Facility Classification Standards

NOVA SCOTIA
Environment

Approval Date: April 3, 2009 Effective Date: April 3, 2009

Approved By: Nancy Vanstone, Deputy Minister

Version Control: Replaces Facility Classification Standards dated December 12, 2005

I. PREFACE

Water and wastewater treatment facility classification is based on a point system developed by the Association of Boards of Certification (ABC) for use by certifying authorities such as Nova Scotia Environment (NSE). Facilities are rated according to their size, population served and unit processes. Classification is assigned using the following point system:

Class I = 30 points or less
Class II = 31 - 55 points
Class III = 56 - 75 points
Class IV = 76 points or greater

II. AUTHORITY

The *Water and Wastewater Facilities and Public Drinking Water Supplies Regulations* require water treatment and wastewater treatment facilities to be classified in accordance with the *Facility Classification Standards*.

The *Water and Wastewater Facilities and Public Drinking Water Supplies Regulations* require classified facilities to be operated by certified operators.

III. APPLICATION

The *Facility Classification Standards* apply to all municipal, commercial, industrial, institutional and privately owned water and wastewater treatment facilities that meet the criteria for classification. Transient water supplies, as defined in the *Water and Wastewater Facilities and Public Drinking Water Supplies Regulations,* are excluded from the classification process.

Each unit process shall have points assigned only once. Unless otherwise noted, the full amount of points shall be assigned. For multiple identical process units, do not double count. For example, a plant that has two flocculators should be given two points, NOT four points. However, for a plant having more than one type of unit for each process, points accrue for each unique unit type.

a) **Water Treatment Facilities**

A water treatment facility shall use Table 1 to determine the classification of the facility. A water system with a secure groundwater supply (i.e. not under the direct influence of surface water or non - GUDI) and only disinfection is to be classified as a water distribution system, not a water treatment facility. A water distribution system shall be classified in accordance with Section 10(4) of the *Water and Wastewater Facilities and Public Drinking Water Supplies Regulations.*

Table 1

ITEM	POINTS
Size	
Design flow average day, or peak month's average day, whichever is larger (1 point per 1.892 million litres. Round up.) Design flow: Consider this to be the design capacity of the plant. Examples 40 MLD = 19 points 18.9 MLD = 10 points (20 points maximum allowed)	1 - 20
Water Supply Sources (Rating based on public health significance)	
Seawater/saltwater	0
Groundwater (non - GUDI)	0
Groundwater under the direct influence of surface water (GUDI)	8
Surface water	10
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
Minor variation - e.g. "High quality" surface source appropriate for slow sand filtration	1
Moderate variation in chemical feed, dosage changes made: monthly	2
Variations significant enough to require pronounced and/or very frequent changes	5
Severe variations - source subject to non-point discharges, agricultural / urban storm runoff, flooding	7

ITEM	POINTS
Raw water quality subject to agricultural or municipal waste point source discharges	8
Raw water quality subject to industrial waste pollution	10
Raw water quality is subject to:	
Taste and/or odour for which treatment process adjustments are routinely made[1]	2
Colour > 15 TCU (not due to precipitated metals)[1]	3
Iron or/and manganese: Fe (2 points) or Mn (3 points) concentrations above aesthetic objective 3 points maximum allowed[1]	2-3
Algal growths for which treatment process adjustments are routinely made[1]	3
Chemical Treatment / Addition Processes	
Fluoridation	4

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

pH adjustment for process control (e.g. pH adjustment aids coagulation	4
Stability or Corrosion Control (If the same chemical is used for both Corrosion Control and pH adjustment, count points only once)	4
Coagulation / Flocculation and Filter Aid	
Primary coagulant addition	6

ITEM	POINTS
Coagulant aid / Flocculant chemical addition (in addition to primary coagulant use)	2
Flocculation	2
Filter aid addition (non-ionic / anionic polymers)	2
Clarification / Sedimentation	
Sedimentation (plain, tube, plate)	4
Contact adsorption	6
Other Clarification processes (air flotation - DAF, ballasted clarification, etc)	6
Upflow clarification ("sludge blanket clarifier")[2]	8
Filtration	
Granular media filtration (Surface water / GUDI) < 122 lpm / sq m	10
Granular media filtration (Surface water / GUDI) > 122 lpm / sq m	20
Groundwater filtration	6
Membrane filtration	10
Diatomaceous earth (pre-coat filtration)	10
Cartridge / bag filters	5
Pre-filtration (staged filtration, pressure sand w/o coagulation, etc.): add one point per stage to a maximum of 3 points	1- 3
Slow sand	5
Other Treatment Processes	
Aeration	3
Air stripping (including diffused air, packed tower aeration)	5
Ion-exchange / softening	5
Greensand filtration	10
Lime-soda ash softening (includes: chemical addition, mixing/flocculation/clarification/filtration - do not add points for these processes separately)	20

ITEM	POINTS
Granular activated carbon filter (do not assign points when included as a bed layer in another filter)	5
Powdered activated carbon	2
Reservoir management employing chemical addition	2
Blending sources with significantly different water quality • To achieve health related compliance (4 points) • For aesthetic reasons (2 points)	2 - 4
Electrodialysis	15
Other: Certification authority may assign 2 to 15 additional points for processes not listed elsewhere in this document. (Specify: _____)	2 -15
Residual Disposal	
• Discharge to surface, sewer, or equivalent (0 points) • On-site disposal, land application (1 point) • Discharge 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
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 shutdowns, plus partial remote operation of plant (2 points) • Extensive or total process operation - alarms and shutdowns, full remote operation of plant possible (4 points)	0 - 4

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 to T&O when there is no specific additional impact on operation. E.g. if system is already pre-chlorinating for disinfection, give no points for T&O.
- Colour > 15 TCU (not due to precipitated metals) (3 points) with following exceptions. Colour will be considered elevated

and points assigned when levels exceed 75 Total Colour Units (TCU) for conventional filtration, 40 TCU for direct filtration, or 15 TCU for all other technologies, except reverse osmosis (no points).

