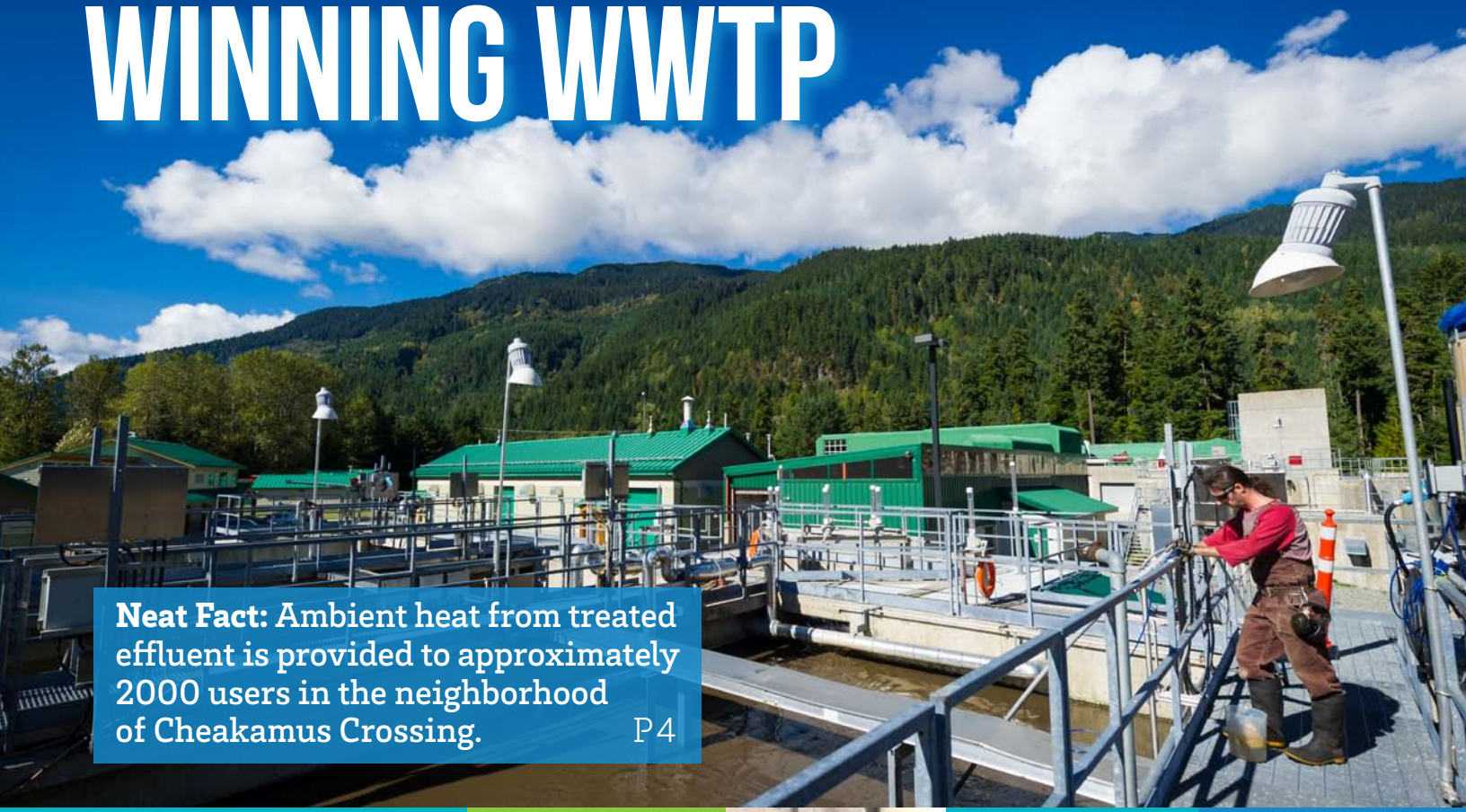
QUARTERLY NEWSLETTER
of the Environmental Operators Certification Program BC/Yukon

OPERATOR DIGEST

EOCP 50 YEARS

SPRING 2017 | NUMBER 132

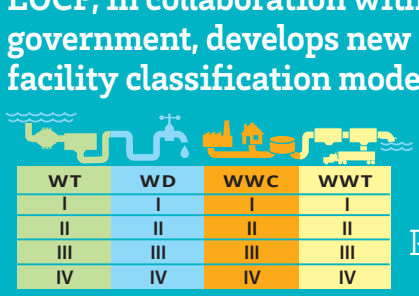
INSIDE WHISTLER'S AWARD WINNING WWTP



Neat Fact: Ambient heat from treated effluent is provided to approximately 2000 users in the neighborhood of Cheakamus Crossing. P4

DEVELOPMENT OF NEW MODELS

EOCP, in collaboration with government, develops new facility classification models.



