

**GOVERNMENT OF THE NORTHWEST TERRITORIES  
WATER AND WASTEWATER OPERATOR  
CERTIFICATION GUIDELINES**

# TABLE OF CONTENTS

FOREWORD .....	3
BACKGROUND .....	4
DEFINITIONS .....	5
OBTAINING/QUALIFYING FOR CERTIFICATION .....	7
EXAMINATIONS .....	11
ISSUANCE AND RENEWAL OF CERTIFICATES.....	12
REQUIREMENTS AND RESPONSIBILITIES .....	13
GNWT WATER AND WASTEWATER CERTIFICATION COMMITTEE - TERMS OF REFERENCE .....	14
APPENDIX I - WATER TREATMENT PLANT POINT RATING SYSTEM .....	16
APPENDIX II - WATER TREATMENT DEFINITIONS .....	20
APPENDIX III - WASTEWATER TREATMENT PLANT POINT RATING SYSTEM (NON- INDUSTRIAL/MUNICIPAL) .....	22
APPENDIX IV - WASTEWATER TREATMENT DEFINITIONS .....	25
APPENDIX V - DISTRIBUTION SYSTEM POINT RATINGS .....	27
APPENDIX VI - COLLECTION SYSTEM POINT RATING SYSTEM.....	28
APPENDIX VII – APPROVED CONTINUING EDUCATION UNITS .....	29

Current as of October 28, 2015

## FOREWORD

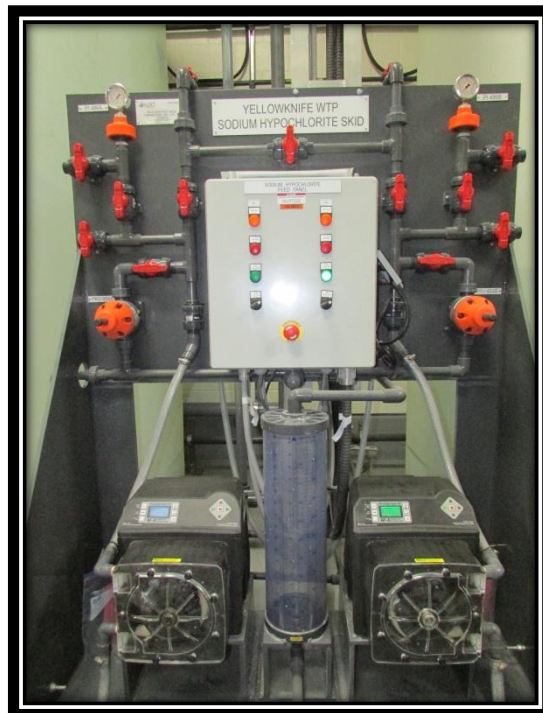
The Government of the Northwest Territories (GNWT), Municipal and Community Affairs (MACA) Water and Wastewater Certification Guidelines (Guidelines) outline the certification processes recommended for operators of waterworks and wastewater systems. The Guidelines provide the public, municipal officials and facility managers with the information necessary to determine certification requirements, and provide operators with information about how to apply for, and obtain certification. Certification criteria are included so that operators will be able to assess their positions with respect to certification.

The GNWT Water and Wastewater Operator Certification Program (Certification Program) is intended to ensure qualified operators supervise the day-to-day operation of all municipal water and wastewater systems.

The benefits of the Certification Program are:

- assurance of a safe and adequate water supply;
- protection of the aquatic environment; and,
- recognition of water and wastewater facility operators and the important role they play in their communities.

MACA implements the GNWT Water and Wastewater Operator Certification Program. As on April 1<sup>st</sup>, 2010 the certification of water treatment plant operators is legislated under the Public Health Act and enforced through the Water Supply System Regulations.



## BACKGROUND

Municipal governments and the GNWT invest hundreds of thousands of dollars annually in water and wastewater facilities. To help ensure proper operation and maintenance of these facilities, and to protect the health of its citizens and the environment, the GNWT developed the Water Wastewater Operator Certification Program (Certification Program).

In 1974, a committee of the Federation of Associations on the Canadian Environment (subsequently the Canadian Water and Wastewater Association) was established to consider compatible certification programs for all provinces. This was done in conjunction with the Association of Boards of Certification, an international organization of certifying authorities, headquartered in Ames, Iowa. This allowed for standardization and recognition of the certification programs across North America.

Prior to 2002 the Northern Territories Water and Waste Association (NTWWA) administered a voluntary training and certification program for the NWT and Nunavut. Since 2002, the Department of Municipal and Community Affairs (MACA) assumed the responsibility for certification of NWT water and wastewater facility operators in the NWT. MACA, through the Department's School of Community Government (SCG) and in partnership with the GNWT's Departments of Public Works and Services (PWS) and Health and Social Services (HSS) provides training and certification.

