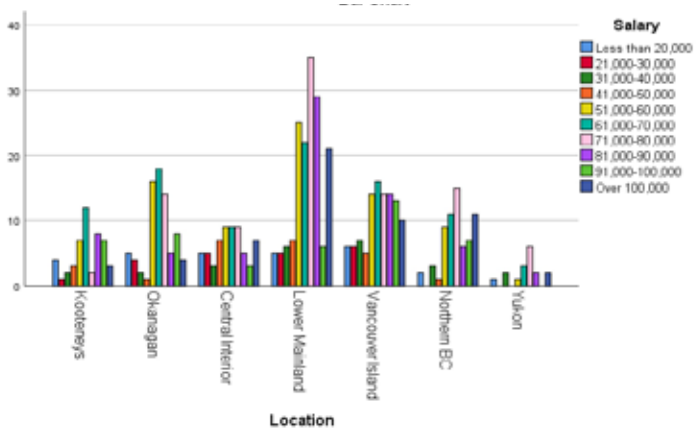
9. The difference in salary between genders is non-significant. There are far more males than females but the differences in salary distribution are not significant (X2= 23.07; p=.147):



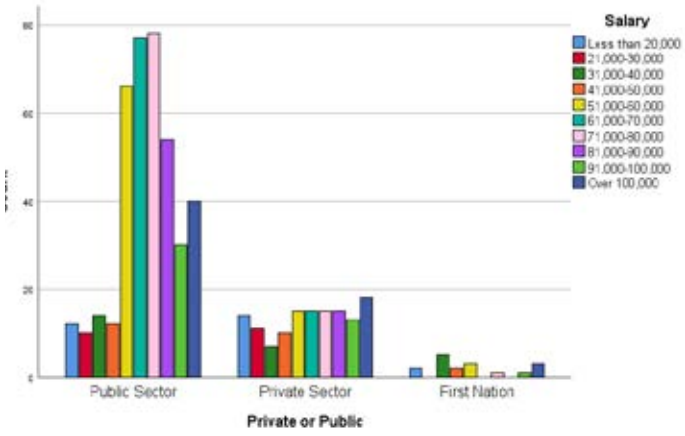
10. The difference in salary for number of years in the field approaches marginal significance (X2= 104.28; p=.076), with those having more years of service falling into the higher salary ranges:



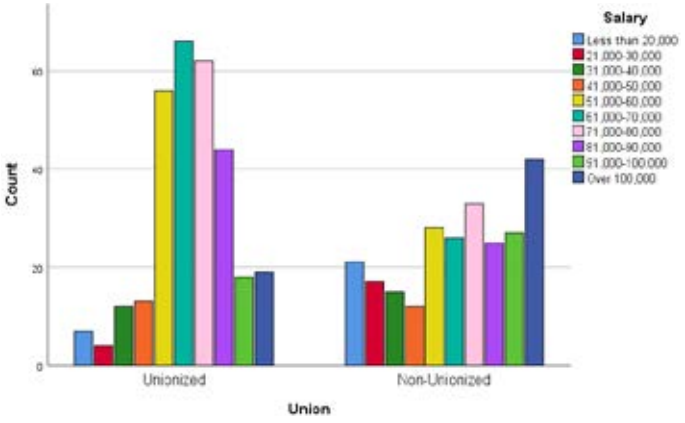
11. There is a significant difference in salary based on location of employment (X2= 158.87; p=.000). Those working in the lower mainland fall into the higher salary ranges. Note though, that this also reflects the fact that more people are employed in the Lower Mainland:



12. There is a significant difference in salary based on sector of employment (X2= 82.98; p=.000) with those working in the public sector falling into the higher salary ranges. Again, this partially reflects the fact that far more Operators are employed in the public sector than in the private or First Nations sectors:

