Appendix 39.1 - Discharge Criteria

Parameters	FEDERAL GUIDELINES	PROVINCIAL CRITERIA		DISCHARGE OBJECTIVES
	CWQG[1]	MDDELCC CRITERIA[2]		CLIENT'S OBJECTIVES [3]
	Protection of Aquatic Life (Long term exposition)	Surface water quality in Quebec		Final effluent discharge objectives
		Chronic effects	Acute effects	
Petroleum hydrocarbons C_{10}-C_{50} (µg/L)	*	**200**	1 800	-
Total polycyclic aromatic hydrocarbons (PAH) (µg/L)				
Acenaphthene	**5,8**	38	100	-
Acenaphthylene	*	*	*	-
Anthracene	**0,012**	*	*	-
Benzo(a)anthracene	**0,018**	*	*	-
Benzo(e)pyrene	*	*	*	-
Benzo(b,j,k)fluoranthene	*	*	*	-
Benzo(c)phenanthrene	*	*	*	-
Benzo(a)pyrene	**0,015**	*	*	-
Benzo(g,h,i)perylene	*	*	*	-
Chrysene	*	*	*	-
Dibenzo(a,h)anthracene	*	*	*	-
Dibenzo(a,l)pyrene	*	*	*	-
Dibenzo(a,i)pyrene	*	*	*	-
Dibenzo(a,h)pyrene	*	*	*	-
7,12-Dimethylbenz(a)anthracene	*	*	*	-
Fluoranthene	**0,04**	1,6	14	-
Fluorene	**3**	12	110	-
Indeno(1,2,3-cd)pyrene	*	*	*	-
1,3-Dimethylnaphthalene	*	*	*	-
3-Methylcholanthrene	*	*	*	-
Naphthalene	**1,1**	11	100	-
Phenanthrene	**0,4**	1,4	4,7	-
Pyrene	**0,025**	*	*	-
1-Methylnaphthalene	*	*	*	-
2-Methylnaphthalene	*	*	*	**1 000**
2,3,5-Trimethylnaphthalene	*	*	*	-
Total polycyclic aromatic hydrocarbons	*	*	*	**0,018**
Volatil organic compounds (VOC) (µg/L)				
Benzene	370	370	950	**51**
Chlorobenzene	**1,3**	1,3	220	-
1,2-Dichlorobenzene	**0,7**	0,7	120	-
1,3-Dichlorobenzene	**150**	150	100	-
1,4-Dichlorobenzene	**26**	26	100	-
Ethylbenzene	**90**	90	160	-
Styrene	72	72	1 400	**8**
Toluene	**2**	2	1 300	-
Xylenes (o,m,p)	*	**41**	370	-
Chloroform	**1,8**	630	5 700	-
Vinyl chloride (chloroethene)	*	930	8 400	**2,4**
1,2-Dichloroethane	100	100	8 200	**37**
1,1-Dichloroethene	*	**130**	1 200	-
1,2-Dichloroethene (cis)	*	**620**	5 500	-
1,2-Dichloroethene (trans)	*	**1 500**	14 000	-
Dichloromethane	**98,1**	98	8 500	-
1,2-Dichloropropane	*	230	2 000	**15**
1,3-Dichloropropane	*	**260**	5 900	-
1,3-Dichloropropene (cis+trans)	*	**9**	81	-
1,1,2,2-Tetrachloroethane	*	200	910	**4**
Tetrachloroethene	110	110	1 400	**3,3**
Carbon tetrachloride	13,3	77	690	**1,6**
1,1,1-Trichloroethane	*	**89**	800	-
1,1,2-Trichloroethane	*	730	3 200	**16**
Trichloroethene	**21**	21	1 800	-
Other organic compounds				
PHENOLIC COMPOUNDS (µg/L)				
2,4-Dimethylphenol	*	**380**	1 300	-
4-Nitrophenol	*	**200**	940	-
Phenol	*	**450**	3400	-
2-Chlorophenol	**7**	18	160	-
3-Chlorophenol	**7**	*	*	-
4-Chlorophenol	**7**	15	140	-
2,3-Dichlorophenol	**0,2**	*	*	-
2,4+2,5-Dichlorophenol	**0,2**	11	92	-
2,6-Dichlorophenol	**0,2**	*	*	-
3,4-Dichlorophenol	**0,2**	*	*	-
3,5-Dichlorophenol	**0,2**	*	*	-
Pentachlorophenol	**0,5**	[8]	[9]	-
2,3,4,6-Tetrachlorophenol	**1**	1,2	11	-
2,3,5,6-Tetrachlorophenol	1	**0,38**	8,5	-
2,4,5-Trichlorophenol	18	**2**	46	-
2,4,6-Trichlorophenol	18	**5**	39	-
m-Cresol	*	*	*	-
ortho-Cresol	*	**82**	740	-
para-Cresol	*	**25**	230	-
Chlorophenols [7]	*	*	*	-
Total Chlorinated phenolic compounds	*	*	*	-
PHENOLS (mg/L)				
Total Phenols	4	**0,45**	3,4	-
Total polychlorinated biphenyls (PCB) (µg/L)				
Total PCB (congeners)	*	*	*	**3[17]**
DIOXINS AND FURANS (pg/L)				
Total Toxic Equivalency[8] (TEQ)	*	*	*	**15[17]**
Dissolved metals (µg/L)				
Aluminum	100 [4]	**87**	750	-
Antimony	*	**240**	1 100	-
Silver	**0,10**	0,1	86,7[6,7]	-
Arsenic	**5,0**	150	340	-
Barium	*	[6]	[6]	**440**
Beryllium	*	**757[6]**	6 810[6]	-
Boron	**1 500**	5 000	28 000	-
Cadmium	**0,09**	[6,7]	[6,7]	-
Chromium	**8,9**	[6,7]	[6,7]	-
Copper	[5]	[6,7]	[6,7]	**9,3**
Tin	*	*	*	-
Iron	**300**	1 300	*	-
Magnesium	*	*	*	-
Manganese	*	[6]	[6]	**1900**