## DEFINITIONS

The definitions in this Section are specific to operator certification. Other definitions as defined by the NWT Public Health Act and the applicable Regulations are found in Appendix V.

**ABC** refers to the Association of Boards of Certification. ACT refers to the NWT Public Health Act

**APPROVAL** means an approval in respect of an activity, and includes renewal of an approval.

**CERTIFICATION COMMITTEE** means the GNWT Water and Wastewater Certification Committee

**CERTIFIED OPERATOR** is a person who holds a valid Certificate of Qualification.

**CONTINUING EDUCATION UNIT (CEU)** is generally 0.1 CEU / contact hour of participation in an organized relevant continuing education experience (training) under responsible sponsorship, capable direction, and qualified instruction as approved by the Certification Committee. CEUs may also be issued at a flat rate for certain activities.

**EXPERIENCE** means the time spent working at a water or wastewater facility in satisfactory performance of operation or supervision duties

**GENERAL EDUCATIONAL DEVELOPMENT (GED)** is a General Educational Development Certificate, which involves the completion of a series of tests that can be taken to qualify for a high school equivalency certificate or diploma.

**GNWT** means the Government of the Northwest Territories.

**GRADE 12** means a secondary school diploma. When grade 12 completion is in doubt, it is the responsibility of the applicant to obtain a clarification.

**MACA** means the Department of Municipal and Community Affairs.

**SCG** means the School of Community Government, a division of MACA.

**H&SS** means the Department of Health and Social Services.

**E&NR** means the Department of Environment and Natural Resources.

**PW&S** means the Department of Public Works and Services.

**GNWT WATER AND WASTEWATER CERTIFICATION COMMITTEE** (Certification Committee) guides the process for the certification of water and wastewater operators in the NWT, classifies water and wastewater treatment plants in the NWT and certifies water and wastewater system operators in the NWT (membership is identified in Section VII of this document).

**OPERATION** means the active daily on-site process for ensuring that a facility accomplishes its defined purpose. Operation may include many elements. These are described further in Appendix IV.

**OPERATOR** is a person who performs day-to-day activities primarily consisting of the control of a water treatment plant. Appendix IV provides more details.

**REGISTRATION** is a registration issued to the certifying body in respect to an activity, and includes renewal of a registration or registration for certification.

**WATER TREATMENT PLANT (WTP)** is the portion of a water system that in some way alters the physical, chemical, or bacteriological quality of the water.

**PIPED WATER DISTRIBUTION SYSTEM (WDS)** is an above ground or underground piping system ensuring consistent flow of water.

**WASTEWATER TREATMENT PLANT (WWTP)** a facility that chemically treats wastewater so that this wastewater is no longer harmful to people or the environment.

**PIPED WASTEWATER COLLECTION SYSTEMS (WWCS)** is piped system for the collection of wastewater and moves this wastewater to a treatment facility.

**YEAR** is defined as 12 consecutive months.

# OBTAINING/QUALIFYING FOR CERTIFICATION

## CLASSIFICATION SYSTEM

Water treatment and wastewater treatment plants and facilities are classified by a classification/scoring system identifying the treatment process occurring at a particular plant.

Water distribution and wastewater collection systems are classified by identifying the amount of population served by a facility.

Note: The GNWT Water and Wastewater Certification Committee classify water and wastewater treatment plants and adjusts the classification if justified. (See Appendix III for plant scoring system).

## CERTIFICATE TYPES

The following are the certification classifications available to operators in the Northwest Territories:

### Water Treatment

- Small System
- Class I
- Class II
- Class III

### Wastewater Treatment (Municipal)

- Small System (Lagoon)
- Class I
- Class II

### Water Distribution

- Class I
- Class II
- Class III

### Wastewater Collections

- Class I
- Class II
- Class III

## COMPLETION OF CERTIFICATION

Application forms for certification are available from:

Municipal and Community Affairs  
School of Community Government (SCG)  
#500, 5201-50th Ave  
Yellowknife, NT X1A 3S9  
867-920-3159  
[www.maca.gov.nt.ca](http://www.maca.gov.nt.ca)

An operator who successfully passes the examination (70% or higher) for the specified treatment plant will receive a certificate of successful completion. Those operators, who pass the examination and obtain the prerequisites for certification, will become certified as a Water or Wastewater Facility Operator for the specified water treatment system classification.

### **Small System Certificate**

This certificate is issued to an operator who meets the training, experience and examination requirements for a small water or wastewater treatment (lagoon) system.

### **Class I Certificate**

This certificate is issued to an operator who meets the training, experience and examination requirements for a Class I water treatment, wastewater treatment, distribution or collection system.

### **Class II Certificate**

This certificate is issued to an operator who meets the training, experience and examination requirements for a Class II water treatment, wastewater treatment, distribution or collection system.

### **Class III Certificate**

This certificate is issued to an operator who meets the training, experience and examination requirements for a Class III water treatment, water distribution or wastewater collection system.