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OPERATOR PROFILE

Meet Ole Christensen, Senior Utility Foreman, City of West Kelowna.

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NEW IT SYSTEM

Web based information system will provide better support.

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EOCP BOARD ELECTIONS

Voting begins April 24th and ends May 24th!

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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

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EOCP IMPROVEMENTS ARE COMING ON STREAM!

Message from the Directors and Staff

Pat Miller, Chair **Kalpna Solanki, CEO**

With the belief that "there is always room for improvement", here are a number of improvements at the EOCP this year (some completed, some in progress):

1. Our new IT system will be implemented this month. This new system will allow for easier interaction by Operators, and employers, Ministry of Health and Ministry of Environment staff, as well as the general public – see article on page 6
2. Thus far we have had excellent feedback on our new Facility Classification Models – to be implemented later in 2017. Several presentations will be made at conferences across BC, as well as in other jurisdictions in Canada, to get feedback on the new models – see article on page 7.
3. The EOCP and BCWWA collaborated on the soon to be published 'Workforce Strategy', culminating two years of research and consultation with employers, associations and professional bodies, training providers, government, and other stakeholders in the water and wastewater industry. More information on the findings will be provided at various upcoming industry conferences, as well as in the next issue of the Operator Digest.
4. The Competency Framework project is now almost complete. The next steps will involve consultation sessions across BC to get feedback from stakeholders on the framework, and modifications to it as necessary. This framework is for Operators, by Operators. We are the first in Canada to develop such a detailed competency framework, and there is the potential for this model to be adopted across Canada, and possibly in some US jurisdictions as well.
5. The Call for Nominations for ECOP Directors for the Board has gone out. We will soon be presenting all EOCP members in good standing with nominee information – please be sure to vote!

This newsletter is an example of how we celebrate our members, and share information on developments that affect the water and wastewater industry in BC and Yukon. We especially appreciate feedback from you on who's on the move, whom to profile, which plants to profile, and innovation in the workplace – so please keep the ideas coming!

We are honoured to serve the water and wastewater sectors of British Columbia and Yukon - providing more than 4.2 million people with safe drinking water and wastewater management. We have been fortunate to have so many dedicated volunteers who have worked with us on numerous projects in 2016, and many will continue to do so going forward – thank-you!

Pat Miller, Chair
Kalpna Solanki, Chief Executive Officer

OPERATOR PROFILE

Ole Christensen

Senior Utility Foreman
City of West Kelowna

How did you became an Operator?
I started with Westbank Irrigation District in 1979 as a labourer when help was needed with a dam project. I was then asked to stay full-time when the three-month part-time position ended, and I have been with the water utility ever since.

How long have you been an Operator?
I first became a certified Operator in 1986. For my first certification, I took a course at UBC and wrote my exams to get certified in WD Level I. Over the years since then I worked my way up and through to the WD Level 4 which I achieved in 2013. In my 38 years since my first job as a laborer with the Westbank Irrigation District in 1979, I have steadily moved up the ranks to the position that I hold now as Senior Utility Foreman for the City of West Kelowna.

What do you most enjoy about the work?
I enjoy the ability and challenge of trying to do things more efficiently, and to make improvements to systems. I also enjoy mentoring the new recruits and passing along my years of knowledge and experience. My work environment is ever-changing at the City of West Kelowna where we oversee five water utility systems that fell under the jurisdiction of the City of West Kelowna in 2010 (Westbank Irrgation District, Lakeview Irrigation District, West Kelowna Estates, Sunnyside, and Pritchard). Throughout these five systems there are approximately 15,000 services, 16 pump houses, 16 reservoirs, and 60 PRVs.

What has surprised you most about your job?
Technology has advanced significantly in the area e.g. SCADA systems.

What do you find most challenging about your work?
Keeping up with the times – always learning.

What do you wish other people knew about working as an Environmental Operator?
Everything isn't always as it seems. The public doesn't know what the job involves, and some of the challenges that the work entails. A prime example of this is the clean water that the public enjoys coming out of their taps everyday...without knowing how it happens, or who makes it happen!