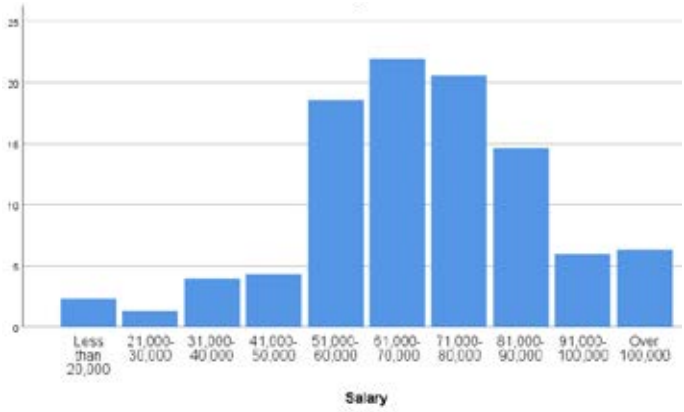


13. There is a significant difference in salary based on union status (X2= 64.05; p=.000) with those who are unionized falling into the higher salary ranges:

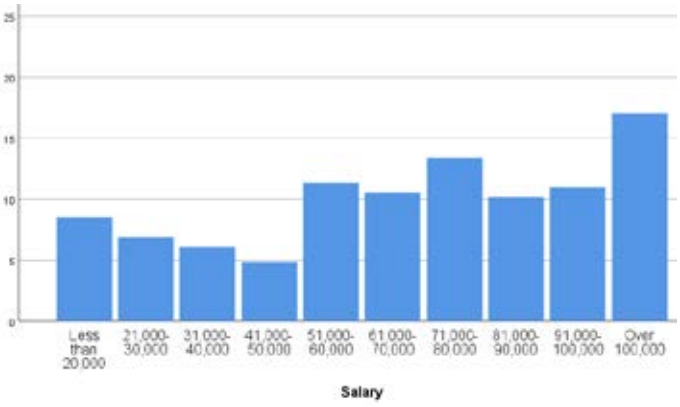


14. Delving deeper into these numbers shows the following two salary ranges:

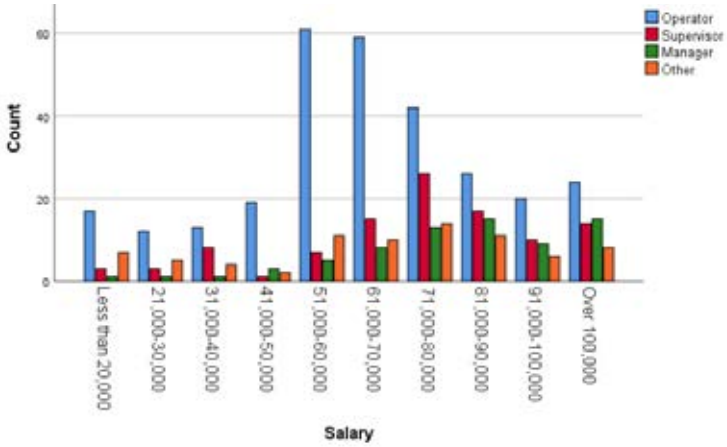
A. Unionized Salary Distribution:



B. Non-Unionized Salary Distribution:

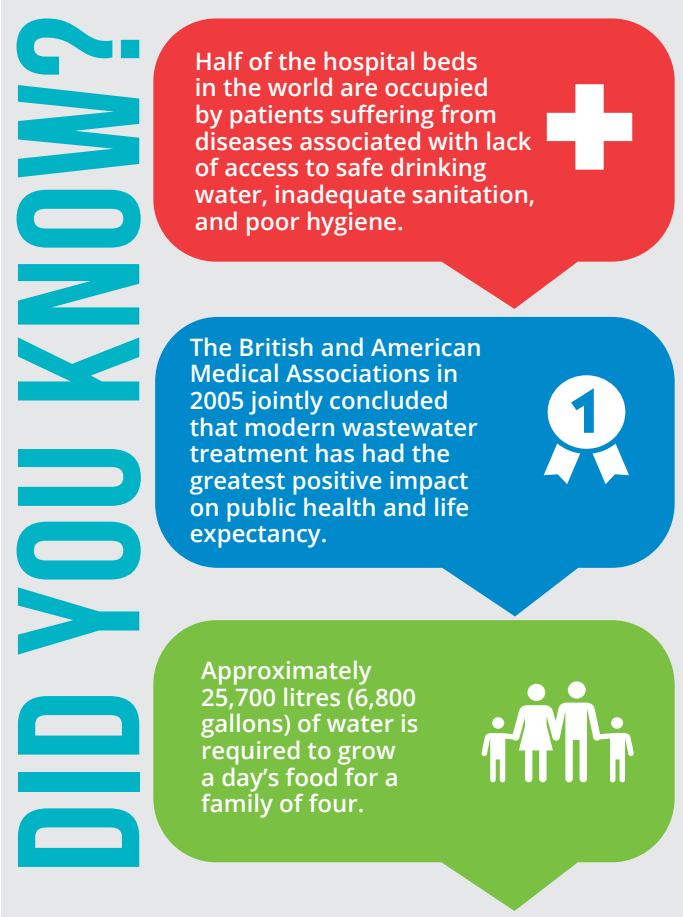


15. There is a significant difference in salary based on position (X2= 98.49; p=.000) with those who work as Operators falling into the higher salary ranges:



