Saskatchewan Water and Wastewater Works Operator Certification Standards, December 2016

EPB 539

FOREWORD

This document replaces The Saskatchewan Water and Wastewater Works Operator Certification Standards, 2012 and sets out the standards for the classification of water and wastewater works and the qualifications for the certification of the operators of those facilities.

These standards, called by *The Waterworks and Sewage Works Regulations* are intended for use by operators, municipalities, consultants and other persons involved with the operation of water and wastewater treatment facilities in Saskatchewan. The Operator Certification Board must base decisions on these standards as well as the regulations. These standards will be revised periodically to reflect changes in technology and certification issues.

These standards apply to facilities regulated by the Water Security Agency. These systems are described in *The Waterworks and Sewage Works Regulations.*

Please forward inquiries concerning these standards to:

Water Security Agency

Environmental and Municipal Management Services Division

420 – 2365 Albert Street

Telephone: (306) 787- 7911 Fax: (306)787- 0780

www.wsask.ca

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1.0 DEFINITIONS

Continuing Education Unit (CEU) means continuing education unit, as defined by the International Association for Continuing Education and Training (Washington, DC), awarded for various educational/training activities that an operator may have undertaken. One (1) CEU represents ten (10) contact hours of participation in an organized continuing education experience under responsible sponsorship, capable direction and qualified instructors.

Contact means two way communication and interaction between a learner and instructor in order for the learner to gain knowledge and to receive feedback.

Direct Responsible Charge (DRC) means experience gained through accountability for the performance of, or supervision of daily, on-site operational duties for a facility or operating shift. This can only occur when the facility owner designates a position held by an operator to be in DRC. The owner of a facility can designate a number of DRCs for that facility.

General Education Development (GED) means an adult education diploma issued by the Saskatchewan Education.

Operating Experience means the time spent working at a water or wastewater treatment facility in satisfactory performance of operating duties as approved by the Board.

2.0 FACILITY CLASSIFICATION

This section sets out the criteria for the classification of water and wastewater facilities. Facilities can be classified as Small System, Class I, Class II, Class III or Class IV. See Appendix A and Appendix B respectively for more detailed information about the classification of water and wastewater treatment facilities.

2.1 Small System

1. Small Water Facilities include those Class I water treatment facilities and/or those Class I water distribution facilities serving 500 people or fewer. The Small System water treatment facilities include only Class I facilities connecting to groundwater sources. Surface water treatment plants are not included in the Small Water Facilities classification.

2. Small Wastewater Facilities include those Class I wastewater treatment facilities and/or those Class I wastewater collection facilities serving 500 people or fewer. Mechanical wastewater treatment facilities, regardless of size, are excluded from this facility classification.

2.2 Class I to Class IV

1. Class I to Class IV water treatment facilities (WT), water distribution facilities (WD), wastewater treatment facilities (WWT) and wastewater collection facilities (WWC) are classified in accordance with the Facility Classification Point System as shown in Table 1. See Appendix A and Appendix B for more detailed information on the rating systems for water and wastewater treatment facilities.

Table 1 - Facility Classification Point System for Class I to IV

Facility	Units	I	II	III	IV
WT	Range of points	up to 30	31-55	56-75	76 & up
WD*	Population served	up to 1,500	1501-15000	15001-50000	50001 & up
WWT	Range of points	up to 30	31-55	56-75	76 & up
WWC*	Population served	up to 1500	1501-15000	15001-50000	50001 & up

*In-line treatment (such as booster pumping, chlorination, fluoridation, sequestering agent, or odour control) is considered part of a distribution or collection system.

3.0 CERTIFICATION REQUIREMENTS

This section sets out the qualifications for the certification of water and wastewater operators. The required formal education, experience and examination for the certification of Small System, Class I, Class II, Class III, Class IV and Operator in Training certificates are set forth in the following sections and summarized below in Table 2.

Table 2 – Summary of Education and Experience Requirements

Operator Level	**Requirements**	**WT**	**WD**	**WWT**	**WWC**
Small Systems	Education*	10 or equivalent		10 or equivalent	
	Training (CEUs)	0.6 CEUs approved applicable training		0.6 CEUs approved applicable training	
	Experience [1]	6 months		6 months	
Level I	Education (years)*	12 or equivalent	12 or equivalent	12 or equivalent	12 or equivalent
	Experience [1]	1 yr.	1 yr.	1 yr.	1 yr.
Level II	Education (years)*	12 or equivalent	12 or equivalent	12 or equivalent	12 or equivalent
	Experience [1]	3 yrs.	3 yrs.	3 yrs.	3 yrs.
Level III	Education (years)*	14 (2 post-secondary)	14 (2 post-secondary)	14 (2 post-secondary)	14 (2 post-secondary)
	Experience [1]	4 yrs.**	4 yrs.**	4 yrs.**	4 yrs.**
	DRC Requirements	2 Years in class 2 or higher	2 Years in class 2 or higher	2 Years in class 2 or higher	2 Years in class 2 or higher

Level IV	Education (years)*	16 (4 post-secondary)	16 (4 post-secondary)	16 (4 post-secondary)	16 (4 post-secondary)
	Experience [1]	4 yrs.**	4 yrs.**	4 yrs.**	4 yrs.**
	DRC Requirements	2 Years in class 3 or 4 facility/system	2 Years in class 3 or 4 facility/system	2 Years in class 3 or 4 facility/system	2 Years in class 3 or 4 facility/system

Notes:

** The following are considered equivalent to Grade 12:*

a) GED, or
b) Post-secondary assessment by person or institution considered qualified to assess education status, or
c) Successful completion of relevant trades program (trade qualified), or
d) Successful completion of post-secondary degree program from a recognized institution, or
e) Successful completion of diploma program from a recognized institution.

Clarification: All requests for certification from persons who were not certified as of the date these standards came into effect (December 4, 2016) will be subject to these standards. For those operators who were certified (WT, WD, WWT, WWC) prior to December 4, 2016, the previously granted level 1 certification will be considered as meeting the educational requirement for level 2 certification as noted in section 3.3.2.

***For Level III and IV certification, the four years of experience must include at least 2 years of Direct Responsible Charge (DRC) experience.*

[1] Operational experience requirements to be used for certification purposes must be at minimum 2/3 on-site, hands on experience and a maximum of 1/3 remote process control.

3.1 SMALL SYSTEM

For small systems only two (2) certificates are available, one (1) certificate for waterworks which combines water treatment and distribution facilities and one (1) certificate for wastewater works which combines wastewater treatment and collection facilities.

An applicant seeking certification in this Class shall:

1. Inclusively comply with clauses 2 to 5.
2. Have completed Grade 10 or GED or equivalent.
3. Have six (6) hours or 0.6 CEUs of applicable, approved training.
4. Have six (6) months of experience in:
    - water treatment and/or distribution facilities, if seeking certification in waterworks; and
    - wastewater treatment and/or collection facilities, if seeking certification in wastewater works.
5. Obtain a mark of at least 70% on:
    - Small system waterworks certification exam, if seeking certification in waterworks;
    - Small system wastewater works certification exam, if seeking certification in wastewater works; and
    - Both small system waterworks and wastewater works certification exams, if seeking certification in both small water and wastewater works.