## **CERTIFICATION COMPONENTS**

To obtain certification at the required level, the operator/applicant must:

- meet the work experience requirements for the appropriate class of certification;
- meet the education requirements for the appropriate class of certification; and,
- write and pass the appropriate certification exam.

### **RESTRICTED CERTIFICATION**

Restricted certification may be issued to a water treatment plant operator who was able to meet some, but not all of the certification components. A restricted certificate will be non-transferrable, limiting the operator certification to their own facility.

The Certification Committee will examine restricted certification on a case by case basis. Restricted certification will be considered in the following situations:

#### **Exam Score Insufficient (Pass = 70%)**

- If an operator has acquired the required experience for certification but has achieved a score of between 60%-69% on the certification exam.
- If an operator has acquired the required experience for certification but has achieved a score of between 50% and 60% on the certification exam and passes an onsite competency test.

#### **Work Experience Insufficient (Varies with Plant Classification)**

- If the operator does not have the required experience for certification but has achieved a passing score of 70% on the certification exam.
- If the operator does not have the required experience for certification but has achieved a score of between 50% and 69% on the certification exam and passes an onsite competency test.



A restricted certificate will be valid for a specific time period to allow a facility owner to hire a fully certified operator, or to permit the restricted WTP operator to gain the required work experience or the academic upgrade required to pass the exam. All facility owners/water treatment plant operators must provide a plan (to the certification committee) to have a fully certified operator within a two year period in advance of a restricted certificate being issued.

## PREREQUISITES

Minimum requirements are based on the following principles:

- the GNWT Water and Wastewater Certification Committee recognizes that there is a basic amount of education and experience needed to be a Water or Wastewater System Operator in the Northwest Territories;
- the GNWT Water and Wastewater Certification Committee recognizes the value of practical experience and therefore work equivalencies may be considered in lieu of education; and,
- the GNWT Water and Wastewater Certification Committee recognizes the value of work experience and related training in other jurisdictions; therefore, they are considered in the certification process.

Prior to receiving certification, the applicant is responsible for documenting that he/she has the following pre-requisites:

### Small System Certification

Minimum Requirements:

- grade 8 education or equivalent as listed in the tables below; 6 months work experience;
- grade of 70% or higher on the exam; and,
- current employment as a small Water or Wastewater System Operator in the NWT in a small system or higher classification water or wastewater system.

Education	Total Years Work Experience
Grade 8	.5 year
Grade 7	1 year
Grade 6	1.5 years
Grade 5	2 years

### Class I Certification

Minimum Requirements:

- grade 12 education or equivalent as listed in the tables below; 12 months work experience;
- grade of 70% or higher on the exam; and
- current employment as a Water or Wastewater System Operator in the NWT in a Class I or higher water or wastewater system.

Education	Total Years Work Experience
Grade 12	1 year
Grade 11	2 years
Grade 10	3 years
Grade 9	4 years
Grade 8	5 years

### **Class II Certification**

Minimum Requirements:

- grade 12 education or equivalent as listed in the tables below; 24 months work experience;
- grade of 70% or higher on the exam; and,
- current employment as a Water or Wastewater System Operator in the NWT in a Class II or higher classification water or wastewater system.

<b>Education</b>	<b>Total Years Work Experience</b>
Grade 12	2 year
Grade 11	3 years
Grade 10	4 years
Grade 9	5 years
Grade 8	6 years

### **Class III Certification**

Minimum Requirements:

- grade 12 or GED; 3 years/36 months experience;
- grade of 70% or higher on the exam; and,
- current employment as a water/ or wastewater system operator in the NWT in a Class III or higher classification water or wastewater system.

<b>Education</b>	<b>Total Years Work Experience</b>
Grade 12	3 year
Grade 11	4 years
Grade 10	5 years
Grade 9	6 years
Grade 8	7 years

### **CERTIFICATION ONE LEVEL ABOVE PLANT CLASSIFICATION:**

All Minimum requirements must be collectively met:

- Grade 12 or GED Equivalent;
- Double years of experience at the plant level currently classified in;
- A Mandatory Course Preparatory Class must be taken prior to taking a Certification Exam;
- Operators must earn an additional Continuing Education Unit (CEU) per CEU renewal cycle [to maintain certification once certified (3 CEUs)].

# EXAMINATIONS

## QUALIFYING TO WRITE A CERTIFICATION EXAM

To qualify to write a certification exam, an operator should meet the minimum applicable education, experience, and training requirements for the classification of certification for which the operator is applying. Application forms for each type or category of exam are available from MACA, SCG. The form outlines the specific requirements that must be met to qualify to write the exam.

If an operator has the required education but not the required experience the operator can write the exam for a given class but will not be considered certified until he or she gains the necessary experience for the appropriate class. The time between when the operator writes the exam and when the operator gains the required experience must also not exceed one year.