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	Protection of Aquatic Life (Long term exposition)	Surface water quality in Quebec		Final effluent discharge objectives
		Chronic effects	Acute effects	
Molybdenum	**73**	3 200	29 000	-
Nickel	(5)	(6,7)	(6,7)	**52**
Lead	**7,0** [5]	26,5[6,7]	681[6,7]	-
Sodium	*	*	*	-
Selenium	1,0	5,0	62	**5,0**
Zinc	**30**	(6,7)	(6,7)	-
Mercury	0,026	**0,0009**	0,0016	-
Other inorganic compounds				
Azote ammoniacal (summer) (N-NH3)	*	(10)	(10)	**0,49**
Azote ammoniacal (winter) (N-NH3)	*	(10)	(10)	**0,74**
Chlorides	**120**	230	860	-
Conductivity	*	*	*	(18)
Total Cyanides	**0,005**	*	*	-
Biochemical oxygen demand	*	**3**	*	-
Fluorides	**0,12**	0,2	4	-
pH	*	**<6,5 ou >9,0**	*	-
Total Suspended Solids	*	(12)	(13)	**12**
Nitrates	**2,9**	2,9	*	-
Nitrites	**0,06**	(16)	(16)	-
Total Phosphorus	*	**0,03**	*	-
Total dissolved solids	*	*	*	(18)
Sulfates	*	(4)	(4)	**691**
Total Sulfides	*	**0.00036**[14]	0.0032[14]	-
Hardness (CaCO3)	*	*	*	(18)
Temperature (°C)				
Temperature	*	*	*	**30**
Chronic toxicity (U.T.c)				
CL50 - 7d (I.C. 95 %) (% v/v) with fathead minnow	*	**1**	*	-
Acute toxicity (U.T.a)				
CL50 - 48h (I.C. 95 %) (% v/v) with Daphnia magna	*	*	**1**	-
CL50 - 96h (I.C. 95 %) (% v/v) with rainbow trout	*	*	**1**	-

Legend:

* : No criterion presently available

- : No value available or no value selected.

U.T.c : Chronic toxicity units

U.T.a : Acute toxicity units

Notes :

[1] Canadian Water Quality Guidelines for the Protection of Aquatic Life

[2] Surface water quality criteria in Quebec.

[3] Selected effluent discharge objectives, notably based on preliminary environmental discharge objectives of the MDDELCC (April 2016).

[4] For this parameter, the criterion varies with hardness and chloride concentration. See « Surface water quality *criteria in Quebec* » (MENV 2001).

[5] For these metals, the criterion increases with hardness. See « Canadian Water Quality Guidelines for the Protection of Aquatic Life » (CCME).

[6] For these metals, the criterion increases with hardness. See « *Surface water quality criteria in Quebec » (MENV 2001).*

[7] For these metals, the criterion reduces with an adjustment factor applied to convert the quality criterion, which is expressed in total extractible metal, in dissolved metals. See « Surface water quality criteria in Quebec » (MENV 2001).

[8] For this parameter, the criterion varies with pH according to the following formula: e[1,005 (pH) - 5,134] / 1000. See « Surface water quality criteria in Quebec » (MENV 2001).

[9] For this parameter, the criterion varies with pH according to the following formula: e[1,005 (pH) - 4,869] / 1000. See « Surface water quality criteria in Quebec » (MENV 2001).

[10] For this parameter, the criterion varies with temprature and pH of water. See appendix 2 of « Surface water quality criteria in Quebec » (MENV 2001).

[11] The quality criterion for total phosphorus aims at limiting the excessive growth of algae and aquatic plants in streams and rivers. The criterion for total phosphorus is applied on a case-by-case basis in order to account for specific conditions for streams and rivers in which groundwater seeps. Please consult with the DSEE of the Ministry.

[12] In clear water (i.e. when suspended solids are < 25 mg/L), this criterion is defined by a maximal increase of 25 mg/L in comparison to the natural or ambient concentration (not influenced by a local source of suspended solids, by a significant rain event or snowmelt) according to context.

[13] In clear water (i.e. when suspended solids are < 25 mg/L), this criterion is defined by a maximal increase of 5 mg/L in comparison to the natural or ambient concentration (not influenced by a local source of suspended solids, by a significant rain event or snowmelt) according to context. In turbid water (i.e. when suspended solids are > 25 mg/L), this criterion is defined by either (under revision): a) a maximal increase at all times of 25 mg/L in comparison to the ambient concentration when the latter varies between 25 and 250 mg/L; or b) a maximal increase of 10 % in comparison to the ambient concentration when the latter is above 250 mg/L at a given moment.

[14] This quality criteria applies to the un-ionized fraction of hydrogen sulfide (H2S). This fraction can be estimated from the average pH of the receiving environment and the dissolved (or total) sulfide concentration (expressed as S-2) of the water sample. See « Surface water quality criteria in Quebec » (MENV 2001).

[15] This quality criteria varies with chloride concentrations in surface water in which groundwater seeps. See « Surface water quality criteria in Quebec » (MENV 2001) and consult the DSEE.

[16] For this parameter, the criterion increases with chloride concentrations in the water environment. See appendix 8 of « Surface water quality criteria in Quebec » (MENV 2001).

[17] Objectives based on the limits for effluent discharge total concentration in the Regulation respecting pulp and paper mills (RLRQ, c. Q-2, r. 27).

[18] No objective is given for this parameter but monitoring is required in order to interpret toxicity testing.