3.2 CLASS I

An applicant seeking certification in this Class shall:

1. Inclusively comply with clauses 2 to 5.
2. Have a Grade 12 or GED or equivalent.
3. Have one (1) year of experience in:
   - water treatment at Class I or higher facilities, if seeking certification in water treatment.
   - water distribution at Class I or higher facilities, if seeking certification in water distribution system.
   - wastewater treatment at Class I or higher facilities, if seeking certification in wastewater treatment.
   - wastewater collection at Class I or higher facilities, if seeking certification in wastewater collection.
4. Not be permitted to substitute education or training (CEU's) for the experience required in 3.2.3.
5. Obtain a mark of at least 70% on:
   - a Class I water treatment certification exam, if seeking certification in water treatment.
   - a Class I water distribution certification exam, if seeking certification in water distribution.
   - a Class I wastewater treatment certification exam, if seeking certification in wastewater treatment.
   - a Class I wastewater collection certification exam, if seeking certification in wastewater collection.
   - all four (4) Class I certification exams, if seeking certification in all four (4) categories at the same time.

3.3 CLASS II

An applicant seeking certification in this Class shall:

1. Inclusively comply with clauses 2 to 5.

2. Have a Class I certificate in:
   - water treatment, if seeking certification in water treatment.
   - water distribution, if seeking certification in water distribution system.
   - wastewater treatment, if seeking certification in wastewater treatment.
   - wastewater collection, if seeking certification in wastewater collection.

   Clarification: All requests for certification from persons who were not certified as of the date these standards came into effect (December 4, 2016) will be subject to these standards. For those operators who were certified (WT, WD, WWT, WWC) prior to December 4, 2016, the previously granted level 1 certification will be considered as meeting the educational requirement for level 2 certification as noted in section 3.3.2.

3. Have three (3) years of experience in:
   - water treatment at Class I or higher facilities, if seeking certification in water treatment. *
   - water distribution at Class I or higher facilities, if seeking certification in water distribution system. *
   - wastewater treatment at Class I or higher facilities, if seeking certification in wastewater treatment. *

- wastewater collection at Class I or higher facilities, if seeking certification in wastewater collection. *

*All operating experience in a water/ wastewater facility/system which is not in the category in the area of certification being sought shall be considered as related experience and can substitute for up to half (max 50%) of the required work experience at the II, III, and IV levels.

Related experience to a maximum of 50% of the total experience requirement shall be credited after a minimum of 1 year operating experience at the following ratio:

a. Relevant Trades: Electrician, plumber, pipe-fitter, millwright, power/stationary engineer working in a water/wastewater facility or related facility - 1:2
b. Relevant Trades: Electrician, plumber, pipe-fitter, millwright, power/stationary engineer not working in a water/wastewater related facility - 1:3
c. Technical professions directly related to water/wastewater, such as engineers, engineering technicians, environmental technicians/technologist, laboratory technicians - 1:2
d. Semi-relevant Trades (for water distribution/wastewater collection): Welder, pipe layer - 1:3

4. Be permitted to substitute for any missing operating experience as follows:
   - 45 CEUs or one (1) year of post high school education in water, wastewater, engineering, science, and/or related fields for one (1) year of facility experience (see Appendix C).
   - up to 1.5 years or 50% of required experience can be substituted with education or training (CEUs).
5. Obtain a mark of at least 70% on:
   - a Class II water treatment certification exam, if seeking certification in water treatment.
   - a Class II water distribution certification exam, if seeking certification in water distribution.
   - a Class II wastewater treatment certification exam, if seeking certification in wastewater treatment.
   - a Class II wastewater collection certification exam, if seeking certification in wastewater collection.
   - all four (4) Class II certification exams, if seeking certification in all four (4) categories at the same time.

3.4 CLASS III

An applicant seeking certification in this Class shall:

1. Inclusively comply with clauses 2 to 8.

2. Have a Class II certificate in:
   - water treatment, if seeking certification in water treatment.
   - water distribution, if seeking certification in water distribution system.
   - wastewater treatment , if seeking certification in wastewater treatment.
   - wastewater collection, if seeking certification in wastewater collection.

3. Have two (2) years of post-high school education in water, wastewater, engineering, science and/or related fields. Appendix C describes how post high school education will be applied and which types of courses are applicable.

4. Be permitted to substitute for any missing education requirements as follows:
   - 45 CEUs of training in water, wastewater, engineering, science and/or related fields for one (1) year of post-secondary school without limitation. These same CEUs shall not be used to substitute for the experience requirements.
   - one (1) year of DRC experience in Class II or higher facility (of the same works category in which the certification is requested) for one (1) year of post-secondary education. This same DRC experience shall not be used to substitute for the experience requirements.

5. Have four (4) years of operating experience in:
   - water treatment at Class II or higher facilities, if seeking certification in water treatment *water distribution at Class II or higher facilities, if seeking certification in water distribution system. *
   - wastewater treatment at Class II or higher facilities, if seeking certification in wastewater treatment. *
   - wastewater collection at Class II or higher facilities, if seeking certification in wastewater collection. *

*All operating experience in a water/ wastewater facility/system which is not in the category in the area of certification being sought shall be considered as related experience and can substitute for up to half (max 50%) of the required work experience at the II, III, and IV levels.

Related experience to a maximum of 50% of the total experience requirement shall be credited after a minimum of 1 year operating experience at the following ratio:

   a. Relevant Trades: Electrician, plumber, pipe-fitter, millwright, power/stationary engineer working in a water/wastewater facility or related facility - 1:2
   b. Relevant Trades: Electrician, plumber, pipe-fitter, millwright, power/stationary engineer not working in a water/wastewater related facility - 1:3
   c. Technical professions directly related to water/wastewater, such as engineers, engineering technicians, environmental technicians/technologist, laboratory technicians -1:2
   d. Semi-relevant Trades (for water distribution/wastewater collection): Welder, pipe-layer - 1:3

6. Two (2) of the four (4) years of operating experience shall be DRC at a Class II or Class III facility, for those seeking water and/or wastewater treatment facility certificates. The DRC requirements shall not apply to those operators currently working in Class IV facilities or to those seeking certification in water distribution and/or wastewater collection.

7. Be permitted to substitute for any missing operating experience as follows:
   - Each year of non DRC experience with an additional of 45 CEUs, or one (1) year of post high school education in water, wastewater, engineering, science and/or related fields. Substitutions for the non DRC experience shall not exceed two (2) years or 50%.

8. Obtain a mark of at least 70% on:
   - a Class III water treatment certification exam, if seeking certification in water treatment.
   - a Class III water distribution certification exam, if seeking certification in water distribution.
   - a Class III wastewater treatment certification exam, if seeking certification in wastewater treatment.
   - a Class III wastewater collection certification exam, if seeking certification in wastewater collection.
- all four (4) Class III certification exams, if seeking certification in all four (4) categories at the same time.