## EXAM FORMAT

### Small System

The exams for Small Water and Wastewater System certification consist of 50 questions each. The questions relate to the operation of small water treatment or wastewater treatment system. The pass mark for each exam is 70%.

### Class I, II and III

The exams for Class I, II, and III Water/Wastewater Treatment, Distribution and Collections certification consist of 100 questions each. The questions relate to the operation of Class I, II and III facilities. The pass mark for each exam is 70%.

## REWRITES OF CERTIFICATION EXAMS

If an applicant does not pass a certification exam, a rewrite is possible with the following restrictions:

- the applicant received a score of not less than 60% on his or her original exam;
- not more than one year has passed since the original attempt;
- the applicant may rewrite the exam only once after the first attempt if he/she has not passed (must not be less than 60%); and,
- if the applicant is not successful on the second attempt then he/she must attend a water or wastewater system training course appropriate to the class of facility he/she works in before the next attempt at writing the exam.

# ISSUANCE AND RENEWAL OF CERTIFICATES

## INITIAL CERTIFICATE

Once an applicant has met the minimum requirements of the Certification Program and has passed the appropriate exam, the GNWT Water and Wastewater Certification Committee will issue a certificate. This certificate will indicate the name of the individual, the initial date of certification, and the type and class of certification.

## CERTIFICATE MAINTENANCE

Water and wastewater system operators who operate water treatment, water distribution, wastewater treatment and wastewater collection systems and facilities who obtain certificates must maintain certification by participating in continuing education on an ongoing basis. This is done through the completion of Continuing Education Units (CEUs). An operator must obtain a minimum of 2.0 CEUs during the previous two-year renewal period. CEUs must be relevant to the Certification category, must be obtained during the two-year renewal period and must be approved. A list of items approved for CEUs is available from the School of Community Government (SCG) – see attached appendix. Upon completion of an approved CEU, operators must submit verification that the CEU has been completed to the SCG. Failure to furnish the required information by the due date will result in the cancellation of the operator's certificate.

The CEU renewal period is **February 01**.

## REVOCACTION

An operator may no longer be deemed certified if one or more of the following conditions exist:

- the application was false or contained inaccurate information;
- the person has failed to perform the duties of an operator-in charge, or has failed to keep records which has:
  - resulted in the discharge of a pollutant into the natural environment, or, a had an adverse effect on the health or safety of an individual, or,
  - had an adverse effect on a process in the subsystem or the system of which the subsystem is a part: or,
- the operator has failed:
  - to exercise the level of care, diligence and skill that a reasonably prudent operator would be expected to exercise in a similar situation, or,
  - to act honestly, competently and with integrity, and ensure the protection and safety of the users of the system, or,
  - if the operator has failed to meet or has contravened any condition that is set out in his or her certificate.
- the person was discharged from employment in a drinking water or wastewater system for gross negligence or for incompetence, unless the person has not yet exhausted the rights of appeal available under a collective agreement.<sup>1</sup>

## APPEALS

If an individual believes that these Guidelines have been misinterpreted or applied inequitably, or special circumstances have not been adequately considered, then a written appeal should be sent to the Deputy Minister of Municipal and Community Affairs. A response to this appeal will be delivered within 90 days of the receipt of this appeal.

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<sup>1</sup> If a person chooses not to appeal within the time required, it would have the same effect as having exhausted their right of appeal.

# REQUIREMENTS AND RESPONSIBILITIES

## RESPONSIBILITY OF OPERATORS

It is the responsibility of certified operators to know the terms and conditions in the approval or registration for their facilities. It is also their responsibility to understand the certification requirements, if any, for operators of their facilities.

Certified operators are also responsible for establishing and understanding contingency plans for their facilities that ensure that the approval or registration requirements with respect to certified operators, are met at all times.

## RESPONSIBILITY OF FACILITY OWNERS

It is the responsibility of the owner, manager or community government responsible for facilities to ensure that requirements are met. These requirements include the developing of an internal program that ensures that competent replacement personnel are available when necessary to operate facilities.



# GNWT WATER AND WASTEWATER CERTIFICATION COMMITTEE - TERMS OF REFERENCE

## PURPOSE

The GNWT Water and Wastewater Certification Committee (the Committee) guides the process for the certification of water and wastewater operators in the NWT, classifies water and wastewater treatment plants in the NWT and certifies water and wastewater system operators in the NWT.

## AUTHORITY

The Committee is a sub-committee of the GNWT's Inter-departmental Drinking Water Management Committee made up of senior management representatives from the four GNWT Departments who share the responsibility and accountability for safe drinking water. These departments are: ENR, MACA, PWS and H&SS. The Inter-departmental Drinking Water Management Committee approved the terms of reference for the Committee (outlined here) and approved the original Government of the Northwest Territories Water and Wastewater Operator Certification Guidelines (the Guidelines) as recommended by the Committee.