We are pleased with the level of participation in this survey, and hope this salary data provides you with some information that is useful in your work as Operators.

We expect that we will repeat this survey again in 2022, and anticipate an even higher level of participation.



REGISTER ON THE EOCP'S NEW CUSTOMER RELATIONSHIP MANAGEMENT SYSTEM

With the launch of the EOCP's new IT System on 1 November 2017, we are working to make it easier for you to manage your career in the water and wastewater management industry in British Columbia and Yukon.

Upon clicking the link provided in the email you will be sent, you will be asked to create a password and log into the new Portal. Once logged into the system, you will be taken through a step by step confirmation process to ensure that the information we have on file is correct and up-to-date.

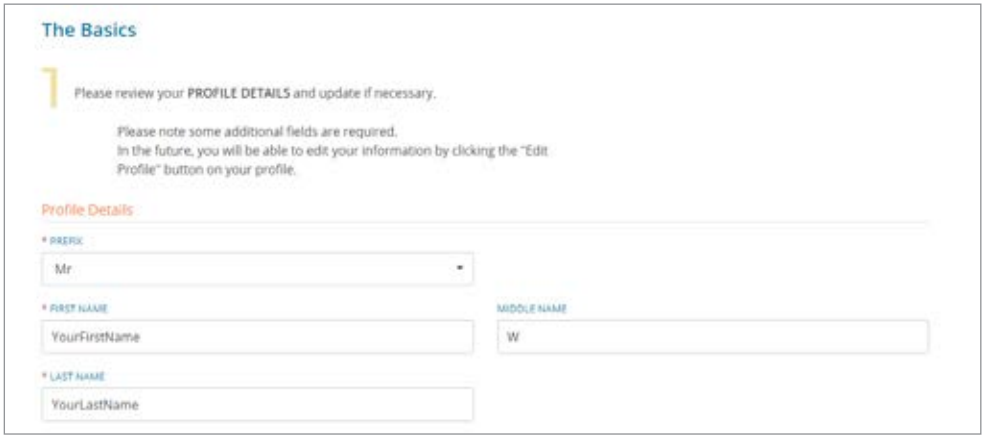
Having correct and up-to-date information helps us help you! From accurate CEUs earned, to providing you with valuable industry knowledge and communications, to helping you move your career forward, it is important to ensure the accuracy of your information.

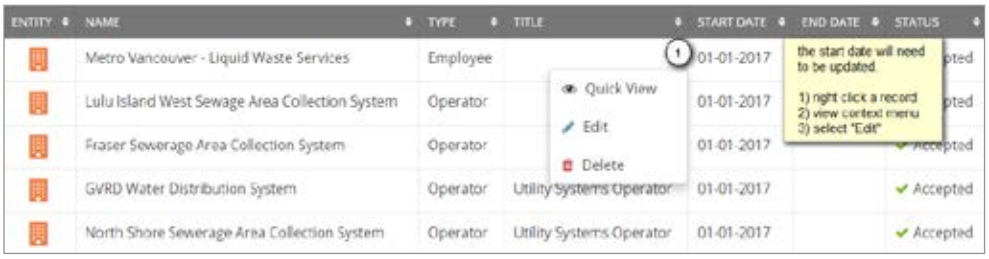
You will be asked to review and confirm:

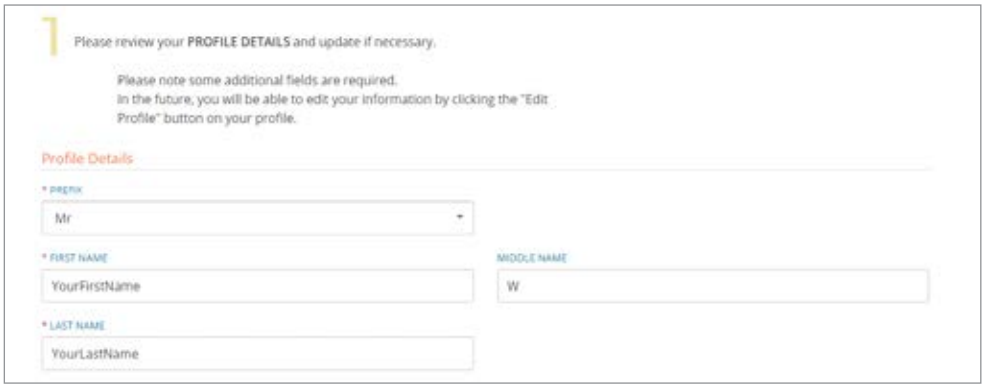
- Personal details (contact information)
- Relationships (with companies and/or facilities)
- Operator Details (if applicable)
- Instructor Details (if applicable)

Please note the number of pages/steps you will need to confirm depends on the roles you hold in relationship to Organizations (employers, facilities & training providers). If you are not an Operator or Instructor, you will not need to verify these details.

Link to step by step review help sheet: http://static.ow.ly/docs/EOCP-Welcome-SteppedRegistrationFinal_6UPn.pdf







LIFETIME OPERATORS

EOCP celebrates the contribution of professionals in the water and wastewater industry, and formally recognizes the crucial role that Operators play in preserving and protecting human health and the environment.

In 2017, six Operators became lifetime members of the EOCP after writing their first certification exams in 1987. These dedicated professionals have been active Operators for 30 years.

The EOCP would like to recognize and thank these Operators for their years of service and participation in the program. Operators are, and always will be, our greatest asset.

Darryl Bjorgaard,
Greg Blundell,
Morris Duncan,
Kevin Huey,
Allan Patterson,
Victor Shopland.

Thank you for all that you do, and please accept our good wishes on the anniversary of your membership with EOCP.

STATISTICS

July 1, 2017 – October 1, 2017

EOCP
Environmental Operators Certification Program

Exams

- **97** Operators wrote exams over the summer.
- **62** were web based exams and **35** were paper exams.

Facilities

- **49** facilities were added or upgraded during this time!

Continuing Education Units (CEUs)

- **1,286** Operators have submitted CEUs between July 1, 2017 and September 15, 2017, with a total of **3,125.95** CEUs earned during this period. This means that Operators spent **31,259.5** hours taking training!!

OPERATOR CERTIFICATION to October 1, 2017

Classification	IV	III	II	MUII	I	MUI	OIT	Total
WT	50	82	237	9	428	13	74	**893**
WD	90	223	972	12	1,070	22	92	**2,481**
WWC	13	79	569	9	835	22	57	**1,584**
MWWT	132	162	282	9	372	23	76	**1,056**
IWWT		4	20		25			**49**
BWD								**68**
SWS								**1,213**
SWWS								**403**
Total	285	550	2,080	39	2,730	80	299	**7,747**

FACILITY CLASSIFICATION to Oct. 1, 2017

Classification	IV	III	II	I	Other	Total
WT	19	44	130	47		**240**
WD	35	55	180	165		**435**
WWC	13	23	82	99		**217**
MWWT	26	34	131	103		**294**
IWWT	2	2	5	1		**10**
SWS					874	**874**
SWWS					267	**267**
Total						**2,337**

Definitions

WT	Water Treatment
WD	Water Distribution
WWC	Wastewater Collection
MWWT	Municipal Wastewater Treatment
IWWT	Industrial Wastewater Treatment
BWD	Bulk Water Delivery
SWS	Small Water System
SWWS	Small Wastewater System

WE ARE BIOMAXX ENVIRONMENTAL

WE ARE BIOMAXX ENVIRONMENTAL

- Flow Metering
- Instrumentation
- PLC Panels
- Smoke Testing
- Package Treatment Plants
- Leak Detection
- Odour/Corrosion Control

BIOMAXX ENVIRONMENTAL

The Evolution of Wastewater

TEL: **604-940-5556**
TOLL FREE: **1855.940.5556**
#1- 7163 Vantage Way,
Delta, B.C. V4G 1N1
www.biomaxx.ca