3.5 CLASS IV

An applicant seeking certification in this Class shall:

1. Inclusively comply with clauses 2 to 8

2. Have a Class III certificate in:
   - water treatment, if seeking certification in water treatment.
   - water distribution, if seeking certification in water distribution system.
   - wastewater treatment, if seeking certification in wastewater treatment.
   - wastewater collection, if seeking certification in wastewater collection.

3. Have two (2) more years of post-secondary education in addition to the two (2) required for a Class III certificate (a total of four (4) years of post-high school education) in water, wastewater, engineering, science and/or related fields. Appendix C describes how post high school education will be applied and which types of courses are applicable.

4. Be permitted to substitute for any missing education requirements as follows:
   - 45 CEUs of training in water, wastewater, engineering, science and/or related fields for one (1) year of post-secondary school without limitation. These same CEUs shall not be used to substitute for the experience requirements.
   - for an operator who obtained their Class III certificate using DRC experience gained while working in a Class III or higher facility for at least six (6) years:
     - one (1) year of DRC experience in Class III or higher facility (of the same works category in which the certification is requested) for one (1) year of post-secondary education. Up to two (2) years of the required post-secondary education in addition to that required for Class III certificate can be substituted. The same DRC experience shall not be used to substitute for the experience requirements.

5. Have four (4) years of operating experience in:
   - water treatment, if seeking certification in water treatment *
   - water distribution, if seeking certification in water distribution system. *
   - wastewater treatment, if seeking certification in wastewater treatment *
   - wastewater collection, if seeking certification in wastewater collection. *

   *All operating experience in a water/ wastewater facility/system which is not in the category in the area of certification being sought shall be considered as related experience and can substitute for up to half (max 50%) of the required work experience at the II, III, and IV levels.

   Related experience to a maximum of 50% of the total experience requirement shall be credited after a minimum of 1 year operating experience at the following ratio:

   a. Relevant Trades: Electrician, plumber, pipe-fitter, millwright, power/stationary engineer working in a water/wastewater facility or related facility – 1:2
   b. Relevant Trades: Electrician, plumber, pipe-fitter, millwright, power/stationary engineer not working in a water/wastewater related facility – 1:3
   c. Technical professions directly related to water/wastewater, such as engineers, engineering technicians, environmental technicians/technologist, laboratory technicians – 1:2

6. Semi-relevant Trades (for water distribution/wastewater collection): Welder, pipe-layer - 1:3

7. Two (2) of the four (4) years of operating experience shall be DRC at a Class III or higher facility, for those seeking water and/or wastewater treatment facility certificates. The DRC requirements shall not apply to those seeking certification in water distribution and/or wastewatercollection.

8. Be permitted to substitute for any missing operating experience as follow:
   - up to one (1) year or 50% of DRC experience with 45 CEUs, or one (1) year of post high school education in water, wastewater, engineering, science and/or related fields.
   - each year of non DRC experience with an additional of 45 CEUs, or one (1) year of post high school education in water, wastewater, engineering, science and/or related fields. Substitutions for non DRC experience shall not exceed two (2) years or 50%.

9. Obtain a mark of at least 70% on:
   - a Class IV water treatment certification exam, if seeking certification in water treatment.
   - a Class IV water distribution certification exam, if seeking certification in water distribution.
   - a Class IV wastewater treatment certification exam, if seeking certification in wastewater treatment.
   - a Class IV wastewater collection certification exam, if seeking certification in wastewater collection.
   - all four (4) Class IV certification exams, if seeking certification in all four(4) categories at the same time.

3.6 OPERATOR IN TRAINING (OIT)

An applicant seeking certification in this Class shall:

1. Be employed in a waterworks or wastewater works facilities classified as Small System, Class I, or Class II.

2. Have the education requirement as stated in Section 3.1 (Small System), Section 3.2 (Class I), or Section 3.3 (Class II).

3. Have the following experience:
   - no experience required for an OIT Certificate in Small System.
   - at least 50% of the required experience as stated in Sections 3.2 and 3.3 for Class I and Class II Operator in Training Certificates respectively.

3.7 TEMPORARY/RELIEF OPERATORS

An applicant seeking certification in any class and is retained on a part-time, contractual, temporary or in a relief capacity as an operator must meet all the requirements as specified for the classification being sought.

For the purposes of determining a year of experience, the following formula will be used: 46 weeks = 1 year; 230 days = 1 year; 1840 hours = 1 year.

3.8 EXPERIENCE REQUIREMENTS-ADDITIONAL CLARIFICATIONS

3.8.1 Operating Experience

Operating experience is defined as the time spent working at a water or wastewater facility in satisfactory performance of operation duties or in supervision of persons performing operation duties.

In order to qualify for certification at any level of operation, the operator must meet the minimum operating experience requirements. For the purposes of the Operator Certification Program, experience gained by remote process control can only be used to a maximum of 1/3 of total required time.

Limited substitution of post-secondary education for experience applies only to Levels II, III, or IV.

3.8.1 Direct Responsible Charge (DRC) Experience Requirements

Direct Responsible Charge - DRC experience means experience gained through accountability for and:

a) Performance of; or
b) Supervision of.

Daily, on–site operational duties for a facility/system or operating shift, but can only occur when the operator has been authorized or identified by the owner as being in control of the facility/system or operating shift.

An operator will gain DRC when he/she has been authorized to perform, on a day–to–day basis, the following types of duties:

1) Review and establish operational parameters for the facility/system; or
2) Control the on–site operations of the facility/system including monitoring, evaluation, and adjustment of the facility/system or process; or
3) Provide on–site supervision of operators performing either a) or b) above.

DRC experience may only be gained after an operator obtains Level II Certification. There are no DRC experience requirements for Small Systems, Level I, or Level II.

Notes:
When shift operation is required, DRC experience can be earned in accordance with the above requirements for each operating shift.

An operator may earn DRC during a temporary assignment (e.g. vacation/illness replacement) that meets the above requirements.

More than one person can gain DRC during an operating shift if each person meets the above requirements.

DRC substitution for education cannot be used to meet experience requirements. DRC substitution can be used for education or for experience, but may not be used simultaneously for both.

Level III
For Level III certification two years DRC experience must be gained in a Class II or higher facility/system. A maximum of one year of DRC experience in a Class II (or higher) facility/system may be substituted for one year of the post-secondary formal education requirement for Level III certification.

Level IV
For Level IV, at least one year of DRC experience must be gained after receiving a Level III certificate, and at least two years DRC experience must be gained in a Class III or IV facility/system. A maximum of two years of DRC experience gained in a Class III or IV facility/system after obtaining Level III certification may be substituted for two years of the post-secondary formal education Level IV certification requirement.

3.8.2 Substitutions for Experience

3.8.2.1 Education

Small Water and Wastewater Systems, Level I – No substitution for the experience requirement is permitted.

Level II, III, or IV – Post secondary education may be substituted for required experience for Levels II, III and IV with the limitation that 50 per cent of any stated experience requirement (both operating and DRC) must be met by actual on-site operating experience in a plant or system. Minimum experience requirements must also be met.