- Iron and/or manganese: Fe (2 points), Mn (3 points) (3 points maximum allowed) with following exceptions: for applications for manganese greensand filters. For applications of manganese greensand filters, iron and manganese levels will be considered elevated when their combined levels exceeds 1.0 mg/L (3 points).
- 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 - 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.

b) Wastewater Treatment Facilities

A wastewater treatment facility shall use Table 2 to determine the classification of the facility. A wastewater system with only collection, lift stations, and disinfection is to be considered as a wastewater collection system and not a wastewater treatment facility. A wastewater collection system shall be classified in accordance with Section 12(4) of the *Water and Wastewater Facilities and Public Drinking Water Supplies Regulations*.

Table 2

ITEM	POINTS
Size	
Maximum population served, peak day. 1 point per 10,000 population served or any fraction thereof	1 -10
Design flow average day or peak month's average day, whichever is larger. 1 point per 3.785 million litres or any fraction thereof	1 -10
Variation in raw waste (6 point maximum)[1]	
Variations do not exceed those normally or typically expected	0
Recurring deviations or excessive variation of 100 to 200% in strength and/or flow	2
Recurring deviations or excessive variation of more than 200% in strength and/or flow	4
Raw wastes subject to toxic waste discharges	6
Impact of septage or truck-hauled waste (0 point minimum to 4 point maximum)	0 - 4
Preliminary treatment	

ITEM	POINTS
Plant pumping of main flow	3
Screening or Comminution	3
Grit Removal	3
Equalization	1
Primary Treatment	
Clarifiers	5
Imhoff Tanks or similar	5
Secondary Treatment	
Fixed-film Reactor	10
Activated Sludge	15
Stabilization ponds without aeration	5
Stabilization ponds with aeration	8
Tertiary Treatment	
Polishing ponds for advanced waste treatment	2
Chemical/physical advanced waste treatment without secondary treatment	15
Chemical/physical advanced waste treatment following secondary treatment	10
Biological or chemical/biological advanced waste treatment	12
Nitrification by designed extended aeration only	2
Ion exchange for advanced waste treatment	10
Reverse osmosis, electrodialysis and other membrane filtration techniques	15
Advanced waste treatment chemical recovery, carbon regeneration	4
Media filtration	5
Additional Treatment Processes	
Chemical additions (2 points each for a maximum of 6 points)	2 - 6

ITEM	POINTS
Dissolved air flotation (for other than sludge thickening)	8
Intermittent sand filter	2
Recirculating intermittent sand filter	3
Micro-screens	5
Generation of oxygen	5
Solids Handling	
Solids stabilization	5
Gravity thickening	2
Mechanical de-watering	8
Anaerobic digestion of solids	10
Utilization of digester gas for heating or co-generation	5
Aerobic digestion of solids	6
Evaporative sludge drying	2
Solids reduction (including incineration, wet oxidation)	12
On-site landfill for solids	2
Solids composting	10
Land application of biosolids by contractor	2
Land application of biosolids under direction of facility operator in direct responsible charge	10
Disinfection (10 point maximum)	
Chlorination or ultraviolet irradiation	5
Ozonation	10
Effluent discharge (10 point maximum)	
Mechanical post aeration	2
Direct recycle and reuse	6
Land treatment and disposal (surface or subsurface)	4

ITEM	POINTS
Instrumentation	
The use of Supervisory Control and Data Acquisition (SCADA) or similar instrumentation systems to provide data with no process operation	0
The use of SCADA or similar instrumentation systems to provide data with limited process operation	2
The use of SCADA or similar instrumentation systems to provide data with moderate process operation	4
The use of SCADA or similar instrumentation systems to provide data with extensive or total process operation	6
Laboratory Control - Bacteriological/Biological [2]	
Lab work done outside the plant	0
Membrane filter procedures	3
Use of fermentation tubes or any dilution method; thermotolerant coliform determination	5
Laboratory Control - Chemical/Physical [2]	
Lab work done outside the plant	0
Push-button or visual methods for simple tests such as pH, settleable solids	3
Additional procedures such as Dissolved Oxygen (DO), Chemical Oxygen Demand (COD), Biochemical Oxygen Demand (BOD), gas analysis, titrations, solids, volatile content	5
More advanced determinations such as specific constituents; nutrients; total oils, phenols	7
Highly sophisticated instrumentation such as atomic absorption, gas chromatography	10

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

2. The key concept is to credit laboratory analyses done on-site by facility personnel.

Dated April 3, 2009

Original signed by:
Nancy Vanstone, Deputy Minister