## RESPONSIBILITIES

The Committee's responsibilities include:

- ensuring the Guidelines comply with the GNWT Safe Drinking Water Strategy, ABC testing standards and national reciprocity agreements;
- classifying water and wastewater treatment plants in the NWT in accordance with the Guidelines;
- establishing prescribed tests of qualification for determining suitability for certification of water and wastewater system operators in the NWT;
- applying the Guidelines in all areas including: exam score, years of experience and CEU compliance
- determining the validity of challenges to prescribed tests of qualification, years of experience or CEU compliance for all classes and ruling on these challenges;
- awarding certification in accordance with the Guidelines;
- revoking certification in accordance with the Guidelines.

## MEMBERSHIP

The Committee will be comprised of up to seven persons including representatives from:

- Health and Social Services (H&SS)
- Municipal and Community Affairs (MACA) Operations Division;
- Municipal and Community Affairs (MACA) School of Community Government;
- Public Works and Services (PWS);
- Community Governments;
- Practitioners; and
- The Northern Territories Water and Waste Association (NTWWA).

The Committee chair is the representative from the Department of Health and Social Services.

## **RESPONSIBILITIES - INDIVIDUAL MEMBERS**

A member of the Committee is expected to:

- understand the purpose of certification;
- prepare for and contribute to discussions at Committee meetings;
- evaluate his/her own personal effectiveness and contribution as a member; and
- apply current GNWT policy and these Guidelines in consideration of certification at all times.

## **MEETINGS**

The Committee meets on an as needed basis. Meetings and decisions can be made by email with full committee involvement and approval.

## APPENDIX I - WATER TREATMENT PLANT POINT RATING SYSTEM

Based on the Association of Boards of Certification Water and Wastewater Plant Classification System.

#	Item	Max Points	Points Awarded
<b>1.0</b>	<b>Size (1 point minimum to 20 point maximum)</b>		
	Design flow average day or peak month's part flow average day, whichever is larger. Design flow: capacity of the plant. (max 20 points)	1 pt per 0.5 MGD or part	
	Subtotal:		
<b>2.0</b>	<b>Water Supply Sources</b>		
	Seawater/saltwater	0	
	Groundwater	0	
	Groundwater under the influence of surface water	5	
	Surface Water	5	
	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: <ul style="list-style-type: none"> <li>▪ Little or no variation – no treatment provided except disinfection (0 points)</li> <li>▪ Minor variation – e.g. “high quality” surface source appropriate for slow sand filtration (1 point)</li> <li>▪ Moderate variation in chemical feed, dosage changes made: monthly (2 points), weekly (3 points), or daily (4 points)</li> <li>▪ Variation significant enough to require pronounced and/or very frequent changes (5 points)</li> <li>▪ Severe variation – source subject to non-point discharges, agricultural/urban storm runoff, flooding (7 points)</li> <li>▪ Subject to agricultural or municipal waste point source discharges (8 points)</li> <li>▪ Subject to industrial waste pollution (10 points)</li> </ul>	0-10	
	Raw Water Subject to: <ul style="list-style-type: none"> <li>▪ Taste and/or odour for which treatment process adjustments are routinely made<sup>1</sup> (2 points)</li> <li>▪ Color &gt; 15 CU (not due to precipitated metals) - see exceptions in Note 1 at end of table<sup>1</sup> (3 points)</li> <li>▪ Fe, Mn &gt; MCL: Fe (2 points), Mn (3 points) (3 points max allowed) - see exceptions in Note 1 at end of table<sup>1</sup></li> <li>▪ Algal growths for which treatment process adjustments are routinely made<sup>1</sup> (3 points)</li> </ul>	0-5	
	Subtotal:		