Formal Education Substituted for Experience
Grade School – High school education cannot be credited for substitution value toward any experience since high school education is a basic requirement for all certification levels

Post-Secondary – One year of approved relevant formal academic education at the post-secondary or college/university level may be substituted for a maximum of one year of operating experience (Not DRC experience) except for Level 1 and Small Systems certification within the limitation noted above.

Note:
Education applied in substitution for an experience requirement can be simultaneously applied to the education requirement. DRC substitution for education cannot also be used to meet the experience requirement.

Operator Training Substituted for Experience
Approved specialized operator training courses, seminars, workshops, technical conferences, etc., may be substituted for operating experience requirements, subject to the minimum experience requirements previously described. Calculation will be based on Continuing Education Units (CEUs) with 45 CEUs considered equal to 1 year.

3.8.2.2 Other Substitutions for Experience

1. All operating experience in a water/wastewater facility/system which is not in the category in the area of certification being sought may be considered as related experience and may substitute for up to half (max 50%) of the required work experience at the II, III and IV.

2. All operating experience in a Federal regulated water/wastewater facility/system, an industrial potable water facility/system, a biological industrial wastewater facility can be substituted for 100% of the experience requirement at the Level I, II, III and IV. Non-potable water and non-biological industrial experience may be credited to a maximum of 50% in their respective drinking water or wastewater treatment fields.

3. Related experience to a maximum of 50% of the total experience requirement shall be credited after a minimum of 1 year operating experience at the following ratio:

    a. Relevant Trades: Electrician, plumber, pipe-fitter, millwright, power/stationary engineer working in a water/wastewater facility or related facility - 1:2.
    b. Relevant Trades: Electrician, plumber, pipe-fitter, millwright, and power/stationary engineer not working in a water/wastewater related facility - 1:3.
    c. Technical professions directly related to water/wastewater, such as engineers, engineering technicians, environmental technicians/technologist, and laboratory technicians - 1:2.

d. Semi-relevant Trades (for water distribution/wastewater collection): Welder, pipe-layer - 1:3.

4. Post-secondary education may be substituted for DRC experience up to a maximum of 50%.

5. If a year of post-secondary education is substituted for experience it can only be reused for education qualification after the missing year is made up.

6. A maximum of one year of Direct Responsible Charge (DRC) experience may be substituted for post-secondary education for Level III.

7. A maximum of two years of DRC experience may be substituted for post-secondary education for Level IV.

8. 45 CEUs may be substituted for 1 year of post-secondary education.

9. The maximum substitution of education and related experience for operating shall not exceed 50% of the stated operating experience requirement.

10. The maximum substitution of education and related experience for DRC experience shall not exceed one year (50%).

3.8.3 Formal Education

Grade 12 (12 years) Successful Completion

The following are considered equivalent to Grade 12

a) GED, or
b) Post-secondary assessment by person or institution considered qualified to assess education status, or
c) Successful completion of relevant trades program (trade qualified), or
d) Successful completion of post-secondary degree program from a recognized institution, or
e) Successful completion of diploma program from a recognized institution.

Note: *There shall be no substitution of operating experience for high school requirement.*

The Operator Certification Board may choose not to ask for verification of Grade 12 diploma or transcripts if the operator has completed any relevant two-year diploma with SASTT Technologist Designation, relevant University Degree, or an APEGS Registered Professional Engineer.

Equivalencies may be approved by Saskatchewan Ministry of Education by contacting http://www.education.gov.sk.ca/programs-services/ . It is the responsibility of the operator to obtain an evaluation before applying for certification or upon request by the Operator Certification board.

14 Years - The formal education requirement of 14 years for Level III Certification includes the basic 12 years plus an additional 2 years of approved related, relevant post-secondary formal education, or specialized training (90 CEUs), or a combination of formal education and training.

16 Years - The formal education requirement of 16 years for Level IV includes the basic 12 years plus an additional four years of approved related, relevant post-secondary formal education, or specialized training (180 CEUs), or a combination of formal education and training. Maximum post-secondary credit allowed it 4 years.

Approved Post-Secondary – The Saskatchewan Water Security Agency may approve related or relevant post–secondary programs. These could include degree, diploma and certificate programs from recognized post–secondary institutions. Maximum post-secondary credit allowed it is four years.

The following courses (must be from a recognized institute) are considered acceptable for Post-Secondary requirements:

a) Successful completion of relevant trades program (if not used for Grade 12 equivalency), or
b) Successful completion of post-secondary degree program from a recognized institution, or
c) Successful completion of diploma program from a recognized institution, or
d) Partial completion of relevant trades, post-secondary degree, or diploma programs or completion of relevant short courses or
e) Correspondence courses.

Note: Course work shall be broadly related to drinking water and/or wastewater operator's duties.

The programs accepted for post-secondary requirements are courses in the following areas:

a) Degree programs accepted at face value including, but not limited to, Science, Engineering, Agriculture, Biology, Chemistry, Physics, Mathematics, Laboratory Studies, Hydrogeology, or
b) Diploma programs accepted at face value including, but not limited to, Applied Science and Technology, Environmental Technician or Technologist, Laboratory Studies, or
c) Academic portion of Applicable Trades accepted at value assigned by jurisdiction's certifying authority – including, but not limited to, Power Engineering, Instrumentation, Plumbing, Electrical, Millwright, Mechanics, or
d) Relevant short course work accepted at value assigned by jurisdiction's certifying authority, or
e) Completion of other 4 year University Degree Programs may be accepted at a maximum of 450 contact hours.

Other courses will be reviewed on an individual basis. The course content of these shall be directly related to the delivery of water and wastewater programs.

Note: *CEUs are considered "post-secondary equivalent", therefore CEUs are not awarded for training taken as part of on-the-job training.*

3.8.5 Substitutions for Formal Education

Allowable substitution – Experience for Education

a) There shall be no substitution of experience for Grade 12, *

Clarification: All requests for certification from persons who were not certified as of the date these standards came into effect (December 4, 2016) will be subject to these standards. For those operators who were certified (WT, WD, WWT, WWC) prior to December 4, 2016, the previously granted level 1 certification will be considered as meeting the educational requirement for level 2 certification as noted in section 3.3.2.

b) Up to 50 percent of the post-secondary education requirements can be substituted by the Direct Responsible Charge (DRC) experience that is in addition to the DRC required for that level.

Note: *DRC substitution for education cannot be used to meet experience requirements or the one year minimum specified in Section 4.3.2.*

Operator Training Substituted for Education

Any CEUs obtained by attendance of specialized operator training courses, seminars, workshops, technical conferences, etc., as recommended and approved by Operator Certification Board may be substituted for formal post-secondary education without limitation. Calculation will be based on forty-five CEUs equals one year post-secondary education.