Can you tell me about any initiatives you have been involved with?
Leading up to the 2007 commissioning of the Powers Creek Water Treatment Plant for the Westbank Irrigation District, I was actively involved ensuring demand could continue to be met within the distribution system while construction of the new plant was happening. After the City of West Kelowna was incorporated in 2007, the water utilities amalgamated in 2010. I was a key person in helping with that transition and amalgamation of these systems and operators.

What are some opportunities regarding the field of Environmental Operator?
For me it's been great to have a steady reliable job in the Okanagan for the last 38 years in a career that is always changing. There are lots of opportunities for protecting public health and the environment, as well as numerous opportunities for continued improvement both personally and for the systems we work on. More recently, there are also lots of job opportunities as the existing workforce starts transitioning into retirement.

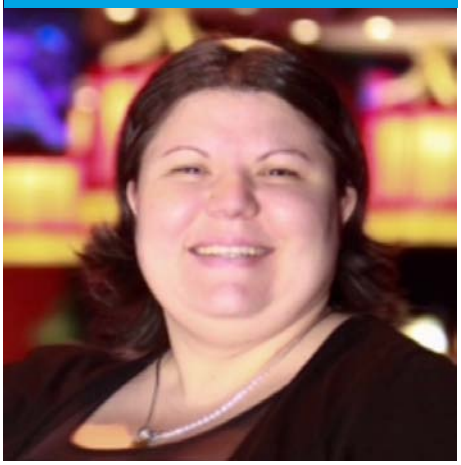
What do you do when you aren't working?
I really enjoy anything outdoors and in the back country spending time with my family, camping, fishing, quadding....

What else can you tell us about working as an Environmental Operator?
It's a challenging job, but also very rewarding, and there are lots of opportunities to work with the public. I've met lots of wonderful people through the industry both on duty and off duty at conferences and seminars.

WHO'S ON THE MOVE

Krista Derrickson

Manager of Utilities
Westbank First Nation



Krista Derrickson has recently returned home to Westbank First Nation (WFN), one of BC's largest First Nation purveyors of water, as their new Manager of Utilities. Krista previously worked as WFN's Operator/ Environmental Officer for just over 7 years when she moved on to work at Indigenous and Northern Affairs Canada (INAC) in the BC Region.

At INAC she worked on training programs for all Operators who work for First Nation communities within BC. She helped to create and approved new training courses and ideas by working closely with outside training providers like MTS Inc., and TRU. Krista also managed the Circuit Rider Training program that consisted of hands-on training for the Operators who work for First Nation communities. Krista hosted the annual First Nation Operators conference for the past 5 years as well, bringing together First Nation Operators from all across BC and Yukon.

Krista is looking forward to the new change at Westbank and is happy to be back home helping her community.

Checking the secondary clarifier sludge blanket depth. Photo: Mike Crane

HISTORY

The **Resort Municipality of Whistler** wastewater treatment improvements were first constructed in 1976. By 1984, more stringent provincial standards and increased flow demanded upgrading of the existing liquid handling facilities. In the 1990's due to the explosion of growth in the Whistler area (the highest in Canada in recent census), plant expansion was again mandated to ensure the discharge standards were met.

After an expansion in 1997, the Whistler Wastewater Treatment Plant was equipped with an influent pumping station, headworks, and primary and secondary clarification systems capable of 52,000 bed unit capacity. The biological and solids handling systems were capable of 42,000 bed unit capacity.

The most recent expansion was completed in time for Whistler to host the 2010 Olympics. That expansion saw the addition of two new fine screens, two modified Johannesburg bioreactor trains, a dissolved air floatation system, an anaerobic fermenter, a soda ash system, a fourth secondary clarifier, a UV disinfection system, two centrifuges, an activated carbon odor removal system, a brand new control building and analytical lab, and a an upgraded SCADA system.

At that time there was also a **District Energy System** added to heat a nearby housing development of over 2000 people with heat extracted from the final effluent.

INSIDE WHISTLER'S AWARD WINNING WWTP

By David Sivyer and Trish Browning

Since the improvements for the 2010 Olympics, The Resort Municipality of Whistler's wastewater treatment facilities are among the most advanced in Canada. Most noteworthy is that ambient heat extracted from treated effluent is provided to Cheakamus Crossing neighbourhood, reducing its greenhouse gas emissions over 90 percent from traditional methods.