#	Item	Max Points	Points Awarded
<b>3.0</b>	<b>Chemical Treatment/Addition Processes</b> <ul style="list-style-type: none"> <li>▪ Fluoridation (4 points)</li> </ul>	4	
	<ul style="list-style-type: none"> <li>▪ Disinfection/Oxidation (Note: Points are additive to a maximum of 15) (0-15 points)</li> </ul> <p>CHECK ALL THAT APPLY:</p> <ul style="list-style-type: none"> <li>▪ Chlorination: <ul style="list-style-type: none"> <li>○ Hypochlorites (5 points) – Add 1 point if generated on site</li> <li>○ Chlorine Gas (8 points)</li> <li>○ Chloramination (10 points)</li> <li>○ Chlorine Dioxide (10 points)</li> </ul> </li> <li>▪ Ozonation (10 points)</li> <li>▪ UV Irradiation (2 Points)</li> <li>▪ Iodine, Peroxide, or similar (5 points)</li> <li>▪ KMnO<sub>4</sub> (4 points) – only on greensand filtration</li> </ul>	0-15	
	<ul style="list-style-type: none"> <li>▪ pH adjustment for process control (e.g. coagulation) (4 points)</li> </ul>	4	
	<ul style="list-style-type: none"> <li>▪ Stability or Corrosion Control (If same chemical is used for both corrosion and pH adjustment, count points only once) (4 points)</li> </ul>	4	
	Subtotal:		
<b>4.0</b>	<b>Coagulation &amp; Flocculation &amp; Filter Aid</b> <ul style="list-style-type: none"> <li>▪ Primary coagulant addition (6 points)</li> <li>▪ Coagulant aid / Flocculent chemical addition (in addition to primary coagulant use) (2 points)</li> <li>▪ Flocculation (2 points)</li> <li>▪ Filter aid addition (Non-ionic/anionic polymers) (2 points)</li> </ul>	0-12	
	Subtotal:		
<b>5.0</b>	<b>Clarification/Sedimentation Process</b> <ul style="list-style-type: none"> <li>▪ Sedimentation (plain, tube, plate) (4 points)</li> <li>▪ Contact adsorption (6 points)</li> <li>▪ Other clarification processes (air flotation, ballasted clarification, etc.) (6 points)</li> <li>▪ Upflow clarification (“sludge blanket clarifier”)<sup>2</sup> (8 points)</li> </ul>	0-8	
	Subtotal:		
<b>6.0</b>	<b>Filtration</b> <ul style="list-style-type: none"> <li>▪ Granular media (surface water/GWI) = 3gpm/sq ft (10 points)</li> <li>▪ Granular media (surface water/GWI) &gt; 3gpm/sq ft (20 points)</li> <li>▪ Membrane filtration (6-10 points) <ul style="list-style-type: none"> <li>○ For compliance with a primary regulation (10 points)</li> <li>○ For compliance with a secondary regulation (6 points)</li> </ul> </li> <li>▪ Diatomaceous earth (pre-coat filtration) (10 points)</li> <li>▪ Cartridge/bad filtration (5 points)</li> <li>▪ Pre-filtration (staged cartridges, pressure sand w/o coagulation, etc.): add one point per stage to max of 3 points (1-3 points)</li> <li>▪ Slow sand (5 points)</li> </ul>	0-20	
	Subtotal:		

#	Item	Max Points	Points Awarded
<b>7.0</b>	<b>Other Treatment Processes</b> <ul style="list-style-type: none"> <li>▪ Aeration (3 points)</li> <li>▪ Air stripping (including diffused air, packed tower) (5 points)</li> <li>▪ Ion-exchange/softening (5 points)</li> <li>▪ Lime-soda ash softening (includes: chemical addition, mixing/flocculation/clarification/filtration – do not add points for these processes separately) (20 points)</li> <li>▪ GAC filter (do not assign points when included as a bed layer in another filter) (5 points)</li> <li>▪ PAC (2 points)</li> <li>▪ Blending sources with significantly different water quality <ul style="list-style-type: none"> <li>○ To achieve MCL compliance (4 points)</li> <li>○ For aesthetic reasons (2 points)</li> </ul> </li> <li>▪ Reservoir management employing chemical addition (2 points)</li> <li>▪ Electrodialysis (15 points)</li> <li>▪ Other: Certification authority may assign 2 to 15 additional points for processes not listed elsewhere in this document.</li> </ul>		
	Subtotal:		
<b>8.0</b>	<b>Residuals Disposal</b> <ul style="list-style-type: none"> <li>▪ Discharge to surface, sewer, or equivalent (0 points)</li> <li>▪ On-site disposal, land application (1 point)</li> <li>▪ Discharge to lagoon/drying bed, with no recovery/recycling e.g. downstream outfall (1 point)</li> <li>▪ Backwash recovery/recycling: discharge to basin or lagoon and then to source (2 points)</li> <li>▪ Backwash recovery/recycling: discharge to basin or lagoon and then to plant intake (3 points)</li> </ul>	0-3	
	Subtotal:		
<b>9.0</b>	<b>Facility Characteristics</b> <p>Instrumentation - Use of SCADA or similar instrumentation systems to provide data, with</p> <ul style="list-style-type: none"> <li>▪ Monitoring/alarm only, no process operation – plant has no automated shutdown capacity (0 points)</li> <li>▪ Limited process operation – e.g. remote shutdown capability (1 point)</li> <li>▪ Moderate process operation – alarms and shutdown, plus partial remote operation of plant (2 points)</li> <li>▪ Extensive or total process operation – alarms and shutdown, full remote operation of plant possible (4 points)</li> </ul>	0-4	
	Subtotal:		
	<b>TOTAL POINTS:</b>		

**Notes:**

**1. Raw water quality is subject to:**

- Taste and/or odour 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 > 15CU (not due to precipitated metals) (3 points) **with following exceptions**. Color will be considered elevated & points assigned when levels exceed 75CU for conventional filtration, 40CU for direct filtration, or 15CU for all other technologies, except RO (no points given for color for RO).