Table 3: Guide to Experience and Education Qualifications and Substitutions

When Short of Experience:

This Education or Training	May be Substituted for	Limit
High School Education	No Credit	—
1 Year relevant post-secondary education	1 year operating or DRC experience	50% of experience requirement
1 Year (expressed as 45 CEU's) relevant and specialized operator training as approved)	1 year operating or DRC experience	50% of experience requirement

When Short of Formal Education:

This Education or Training	May be Substituted for	Limit
For Level III DRC (only) 1 year DRC experience in Class II or higher facility	1 year post-secondary education	50% of post-secondary education requirement
For Level IV DRC (only) 1 year DRC experience in Class III or IV facility	1 year post-secondary education	50% of post-secondary education requirement
1 year (expressed as 45 CEU's) relevant and specialized operator training as approved	1 year formal education	None

Note: *For Levels II, III, and IV certification, substitutions may be made for required experience, but the minimum experience requirement must be met and at least 50% of all stated experience requirements must be met by actual on–site operating experience in the appropriate type of plant or system.*

3.9 Mandatory Training Requirements

Mandatory training on defined subjects ensures that all operators have completed training on the fundamentals of water/wastewater. Mandatory training was a recommendation made by the Walkerton Inquiry (Recommendation #61), to ensure that it is not "possible for an individual to

pass the certification exam with no knowledge of, or experience in, one or more specific subjects."

The Canadian Best Practices state: "Each Jurisdiction should have some form of Mandatory Entry Level Training. This training may be a condition for certification. The Mandatory Entry Level Training should be developed and delivered independently from the certification process to ensure that the course does not teach directly to the exam."

Mandatory entry-level training is required for Small Systems Certification.

Small Systems Certification

Six hours or 0.6 CEUs of mandatory approved training are required for each category, e.g., small water systems and small wastewater systems. This can be the Small Water Systems or Small Wastewater Systems courses approved by the Operator Certification Board or other training as approved by the Board.

APPENDIX A

Point Rating System for Water Treatment Facilities

Water treatment definitions

Aeration
The process of adding air to water. Air can be added to water by passing air through water or passing water through air.

Diatomaceous Earth Filters
Filter technology using a thin layer of diatomaceous earth (a fine, siliceous material) that is deposited on a porous plate to serve as a filter. Mainly used in smaller systems because of its relative simplicity of units and maintenance requirements.

Direct Filtration
Filtration process where the sedimentation stage of conventional filtration is omitted. Filtration is performed directly after the flocculation stage of treatment. Filter aid is usually added before filtration.

Dissolved Air Flotation
Process of solids removal where dissolved air is added to the clarifier from the bottom of the basin and the air raises suspended particles to the top of the water where the particles are removed by skimming.

Electrodialysis
Process where brackish water flows between alternating cation-permeable and anion-permeable membranes. A direct electric current provides the motive force to cause ions to migrate through the membranes and either react to create a gas or remain in a separate solution as brine wastewater.

Horizontal-flow
Flow of water in a horizontal direction through a rectangular or round sedimentation/clarification basin as opposed to a vertical or upward flow that would be found in a solids-contact clarifier.

Ion Exchange
A chemical process involving reversible interchange of ions between a liquid and a solid but no radical change in structure of the solid.

Injection Mixers
Use of perforated tubes or nozzles to disperse the coagulant into the water being treated. Provides uniform distribution of the coagulant over the entire basin. Generally sensitive to flow changes and may require frequent adjustments to produce the proper amount of mixing.

In-line Blender Mixers
Used for coagulant mixing where coagulant is added directly to water being treated through a diffuser in a pipe. Provides rapid dispersion of the coagulant without significant head loss. Energy consumption is less than a comparable mechanical mixer.

Mechanical Dewatering
The use of mechanical devices such as centrifuges and rotational mechanisms to force the separation of solids (sludge) from liquids (water).

Mechanical Mixers
Paddles, turbines, and propellers frequently used in coagulation facilities. Use electrical energy for mixing the coagulant with the water being treated.

Microfiltration
A pressure-driven membrane filtration process. The membranes typically operate at about 34.5 to 207 kPa (5 to 30 psi) of transmembrane pressure and can be used to remove particulates such as turbidity, Giardia and Cryptosporidium protozoa, and bacteria.

Mixed-media Filters
A filter containing filtering media of different particle size or density.

Nanofiltration
A pressure-driven membrane filtration process used to remove dissolved organic matters and multivalent ions such as calcium and magnesium hardness ions. The membranes typically operated at about 352 to 880 kPa (50 to 125 psi) of transmembrane pressure.

pH Adjustment
The alteration of the pH of the raw water or prefinished water by mechanical or chemical procedures to enhance the performance of the treatment process.

Recarbonation
The process of introducing carbon dioxide as a final stage in the lime-soda ash softening process in order to convert carbonates to bicarbonates and thereby stabilize the solution against precipitation of carbonates.

Reverse Osmosis
Passage of water from a concentrated solution through a semipermeable membrane to fresh water with the application of pressure.

SCADA Instrumentation The **S**upervisory **C**ontrol **A**nd **D**ata **A**cquisition system is a computer-based system that monitors and controls remote water facility sites. A SCADA master control is typically located in a dedicated control center or treatment plant control room. Remote sites are equipped with remote terminal units to gather information and issue controls from the master station.

Solids Composting
Mixing of sludge with decaying organic material for eventual use as fertilizer.

Stability or Corrosion Control
The removal of dissolved gases, treatment of the finished water to make it noncorrosive and building of protective coating inside the pipe.

Tube Sedimentation
Tube settlers or high rate settlers are placed in rectangular or circular basins. Water enters the inclined settler tubes and is directed upward through the tubes. Each tube functions as a shallow settling basin. Particles collect on the inside surfaces of the tubes or settle to the bottom of the basin.

Ultra-Filtration
The process of removing colloidal and dispersed particles from a liquid by passing the liquid through a membrane under high pressure. Ultrafiltration membrane typically operated at about 138 to 517 kPa (20 to 75 psi).

Up-flow Solid-Contact Sedimentation
Unit which combines the coagulation, flocculation, and sedimentation processes into a single basin, which is either rectangular or circular in shape. Flow is in an upward direction through a sludge blanket or slurry of flocculated, suspended solids.

Urban Runoff
During dry periods, oil, grease, gasoline, and other residues accumulate on paved surfaces. When storms begin, this material is washed into local receiving water from roadway storm drainage systems. Urban runoff also contains animal droppings from pets and fertilizers used for landscaping. Contributes to taste and odor complaints.

Community Name

Water Treatment/Distribution Classification (2010 ed.)