The Whistler WWTP is a Level IV facility that services a population of 10,500 residents, and over two million visitors annually. The plant receives average daily flows of approximately 14,000 cubic metres per day in winter and approximately 11,000 in summer.

Liquid Flow

The wastewater enters the plant and enters the influent pump station, where it is pumped through three 80 HP influent pumps to the headworks. Two mechanical fine screens and a bar screen remove

The plant, located near the Cheakamus Crossing neighbourhood, is a tertiary treatment system, meaning it uses three levels of treatment for the wastewater, and includes a sophisticated odour-control system.

rags, plastics and other debris, and two grit conveyers remove grit that settles out.

The water then flows into the **primary clarifiers**, where the water slows down and the heavy organic materials settle out and are removed. This process removes up to 60% of the organic matter from the wastewater, and the material is raked into sumps and pumped out with sludge pumps. The primary effluent then flows into the bioreactors.

In the bioreactors, microorganisms use the nutrients and carbon to grow and multiply, creating a dense biomass. The bioreactors are constructed in a Modified Johannesburg Process configuration consisting of seven cells; a pre-anoxic, anaerobic, main anoxic, and four aerated cells. This process configuration allows for the simultaneous removal of carbon, phosphorous and nitrogen by the biomass, through nitrification, denitrification, and biological phosphorous removal. Each cell has a controlled amount of oxygen, which dictates what biological functions the selected bacteria will carry out.

After passing through the bioreactors, a fraction of the wastewater and biomass, called waste activated sludge, is wasted to the dissolved air floatation system to separate the solids. The rest of the water flows into the secondary clarifiers.

There are four clarifiers; two capable of handling 5 MLD each, and two capable of handling 10 MLD each. In the secondary clarifiers, the process flow is slowed down enough so the biomass created in the bioreactor can settle out, and be pumped back to the bioreactor as return activated sludge. The clear supernatant then flows over the weirs, and to the UV disinfection stage.

The UV system consists of two banks of 18 ultraviolet bulbs each. The bulbs are submersed in the wastewater channel, and the UV light sterilizes any bacteria remaining in the wastewater. This water is then discharged into the Cheakamus River as final effluent.

Solids Flow

The Whistler WWTP uses a dissolved air flotation system, an anaerobic fermenter, and two state of the art centrifuges to separate the solids from the water, breakdown, and dewater the solids.

The primary sludge is pumped over to a storage tank to be dewatered. The waste activated sludge, or WAS, from the bioreactors is put through the dissolved air floatation system, or DAF. Polymer is introduced to the liquid stream, and the liquid flows through the chamber, while having dissolved air bubbled through it. This thickens the WAS to 3-5 % solids, which are skimmed from the top of the system. The subnatant is returned to headworks for retreatment.

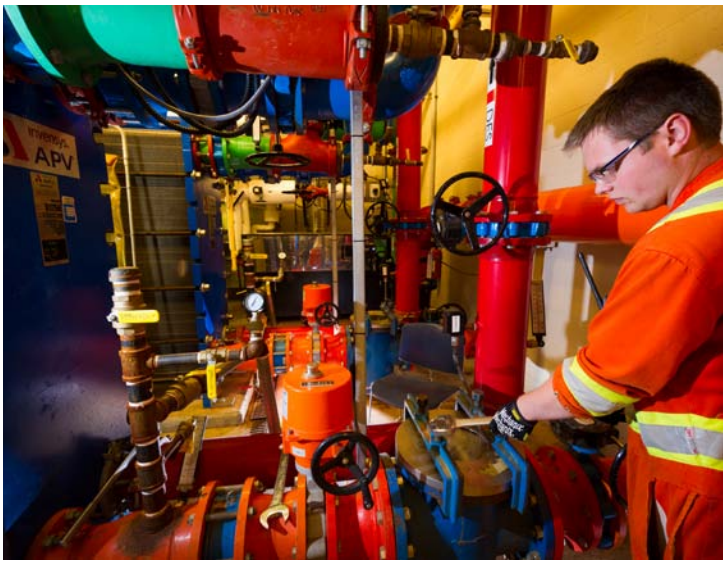
The primary sludge and thickened waste activated sludge, or TWAS, are mixed together and put through the centrifuges for dewatering. Polymer is added before the stream enters the centrifuges, where it is spun at a high rate of speed, separating the water and the solids. The liquid removed is returned to headworks for retreatment; the solids are loaded by an automatic conveyor into a bin, and eventually composted for topsoil production. The solids content of the biosolids produced is 24-26% on average.