• 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 are assigned if they are greater than the MCL, except applications of manganese greensand filters. For applications of manganese greensand filters, iron and manganese levels will be considered elevated when their combined level exceeds 1.0mg/L (3 points allowed).

• Algal growths for which treatment process adjustments are routinely made (3 points): Raw water will be considered subject to algae growth when treatment processes are specially adjusted due to the presence of high levels of algae on at least a weekly basis for at least two months each year.

2. **Up flow 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.

### Plant Classification Criteria:

- **Small Systems:**
  - 1. Chlorination is the only form of chemical treatment, and
  - 2. Excluding gaseous chlorine as treatment, and
  - 3. Scores 30 points or less
- **Class I Water Treatment Plant:**
  - Below 30 points and does not meet the requirements for Very Small Systems OR
  - Scores between 31 -40 points
- **Class II Water Treatment Plant:**
  - Scores 41-55 points.
- **Class III Water Treatment Plant:**
  - Scores 56-75 points

Note: For all point rating systems, each unit process should have points assigned only once, i.e. for a plant using oxidation, precipitation, and filtration for iron removal, add 10 points for the iron removal only and 0 points for filtration.



## APPENDIX II- 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. Good technology for 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 electronic 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.

### **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.

### **pH adjustment**

The alteration of the pH of the raw water or pre-finished water by mechanical or chemical procedures to enhance the performance of the treatment process.

**Reverse osmosis**

Passage of water from a concentrated solution through a semi permeable membrane to fresh water with the application of pressure.

**SCADA instrumentation**

The Supervisory Control and Data Acquisition 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 non-corrosive, 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.

**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 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.

## APPENDIX III- WASTEWATER TREATMENT PLANT POINT RATING SYSTEM (NON-INDUSTRIAL/MUNICIPAL)

Based on the Association of Boards of Certification Water and Wastewater Plant Classification System.

A wastewater system with only collection, lift stations, and chlorination is considered a collection system and not a wastewater treatment plant. Each unit process should have points assigned only once.

#	Item	Max Points	Points Awarded
1.0	Size (2 point minimum to 20 point maximum)		
1.1	Maximum population equivalent (PE) or part served, peak day (1 point minimum to 10 point maximum)	1 pt per 10,000 or part	
1.2	Design flow average day or peak month's part flow average day, whichever is larger (1 point minimum to 10 point maximum)	1 pt per MGD or part	
	Subtotal:		

2.0	Variation in raw waste (0 point minimum to 6 point maximum)		
2.1	Variations do not exceed those normally or typically expected	0	
2.2	Recurring deviations or excessive variations of 100 to 200% in strength and/or flow	2	
2.3	Recurring deviations or excessive variations of more than 200% in strength and/or flow	4	
2.4	Raw wastes subject to toxic waste discharges	6	
2.5	Impact of septage or truck-hauled waste (0 point minimum to 4 point maximum)		
	Subtotal:		

3.0	Preliminary treatment		
3.1	Plant pumping of main flow	3	
3.2	Screening, comminution	3	
3.3	Grit removal	3	
3.4	Equalization	1	
	Subtotal:		

4.0	Primary Treatment		
4.1	Clarifiers	5	
4.2	Imhoff tanks or similar	5	
	Subtotal:		

5.0	Secondary Treatment		
5.1	Fixed-film reactor	10	
5.2	Activated sludge	15	
5.3	Stabilization ponds without aeration	5	
5.4	Stabilization ponds with aeration	8	
	Subtotal:		

6.0	Tertiary Treatment		
6.1	Polishing ponds for advanced waste treatment	2	
6.2	Chemical/physical advanced waste treatment w/o secondary	15	
6.3	Chemical/physical advanced waste treatment following secondary	10	
6.4	Biological or chemical/biological advanced waste treatment	12	
6.5	Nitrification by designed extended aeration only	2	
6.6	Ion exchange for advanced waste treatment	10	
6.7	Reverse osmosis, electrodialysis and other membrane filtration techniques	15	
6.8	Advanced waste treatment chemical recovery, carbon regeneration	4	
6.9	Media filtration	5	
	Subtotal:		

7.0	Additional Treatment Processes		
7.1	Chemical additions (2 points each for a maximum of 6 points)	6	
7.2	Dissolved air flotation (for other than sludge thickening)	8	
7.3	Intermittent sand filter	2	
	Reticulating intermittent sand filter	3	
7.4	Microscreens	5	
7.5	Generation of oxygen	5	
	Subtotal:		

8.0	Solids Handling		
8.1	Solids stabilization	5	
8.2	Gravity thickening	2	
8.3	Mechanical dewatering	8	
8.4	Anaerobic digestion of solids	10	
8.5	Utilization for digester gas for heating or cogeneration	5	
8.6	Aerobic digestion of solids	6	
8.7	Evaporative sludge drying	2	
8.8	Solids reduction (including incineration, wet oxidation)	12	
8.9	On-site landfill for solids	2	
8.10	Solids composting	10	
8.11	Land application of biosolids by contractor	2	
8.12	Land application of biosolids under direction of facility operator in direct responsible charge	10	
	Subtotal:		