R. M. of --, #---

Item	Points Possible	Points
Size		
Design flow average day, or peak month's average day, whichever is larger (1 point per 1900 m^3/day. Round up.) Design flow: Consider this to be the design capacity of the plant. Ex. 34960 m^3/day = 19 points 17860 m^3/day = 10 points (20 max.)	1 - 20	**0**
Water Supply Sources (Rating based on public health significance)		
Seawater/saltwater	0	**0**
Groundwater	0	**0**
Groundwater under direct influence of surface water (GWI)	8	**0**
Surface water	10	**0**
Average Raw Water Quality Variation - Applies to all sources (surface and groundwater). Key is the effect on treatment process changes that would be necessary to achieve optimized performance. • Little or no variation - no treatment provided except disinfection (0 points) • Minor variation - e.g. "high quality" surface source appropriate for slow sand filtration (1 point) • Moderate variation in chemical feed, dosage changes made: monthly (2 points), weekly (3 points), or daily (4 points) • Variation significant enough to require pronounced and/or very frequent changes (5 points) • Severe variation - source subject to non-point discharges, agricultural/urban storm runoff, flooding (7 points) • Raw water quality subject to agricultural or municipal waste point source discharges (8 points) • Raw water quality subject to industrial waste pollution (10 points)	0 - 10	**0**
Raw water quality is subject to:		
• Taste and/or odor for which treatment process adjustments are routinely made [1]	2	**0**
• Color > 15 CU (not due to precipitated metals) - ***see exceptions in Note 1 at end of table*** [1]	3	**0**
• Iron or/and manganese > MCL: Fe (2 points), Mn (3 points) (3 points maximum allowed) - ***see exceptions in Note 1 at end of table*** [1]	2 - 3	**0**
• Algal growths for which treatment process adjustments are routinely made [1]	3	**0**
Chemical Treatment/Addition Processes		
Fluoridation	4	**0**

Disinfection/Oxidation (Note: Points are additive to a maximum of 15 points allowed for this category.)
CHECK ☑ ALL THAT APPLY:
• Chlorination:
  • Hypochlorites (5 points) ☐
  • If generated on site (add 1 point) ☐
  • Chlorine gas (8 points) ☑
  • Chloramination (10 points) ☐
  • Chlorine dioxide (10 points) ☐
• Ozonation (10 points) ☐
• UV Irradiation (2 points) ☐
• Iodine, Peroxide, or similar (5 points) ☐
• Potassium permanganate (4 points) ☐ (If used with greensand filtration do not give 4 points)
	0 - 15	**0**

pH adjustment for process control (e.g. pH adjustment aids coagulation)	4	**0**
Stability or Corrosion Control (If the same chemical is used for both Corrosion Control and pH adjustment, count points only once)	4	**0**

Coagulation/Flocculation & Filter Aid		
Primary coagulant addition	6	**0**
Coagulant aid / Flocculant chemical addition (in addition to primary coagulant use)	2	**0**
Flocculation	2	**0**
Filter aid addition (Non-ionic/anionic polymers)	2	**0**
Clarification/Sedimentation		
Sedimentation (plain, tube, plate)	4	**0**
Contact adsorption	6	**0**
Other clarification processes (air flotation, ballasted clarification, etc.)	6	**0**
Upflow clarification ("sludge blanket clarifier") [2]	8	**0**
Filtration		
Granular media filtration (Surface water/GWI) ≤ 3 gpm/sq ft	10	**0**
Granular media filtration (Surface water/GWI) > 3 gpm/sq ft	20	**0**
Groundwater filtration	6	**0**
Membrane filtration • For compliance with a primary regulation (10 points) • For compliance with a secondary regulation (6 points)	6-10	**0**
Diatomaceous earth (pre-coat filtration)	10	**0**
Cartridge/bag	5	**0**
Pre-filtration (staged cartridges, pressure sand w/o coagulation, etc.): add one point per stage to maximum of 3 points	1 - 3	**0**
Slow sand	5	**0**
Other Treatment Processes		
Aeration	3	**0**
Air stripping (including diffused air, packed tower aeration)	5	**0**
Ion-exchange/softening	5	**0**
Greensand filtration	10	**0**
Lime-soda ash softening (includes: chemical addition, mixing/flocculation/ clarification/filtration - do not add points for these processes separately)	20	**0**
Granular activated carbon filter (do not assign points when included as a bed layer in another filter)	5	**0**
Powdered activated carbon	2	**0**
Blending sources with significantly different water quality • To achieve MCL compliance (4 points) • For aesthetic reasons (2 points)	2-4	**0**
Reservoir management employing chemical addition	2	**0**
Electrodialysis	15	**0**
Other: Certification authority may assign 2 to 15 additional points for processes not listed elsewhere in this document. (Specify	2 - 15	**0**
Residuals Disposal		
• Discharge to surface, sewer, or equivalent (0 points) • On-site disposal, land application (1 point) • Discharge to lagoon/drying bed, with no recovery/recycling – e.g. downstream outfall (1 point) • Backwash recovery/recycling: discharge to basin or lagoon and then to source (2 points) • Backwash recovery/recycling: discharge to basin or lagoon and then to plant intake (3 points)	0 - 3	**0**
Facility Characteristics		
Instrumentation - Use of SCADA or similar instrumentation systems to provide data, with: • Monitoring/alarm only, no process operation - plant has no automated shutdown capability (0 points) • Limited process operation - e.g. remote shutdown capability (1 point) • Moderate process operation - alarms and shutdown, plus <u>partial</u> remote operation of plant (2 points) • Extensive or total process operation - alarms and shutdown, full remote operation of plant possible (4 points)	0 - 4	**0**
Clearwell size less than average day design flow	5	**0**
Laboratory control		
Bacteriological/biological [Table a]	0 – 5	**0**
Chemical/Physical [Table b]	1 – 10	**0**
Total Points	(Right click – Update Field)	**0**

Points➔Class: **Class-1** = 30 or fewer **Class-2** = 31-55 **Class**-3 = 56-75 **Class-4** = 76 +

Water Plant Facility Classification: _____

Water Distribution System Classification: _____

Reviewed by: _____ **Date:** _____

Notes:

[1] **Raw water quality is subject to**:

- Taste and/or odor for which treatment process adjustments are routinely made (2 points): 1) T&O issue has been identified in a pre-design report, etc., 2) a process has been installed to address, and 3) operational control adjustments are made at least seasonally. Do not give points for T&O when there is no specific additional impact on operation. E.g. if a system is already pre-chlorinating for disinfection, give no points for T&O.
- Color > 15 CU (not due to precipitated metals) (3 points) ***with following exceptions***. Color will be considered elevated and points assigned when levels exceed 75 Color Units (CU) for conventional filtration, 40 CU for direct filtration, or 15 CU for all other technologies, except reverse osmosis (no points given for color for reverse osmosis).
- Iron and/or manganese > MCL: Fe (2 points), Mn (3 points) (3 points maximum allowed) ***with following exceptions***. Iron and manganese levels will be considered elevated and points assigned if they are greater than the MCL, except for applications of manganese greensand filters. For applications of manganese greensand filters, iron and manganese levels will be considered elevated when their combined level exceeds 1.0 mg/L (3 points allowed).
- Algal growths for which treatment process adjustments are routinely made (3 points): Raw water will be considered subject to algae growths when treatment processes are specifically adjusted due to the presence of high levels of algae on at least a weekly basis for at least two months each year.

[2] **Upflow clarification** ("sludge blanket clarifier") – 8 points **–** Also known as sludge blanket clarification. Includes such proprietary units as Super-Pulsator. These units include processes for flocculation and sedimentation. Important note: these are not the same as adsorption clarifiers.