District Energy System

The District Energy System (DES) is a system that extracts low-temperature ambient heat from the Whistler WWTP treated effluent and provides it to the approximately 2000 users in the neighborhood of Cheakamus Crossing. Its low-temperature

Primary clarification. Photo: Mike Crane

Solids dewatering. Photo: Mike Crane



Cleaning the **District Energy System** heat exchanger strainers. Photo: Mike Crane

Secondary clarification overview. Photo: Trish Browning

design makes it flexible enough to provide heating to users during the winter months, as well as nominal cooling during the summer months.

A percentage of the WWTP treated effluent is pumped across two heat exchangers which allow for the transfer of latent heat to the water flowing through the closed District Energy System Loop. The DES Loop water is then pumped to the buildings in Cheakamus Crossing, where individual heat pumps in each building use the energy from the DES Loop to heat radiant floors as well as domestic hot water. The "used" water returns to the DES Loop after passing through the heat pumps, and is returned to the DES plant at the WWTP to be reheated and pumped back to the village.

50 YEARS AND BEYOND... A NEW IT SYSTEM!

by Kalpna Solanki, CEO

The EOCP is undergoing a major IT upgrade, and the new web-based information system will provide improved overall business management support and functions for the EOCP and our stakeholders.

The new system will collect and store Operator information (from initial contact through certification and professional development until retirement), facility, employer, owner, instructor, associate members, and training provider information, in an electronic format.

Several key features of the new EOCP IT System are:

1. Storage of data electronically;
2. Track, manage and report on EOCP Operators throughout the full lifecycle of their interaction with the EOCP;
3. Collection and processing of Continuing Education Units;
4. Improving the interaction with Operators by using an up-to-date design and web interaction methods;
5. Provide workflow and status tracking;
6. Manage facilities, employers, and owners;
7. Collect Operator dues and facility fees;
8. Provide roll-up reporting and exception reporting to various levels;
9. Provide enhanced data security and data access – in the event of fire/flood/ earthquake;
10. Provide support to integrate with the EOCP's accounting system.

The EOCP's new IT system will provide more accurate and timely management of information for staff, Operators, employers, and government agencies, and will contribute to the ongoing success of the EOCP as it continues its work to Certify Operators and Classify Facilities enabling the prudent management of water and wastewater in British Columbia and Yukon.

NEW FACILITY CLASSIFICATION MODELS

In 2015, a multi-stakeholder review of the water and wastewater treatment systems in British Columbia identified significant opportunities for improvement to the classification system currently used in the province. Among the considerations:

- De-emphasize population as a factor in the classification of systems and facilities;
- Make the classification models and related business processes more open and transparent;
- Update the models to better reflect current technologies;
- Consider the full scope of Operator responsibilities when classifying a facility or system (i.e. from watershed to tap, and drain to watershed.)

With these considerations in mind, engineers at the Ministries of Health and Environment, with the support of a technical committee of the EOCP, initiated the development of a new set of classification models from the ground up, unconstrained by existing templates.

Following the completion of the initial work, the EOCP has continued to develop and refine the new facility classification models. Teams of Chief Operators were engaged as subject-matter experts (SMEs) to review and refine the models. Based on their input, the models are now ready for broader industry consultation.

Overview of the New Facility/System Classification

Classification is typically based on an assessment of operational complexity, measured by assigning points based on infrastructure components and operating attributes. The facility/system class is determined by setting threshold point values for each class. When developing new classification models, it became apparent that there are few external benchmarks to help establish the threshold values.

In order to accommodate the absence of an absolute standard against which to measure classification levels, it is important to:

- Make the classification process as open and transparent as possible;
- Encourage comparison among similar facilities/systems to highlight apparent inconsistencies, etc.;
- Provide a mechanism for appealing/disputing results;
- Provide a mechanism for modifying the model to correct errors and omissions and to accommodate change;
- Engage all stakeholders in the details of the classification processes.