9.0	Disinfection (0 points minimum to 10 point maximum)		
9.1	Chlorination or ultraviolet irradiation	5	
9.2	Ozonation	10	
	Subtotal:		

10.0	Effluent discharge (0 point minimum to 10 point maximum)		
10.1	Mechanical post aeration	2	
10.2	Direct recycle and reuse	6	
10.3	Land treatment and disposal (surface or subsurface)	4	
	Subtotal:		

11.0	Instrumentation (0 point minimum to 6 point maximum)		
11.1	The use of SCADA or similar instrumentation systems to provide data with no process operation	0	
11.2	The use of SCADA or similar instrumentation systems to provide data with limited process operation	2	
11.3	The use of SCADA or similar instrumentation systems to provide data with moderate process operations	4	
11.4	The use of SCADA or similar instrumentation systems to provide data with extensive or total process operation	6	
	Subtotal:		

12.0	Laboratory control (0 point minimum to 15 point maximum)		
12.1	Bacteriological/biological (0 point minimum to 5 point maximum)		
	* Lab work done outside the plant		
	* Membrane filter procedures		
	* Use of fermentation tubes or any dilution method; fecal coliform determination		
12.2	Chemical/physical (0 minimum to 10 point maximum)		
	* Lab work done outside the plant		
	* Push-button or visual methods for simple tests such as pH, settleable solids		
	* Additional procedures such as DO, COD, BOD, gas analysis, titrations, solids, volatile content		
	* More advanced determinations such as specific constituents; nutrients, total oils, phenols		
	* Highly sophisticated Instrumentation such as atomic absorption, gas chromatography		
	Subtotal:		
	<b>TOTAL POINTS</b>		

The key concept is frequency and/or intensity of deviation or excessive variation from normal or typical fluctuations; such deviation can be in terms of strength, toxicity, shock loads, 1/1, with points from 0 to 6.

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



## APPENDIX IV - 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, and precipitation, etc.

### **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.

### **Land treatment and disposal (surface or subsurface)**

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.

**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 in vessel.

**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.

## APPENDIX V - DISTRIBUTION SYSTEM POINT RATINGS

Based on the Association of Boards of Certification Water Distribution System Classification System.

Distribution systems shall be rated according to the population served as follows:

Class			
	Class I- 1,500 or less		
	Class II-1,501 to 15,000		
	Class III-15,001 to 50,000		
	Subtotal:		
	TOTAL POINTS:		

In-line treatment (Such as booster pumping, chlorination, or stabilization) is considered an integral part of the collection system.

## APPENDIX VI - COLLECTION SYSTEM POINT RATING SYSTEM

Based on the Association of Boards of Certification Collection System Classification System.

Collection systems shall be rated according to the population served as follows:

Class			
	Class I -1,500 or less		
	Class II- 1,501 to 15,000		
	Class III-15,001 to 50,000		
	Subtotal:		
	TOTAL POINTS:		

In-line treatment (Such as lift stations, chlorination, or odor control) is considered an integral part of the collection system.

## APPENDIX VII – APPROVED CONTINUING EDUCATION UNITS

Courses Directly Related to WW Systems	CEU/hr	CEU (max)			Comment
		Small System	Class 1	Class II	
ABC Training/Certification		1	1	1	Effective after operator certification
Accredited courses/workshops (Filter management, pump maintenance, etc.)		CEU as stipulated			System specific
Field training or classroom training	0.1	1	1	1	Using approved videos for classroom training
Water supply system review	0.1	1	1	1	
Safety Training (First-Aid, WHMIS, Confined space, etc.)		0.5	0.5	0.5	
Safety meetings	0.1	0.5	0.5	0.5	
MMOS (or other maintenance management software training)	0.1	0.5	0.5	0.5	
Presentation (O&M of water supply system)		0.5	0.5	0.5	Council, school, conference, etc.
Home study (approved materials with test questions)		0.5	0.5	0.5	
Conference	0.1	1	1	1	NTWWA/other
Workshop	0.1	1	1	1	

Courses Not Directly Related to WW Systems	CEU/hr	CEU (max)			Comment
		Small System	Class 1	Class II	
Accredited courses/workshops		CEU as stipulated			
Presentation	0.1	0.5	0.5	0.5	
Conference/Workshop	0.1	0.5	0.5	0.5	
Education upgrade	0.1	0.5	0.5	0.5	
SCG courses					
* Energy Management	0.1	0.5	0.5	0.5	
* Heating and Ventilation (boiler, furnace, genset maintenance)	0.1	0.5	0.5	0.5	
SCG courses & other classroom instruction (eg. management skills courses)	0.1	0.5	0.5	0.5	