Laboratory control

The key concept is to credit laboratory analyses done on-site by plant personnel under the direction of the operator in direct responsible charge (points from 0 to 15).

c) Bacteriological/biological (0 min. - 5 max.)

0 - Lab work done outside the plant
3 - Membrane filter procedures
5 - Use of fermentation tubes or any dilution method; fecal coliform determination

d) Chemical/physical (0 min. - 10 max.)

0 - Lab work done outside the plant
3 - Push-button or visual methods for simple tests such as chlorine, iron, manganese, turbidity
5 - Additional procedures such as filtration, jar tests and alkalinity
7 - More advanced determinations such as numerous inorganics
10 - Highly sophisticated instrumentation such as atomic absorption, gas chromatography

APPENDIX B

Point Rating System for Wastewater Treatment Facilities

WASTEWATER TREATMENT DEFINITIONS

Activated sludge
Wastewater treatment by aeration of suspended organisms followed by clarification, including extended aeration, Intermittent Cycle Extended Aeration System (ICEAS), and other similar processes. A sequencing batch reactor with the purpose of providing this form of treatment would be rated under this category.

Biological or chemical/biological advanced waste treatment
The advanced treatment of wastewater for nutrient removal including nitrification, denitrification, or phosphorous removal utilizing biological or chemical processes or a combination. If the facility is designed to nitrify based solely on detention time in an extended aeration system, only the points for nitrification by designed extended aeration should be given.

Chemical addition
The addition of a chemical to wastewater at an application point for the purposes of adjusting pH or alkalinity, improving solids removal, dechlorinating, removing odors, providing nutrients, or otherwise enhancing treatment, excluding chlorination for disinfection of effluent and the addition of enzymes or any process included in the Tertiary Chemical/Physical Processes. The capability to add a chemical at different application points for the same purpose should be rated as one application; the capability to add a chemical(s) to dual units should be rated as one application; and the capability to add a chemical at different application points for different purposes should be rated as separate applications.

Chemical/physical advanced treatment following secondary
The use of chemical or physical advanced treatment processes following (or in conjunction with) a secondary treatment process. This would include processes such as carbon adsorption, air stripping, chemical coagulation, and precipitation, etc.

Chemical/physical advanced treatment without secondary
The use of chemical or physical advanced treatment processes without the use of a secondary treatment process. This would include processes such as carbon adsorption, air stripping, chemical coagulation, precipitation, etc.

Effluent treatment and disposal
The ultimate treatment and disposal of the effluent onto the surface of the ground by rapid infiltration or rotary distributor or by spray irrigation. Subsurface treatment and disposal would be accomplished by infiltration gallery, injection, or gravity or pressurized drain field.

Fixed-film reactor
Biofiltration by trickling filters or rotating biological contactors followed by secondary clarification.

Imhoff tanks (or similar)
Imhoff tanks, septic tanks, spirogester, clarigester, or other single unit for combined sedimentation and digestion.

Land application of biosolids by contractor
The land application or beneficial reuse of biosolids by a contractor outside of the control of the operator in direct responsible charge of the wastewater treatment facility.

Mechanical dewatering
The removal of water from sludge by any of the following processes and including the addition of polymers in any of the following: vacuum filtration; frame, belt, or plate filter presses; centrifuge; or dissolved air flotation.

Mechanical post-aeration
The introduction of air into the effluent by mechanical means such as diffused or mechanical aeration. Cascade aeration would not be assigned points.

Media filtration
The advanced treatment of wastewater for removal of solids by sand or other media or mixed media filtration.

Operator in Direct Responsible Charge
Direct Responsible Charge (DRC) is accountability for and performance of active daily, on-site operation of a plant/system.

Solids composting
The biological decomposition process producing carbon dioxide, water, and heat. Typical methods are windrow, forced air-static pile, and mechanical.

Solids stabilization
The processes to oxidize or reduce the organic matter in the sludge to a more stable form. These processes reduce pathogens or reduce the volatile organic chemicals and thereby reduce the potential for odor. These processes would include lime (or similar) treatment and thermal conditioning. Other stabilization processes such as aerobic or anaerobic digestion and composting are listed individually.

Waste Stabilization Ponds or Lagoons
Open basins or reservoirs designed to treat or store wastewater.

Community Name

Wastewater Treatment/Collection Classification (2010 ed.)

R. M. of ---, #---

Item		Points
Size: Maximum population or part served, peak day (1 point minimum to 10 point maximum)	1 per 10,000 or part	0
Size: Design flow average day or peak month's flow average day, whichever is larger (1 point minimum to 10 point maximum)	1 pt per 1.0 MGD or part	0
Variation in raw waste		
Variation in raw waste [Table a]	0 - 6	0
Impact of septage or truck-hauled waste	0 - 4	0
Preliminary treatment		
Plant pumping of main flow / Lift stations / Modified	3	0
Screening, comminution	3	0
Grit Removal	3	0
Equalization	1	0
Primary treatment		
Primary clarifiers	5	0
Imhoff tanks or similar	5	0
Secondary treatment		
Fixed film reactor, e.g. RBC with secondary clarifiers	10	0
Activated sludge w.sec clarifiers (inc ext aeration & oxidation ditch)	15	0
Stabilization ponds/lagoons/storage cells, no aeration	5	0
Stabilization ponds with aeration/Aerated lagoons	8	0
Tertiary treatment		
Polishing ponds for advanced waste treatment	2	0
Chemical/physical advanced waste treatment w/o secondary	15	0
Chemical/physical advanced waste treatment after secondary	10	0
Biological or chemical/biological advanced waste treatment	12	0
Nitrification by designed extended aeration only	2	0
Ion exchange for advanced waste treatment	10	0
RO, EDR and other membrane filtration techniques	15	0
Advanced waste treatment chemical recovery, carbon regeneration	4	0
Media filtration	5	0
Additional Treatment Process		
Chemical addition (2 points for a maximum of 6 points	0 - 6	0
Dissolved air flotation (for other than sludge thickening)	8	0
Intermittent sand filter	2	0
Recirculating intermittent sand filter	3	0
Microscreens	5	0
Generation of oxygen	5	0
Solids handling		
☐ Solids stabilization	5	0
Gravity thickening	2	0
Mechanical dewatering	8	0
Anaerobic digestion of solids	10	0
Utilizing digester gas for heat or cogeneration	5	0
Aerobic digestion of solids	6	0
Evaporative sludge drying	2	0
Solids reduction (incl. incineration, wet oxidation)	12	0
On-site landfill for solids	2	0

Solids composting	10	**0**
Land application of biosolids by contractor	2	**0**
Land application of biosolids under direction of facility operator in direct responsible charge	10	**0**
Disinfection (min. 0 to max. 10)		
Chlorination or UV radiation	5	**0**
Ozonation	10	**0**
Effluent disposal (min. 0 – max. 10)		
Direct recycle and reuse	6	**0**
Continuous discharge into water body	6	**0**
Controlled or intermittent discharge into a receiving water body	4	**0**
Controlled or intermittent discharge - Overland / Wetlands	2	**0**
Effluent irrigation	4	**0**
Evaporation	2	**0**
Subsurface	4	**0**
Facility Characteristics		
Instrumentation Table b	0 - 6	**0**
Laboratory Control		
Bacteriological/biological Table c	0 - 5	**0**
Chemical/physical Table d	0 - 10	**0**
Total Points	(Right click – Update Field)	**0**