FOUR MODELS

There will be four classification models:

Water Treatment

Water Distribution

Wastewater Collection

Wastewater Treatment

The purpose of the models is to measure the operational complexity of a facility or system, and each model is structured in a similar fashion. They each consider two sets of factors in the assessment of operational complexity:

- **Infrastructure:** The 'as-built' structures, components and processes that comprise the facility or system;
- **Influencers:** Other factors (such as staffing, operational schedule, O&M programs, input variability, etc.) that could contribute to operational complexity.

POINTS SCORE

At the core of each model is a consistent and transparent approach to the development of the 'points score' for each classification factor. Five different dimensions or variables are considered for each factor:

1. Operational Complexity
- How complex is the component?

2. Operational Sensitivity
- How sensitive is the equipment or process to Operator input or changes?
- Is advanced Operator knowledge required?

3. Operator Attention and Maintenance
- How often is Operator attention required to keep the component operating and maintained adequately?

4. Consequence of Failure
- What are the consequences of failure to worker and public health and the environment?
- How complex is emergency management and/or bringing the component back on line?

5. Impact to Water/Effluent Quality
- Does the component impact physical, chemical, or biological (pathogenic) properties of the water or effluent?
- How critical is the component to the plant's water or effluent quality?

Every infrastructure factor used in the models is ranked for its contribution to operational complexity on each of these five dimensions, and the rankings are weighted and consolidated into a single score on a 1-10 scale. The weights assigned to the infrastructure factors are consistent throughout the models:

Factor	Weight
Operational Complexity	7
Operational Sensitivity	5
Operator Attention & Maintenance	3
Consequence of Failure	10
Impact to Water/Effluent Quality	8

The influencer factors are also assigned point scores, using the same five variables, but each influencer has been weighted individually based on the strength of its influence on operational complexity.

This approach has a number of strengths:

- All of the intermediate rankings and calculations are retained and made available in the model, providing an 'audit trail' in support of the final point scores;
- A consistent process facilitates comparison among factors, making

model evaluation and maintenance relatively straightforward;
- The outputs of the models are more objective and defensible than the simple checklists typically in use.

CALIBRATION

The models were initially calibrated using a variety of hypothetical or 'model' facilities and systems ranging from very simple to very complex, with the simplest classified as Class I and the most complex as Class IV.

When field-tested using actual facilities and systems, the models produced classifications that were quite different from those already in place. This would have made the new models very difficult to implement given the potential impact on Chief Operator requirements, Operator experience, and DRC hours, etc. Accordingly, each of the models has been recalibrated with the objective of obtaining an overall neutral result when compared with current classification levels (though the classification of an individual facility or system could still increase or decrease from its existing value).

Implementation Considerations

Changes to facility/system classification can appear as a 'zero sum' proposition; a change that benefits the Operators represents a cost to the owners, and vice versa.

A reduction in the classification of a facility/system benefits the owners, because they require a lower classification of Chief Operator, which could in turn reduce their operating costs, and potentially make recruiting less difficult (level III and IV Operators are in short supply). An increase in facility/system classification could have the opposite effect.

An increase in the classification of a facility/system increases the 'value' of the experience being earned by Operators, in that they are eligible for higher levels of certification. In the short term, however, the increase in classification may render the Chief Operator underqualified for their position. A reduction in the classification of a facility/system might make it more difficult for Operators to certify at higher levels.

Business Processes Considerations

Appeals Process

The appeals process would include verification of the current facility/system classification using the previous model, as some classifications are very old and may not have been updated following facility/system changes.

The application would then be reviewed with the facility/system owner to confirm the details and the result.

If a controversial result were to be produced with the new classification model, a phase-in process would be considered, or other provisions made to mitigate the impact of change on facility/system owner and/or and Operators.

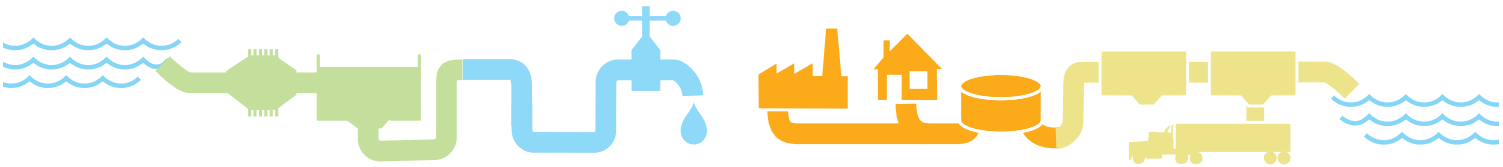
Model Revision Process

Errors and omissions in the classification models will be identified, particularly in the period immediately after widespread adoption. There will be a process for making changes to the models, and for managing the impact of changes on Operators and/or owners when facility/system classifications change as a result of these updates. The classification models will also be reviewed every five years by the EOCP to consider changes in technology, etc.