***Remember to update the Total Points Field after every change!!**

Points➔Class: **Class-1** = 30 & less **Class-2** = 31-55 **Class**-3 = 56-75 **Class-4** = 76 +

Wastewater Plant Facility Classification: _____

Wastewater Collection System Classification: _____

Reviewed by: _____ **Date:** _____

a) Points for variation in raw waste quality (0-10*)
The key concept is the frequency and/or intensity of deviation or excessive variation from normal or typical variations. Such variations can be in terms of strength , toxicity, shock loads, I/I, with points from 0 – 6.
Of the raw water source. Suggested point values are:
0 - Variations do not exceed those normally or typically expected
2 - Recurring deviations or excessive deviations of 100 – 200% in strength and/or flow
4 - Recurring deviations or excessive deviations of more than 200% in strength and/or flow
6 - Raw wastes subject to toxic waste discharges

b) Facility Characteristics Instrumentation (0 point minimum to 4 point maximum)
- The use of SCADA or similar instrumentation systems to provide data with no process operation
0
2 - The use of SCADA or similar instrumentation systems to provide data with limited process operation
4 - The use of SCADA or similar instrumentation systems to provide data with moderate process operation
6 - The use of SCADA or similar instrumentation systems to provide data with extensive or total process operation

Laboratory control (0 point minimum to 15 point maximum)

The key concept is to credit laboratory analyses done on-site by plant personnel under the direction of the operator in direct responsible charge (points from 0 to 15).

c) Bacteriological/biological (0 point minimum to 5 point maximum)
0 - Lab work done outside the plant
3 - Membrane filter procedures
5 - Use of fermentation tubes or any dilution method; fecal coliform determination

d) Chemical/physical (0 point minimum to 10 point maximum)
0 **-** Lab work done outside the plant
3 -Push-button or visual methods for simple tests such as pH, settleable solids
5 - Additional procedures such as DO COD, BOD, gas analysis, titrations, solids, volatile content
7 - More advanced determinations such as specific constituents; nutrients, total oils, phenols
10 - Highly sophisticated instrumentation such as atomic absorption, gas chromatography

APPENDIX C

Educational Course Assessment for the Operator Certification Program

Equivalent Time Calculation

For the purpose of calculating time allocation, one year of post high school is equal to 30 credit hours of university courses based on five classes each of 3 credit hours per semester over two semesters; 900 hours of course content from a technical school; 45 CEU's of training in an appropriate field; or completion of a full year of course content in an appropriate field of study as defined below.

Appropriate Field of Studies - Completed Degrees and Diplomas

For the purpose of completed degrees and diplomas a DACUM will be used to assess the acceptability of the program. The DACUM establishes the minimum course content requirements to meet the training needs of an operator. The DACUM for water and wastewater operators requires that any degree or diploma include the minimum of:

- courses in mathematics or physics
- courses in environmental studies, water/wastewater or related fields
- courses in a natural science (Biology, Chemistry....)
- courses in administration or management

In general, the following areas of study are appropriate as post-secondary education fields:

- A Bachelor Degree in Science, Medicine or Engineering resulting in a B.Sc., B.A.Sc. or B.Eng. This can include Agriculture, Biology, Laboratory Studies and Chemistry degrees.
- A diploma in the field of Applied Science and Technology, Laboratory Studies, Medical Studies, or Engineering Technology.

If a degree or diploma does not meet the minimum DACUM requirements, the applicant will be advised of the missing component(s) and be required to supplement their education by attending CEU accredited courses or by other education means. The Certification Board will review and assess non-traditional education programs not addressed by this policy as required. The assessment will be based on a common understanding of educational requirements needed for an operator to perform their duties.

Appropriate Field of Studies - Partial Degrees and Diplomas

For the purpose of partially completed degrees and diplomas, the following classes will be counted towards the post-secondary educational requirements:

- any and all courses included in Table 1.
- no more than seven (7) courses from a University or Technical College included in Table 2.
- no more than three (3) courses from a University or Technical College included in Table 3.

For partial degree/diploma credit, the applicant must provide sufficient information concerning courses taken and the contact hours received and passed, for the Operator Certification Board to review and rule on.

With the variability of education criteria, no one submission format has been developed. In general, submission of educational information for assessment by the Board needs to be submitted in a detailed and assessable format.

This should include presenting the information in a tabular form that includes information identifying the class name, a class description/outline, calculation of course credit (contact hours, credit hours, etc.).

The applicant should work closely with the educational institution to ensure sufficient supporting documentation is submitted to the Board for review as to the acceptability of the course content as defined under Tables 1, 2 and 3.

The Board's responsibility rests with the assessment of an operator's qualifications and not with compiling the information in a coherent and manageable format. If the submission is unclear or raises new questions, the Board has the right to address these issues with the applicant and hold off on issuing any certificate until satisfied of course integrity.

The Certification Board will review and assess non-traditional courses not addressed in the following tables as required. The assessment will be based on a common understanding of educational requirements needed for an operator to perform their duties.

TABLE 1

Engineering	Any class listed under the Faculty, Department or College of Engineering Calendar from a University or Technical College.
Natural Sciences	Biology, Microbiology, Biochemistry, Chemistry as listed by a University or Technical College.
General Sciences	Computer Science, Mathematics, Statistics, Physics, Laboratory Procedures, Medical Field as listed by a University or Technical College.

TABLE 2

Administration	Courses relating to accounting, finance, production, operational management or public sector management as listed by a University or Technical College.
Economic	Any economic course as listed by a University or Technical College.
Education	Science related (per definition under Table 1) courses for high school education requirements as listed by a University or Technical College

TABLE 3

Arts	English, Geography, Geology, Sociology, Psychology, Anthropology, History or Political Science as listed by a University or Technical College. NOTE: language courses or fine art program courses are not acceptable.
Education	Business related courses for high school education requirements as listed by a University or Technical College.

Journeyman, Technician and Apprentice Courses

Due to the variability of course content, length and applicable subject matter in these types of programs, the Certification Board will require that detailed information concerning the program be submitted along with a copy of the transcript. This will include sufficient information to support the claim that the program studies are applicable to the fields of knowledge required by an operator.

Completed certificates may be allowed for credit towards post-secondary education if the course length and content are applicable as determined by the Board. An assessment as to the percentage towards education credit will be provided by the Board after assessment is complete.

Fields which may be appropriate include the following areas:

- electrician/electronics or instrumentation;
- pipe fitter/pump mechanic/plumber; and
- pressure vessels/steam engineer certificate.

Typically, a Journeyman's certificate in areas such as carpentry, masonry or other general construction will not be accepted as equivalent educational knowledge under the Standards.