More Details

The EOCP is planning on presenting the new classification models for review and discussion at several conferences across BC and Yukon to demonstrate what the models entail, and to get feedback from you. In the meantime, please contact us if you need any additional information on the new facility/system classification models that are being developed.

THE EOCP'S COMPETENCY FRAMEWORK PROJECT



WT	WD	WWC	WWT
I ✓	I	I	I
II	II	II ✓	II
III	III ✓	III	III
IV	IV	IV	IV ✓

The EOCP, in collaboration with the Ministry of Health, recently completed Phase I of a project to build a new Competency Framework for Operators.

This framework is being developed by EOCP and the Ministry of Health in consultation with Operators. Currently, it comprises:

1. Competencies for all four Operator disciplines – Water Treatment, Water Distribution, Wastewater Collection and Wastewater Treatment;
2. Competencies for the four levels within each discipline – Levels I to IV;
3. Competencies for Senior Operators for all four levels and for all four disciplines.

This project aligns itself well with the Workforce Strategies Project where competencies were identified as a key priority by Operators and employers when hiring and training employees, and in particular for succession planning.

What are Competency Frameworks and why are they Important?

Competency frameworks define all of the competencies required to successfully practice in an occupation or to perform a job. A single competency consists of the knowledge, skills and attributes required to complete a work activity. Competencies are observable and measurable, and are expressed in terms of behaviours and outcomes.

Competency frameworks are important because they provide occupational bodies and employers with evidenced-based options for:

1. Setting minimum performance standards for work and/or certification;
2. Providing fair and transparent expectations for performance and behavior at work;
3. Obtaining a closer match between occupation/job requirements and an individual's knowledge, skills and attributes;
4. Identifying and addressing specific knowledge, skill and/or attribute gaps for an individual;
5. Providing guidelines/content for training and training curriculum;
6. Recognizing work experience and credentials obtained by individuals outside of formal training and/or from other jurisdictions/countries.

What have we accomplished to date?

We have completed a first pass through of each of the four occupations, engaging working Operators as Subject Matter Experts (SMEs), to review the initial set of competencies. This means that EOCP now has:

1. A first draft of a competency framework for drinking water and wastewater occupations;
2. Draft competency profiles, for each of the four Operator occupations at each level, outlining the work activities (collection of competencies) that make up an Operator's job;
3. Competencies that define work activities done by Operators in terms of 'Need to Know and Do' criteria and clearly spelled out 'must have' knowledge, skills, and attributes;
4. A numerical score for each competency in the framework that can serve as a basis for determining the potential value of continuing education units (CEUs);
5. Competencies and input defining the role of the 'Senior Operator' (Chief Operator), which can serve as the basis for a more focused discussion with SMEs who act/have acted in this position, and with other interested parties such as the Ministry of Health.

What happens next?

The next phase of the project will involve:

1. Reviewing and validating the framework with a broader range of SMEs/Operators at each level and within each discipline, and across regions;
2. Meeting with employers and training providers to introduce them to the framework, solicit input, and to discuss how the framework may be helpful to them;
3. Investigating how the EOCP can use the framework to support certification and enhance the ability of individuals to obtain certification;
4. Exploring options for using the framework to help implement the Workforce Strategy, which the EOCP will continue to support with stakeholders in the drinking water and wastewater sectors.

We will very soon be proposing dates and locations for meetings with Operators, employers, and training/education providers, and we look forward to your feedback on the EOCP's Competency Framework Project.

NOMINEES-EOCP BOARD ELECTION

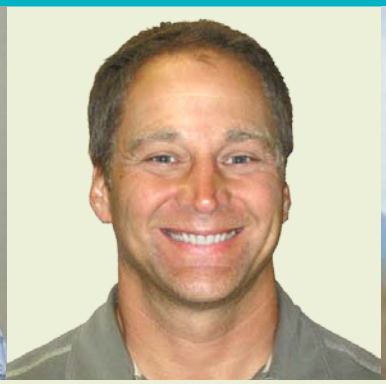
Voting begins on April 24th and ends on May 24th

You will receive an email on April 24th with instructions on how you can vote

ADMINISTRATOR (1 position)

Benjamin Kineshanko

(WWT I, WT I, WD OIT, WWC OIT) Technical Operations Manager – District of Squamish



Jim McQuarrie (Incumbent)

(WWT IV) Superintendent, LuLu Island Wastewater Treatment Plant – Metro Vancouver

Yonatan Yohannes

(WD IV, WT IV) Water Operations Manager City of Surrey

MEMBER-AT-LARGE (1 position)

Ron Enns

(WD I) Manager, Business Development – Kwantlen Polytechnic University (KPU), Recognized Instructor in EOCP Training Registry

Mike Firlotte

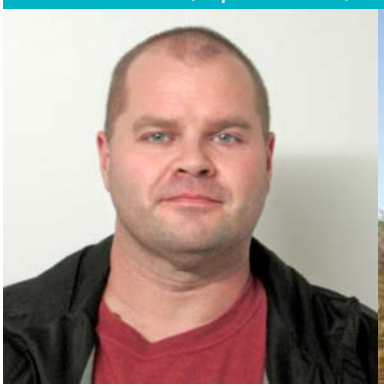
(WT IV, WWT I, WD OIT) Manager of Drainage City of Abbotsford, Recognized Instructor in EOCP Training Registry

John Reynolds

(MWWT IV, IWWT III, WWC IV, WT II, SWS) Retired, Recognized Instructor in EOCP Training Registry

Election results will be announced at the AGM on June 22nd.

OPERATOR (2 positions)

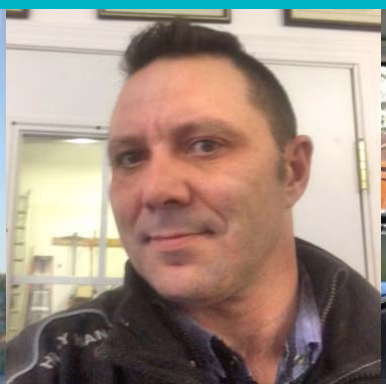


Jeff Culhane

(WD IV, WT I) Water Systems Operator Township of Langley

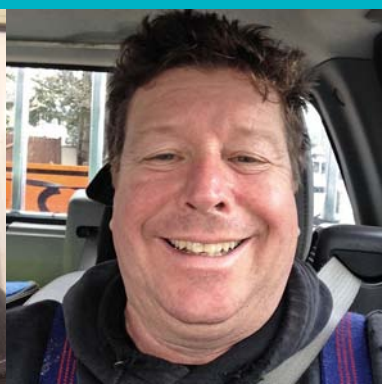
Tyrone McCabe

(WWT III, WT III, WD II, SWS) Operations Manager - BC Interior – Corix Utilities Inc.



Parrish Miller

(WWT II, WWC II, WD II, MU WT I) Works and Services Foreman Regional District of Kitimat-Stikine



Greg Mitchell

(WD II, WWC I) Maintenance Worker, Utilities City of Coquitlam

STATISTICS

January 1, 2017 – March 31, 2017

EOCP 50 YEARS

Exams

- **283** Operators wrote exams during this period.
- **180** were web based exams and **103** were paper based exams.

Facilities

- **11** facilities were added or upgraded during this time.

Continuing Education Units (CEUs)

- **745** Operators have submitted CEUs between January 1, 2017 and March 31, 2017, with a total of **2179.1** CEUs earned during this period. This means that Operators spent **21,791** hours taking training!

Definitions

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

FACILITY CLASSIFICATION to March 31, 2017

Classification	IV	III	II	I	Other	Total
WD	33	54	173	161		**421**
WT	19	43	127	44		**233**
WWC	14	21	79	96		**210**
MWWT	25	32	107	83		**247**
IWWT	2	1	5	1		**9**
SWS					857	**857**
SWWS					229	**229**
Total						**2,206**

OPERATOR CERTIFICATION to March 31, 2017

Classification	IV	III	II	MUII	I	MUI	OIT	Total
WD	88	222	966	8	1,074	24	92	**2,474**
WT	49	75	231	7	418	12	76	**868**
WWC	13	77	573	8	839	22	54	**1,586**
MWWT	131	162	272	8	386	18	77	**1,054**
IWWT		4	19		26			**49**
Total	281	540	2,061	31	2,743	76	299	**6,031**
BWD								**62**
SWS								**1,224**
SWWS								**397**
Total								**7,714**