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Wastewater treatment plants to meet Ottawa's new minimum performance standards

Every year, over 150 billion litres of untreated wastewater are discharged to Canadian waters. This is about four times the average flow of the Ottawa River before it enters the St. Lawrence. In response, Ottawa has set national minimum effluent quality standards for four deleterious substances in the effluents of wastewater treatment plants to ensure systems provide at least secondary treatment or the equivalent. Of the 3,700 wastewater facilities operating in Canada, some 849 (or 23 per cent) do not currently meet the new standards.

After three years of consultation and debate Environment Canada finalized the *Wastewater Systems Effluent Regulations*. They were published in the *Canada Gazette, Part II* on July 18, 2012. The new regulations also cover sampling, monitoring, record keeping and reporting requirements.

Compliance Phase-In

Operators of facilities in the "high risk" category will have to upgrade their plants by December 31, 2020, while the compliance deadlines for medium and low risk plants are the end of 2030 and 2040, respectively. In Ontario the CCME has determined that there are only three high risk facilities. When the bill was first introduced, all the federal facilities (150), which include systems on federal or Aboriginal land, were tagged as high risk. Today even more federal facilities (226) are identified but only 30 are high risk.

The regulations will be phased in, beginning with the effluent monitoring requirements, record-keeping and reporting requirements, which come into force on January 1, 2013. The effluent quality standards come into force on January 1, 2015, with the exception of the standard for total residual chlorine, which takes full effect on January 1, 2021. Operators of wastewater systems that do not meet the effluent quality standards must apply for a transitional authorization between January 1, 2013, and June 30, 2014. Such an authorization will set the conditions under which the facility may continue to operate, as well as a risk-based timeline for achieving final compliance.

Is Your Facility Affected?

Discharges from separate storm sewer systems are not covered under the regulations. The regulations apply to any wastewater system that discharges effluents to surface water and has a nameplate capacity of 100 cubic metres of influent per day (or handles an average daily volume of 100 m3 or more during a year). They do not apply to systems in the Northwest Territories, Nunavut and north of the 54th parallel in the provinces of Quebec and Newfoundland and Labrador. Further research is needed before Ottawa sets

standards appropriate for the extreme climatic conditions found in those areas. This is expected to take five years.

The regulations do not apply to industrial, commercial or institutional wastewater systems designed to collect influent consisting of less than 50 per cent blackwater (containing human fecal matter or urine) and greywater (from appliances in a kitchen or laundry) combined. Nor do they apply to pulp and paper mills, as defined in section 2 of the Pulp and Paper Effluent Regulations. Final amendments to off-site treatment facility provisions of these regulations were posted on the *Canada Gazette* at the same time.

Effluent standards

The regulations, based on a 2009 commitment to the Canadian Council of Ministers of the Environment (CCME), set effluent quality standards for four deleterious substances:

- average carbonaceous biochemical oxygen demand (CBOD) of less than or equal to 25 mg/L
- average concentration of suspended solids of less than or equal to 25 mg/L
- average concentration of total residual chlorine of less than or equal to 0.02 mg/L
- maximum concentration of un-ionized ammonia of less than 1.25 mg/L (expressed as nitrogen) at 15°C ± 1°C.

The new effluent limits reflect similar standards adopted in both the United States and the European Union. These performance standards reflect a secondary level of treatment or equivalent, which should remove over 95 per cent of the total mass of conventional pollutants in wastewater. Compliance will be based on yearly, quarterly or monthly averages depending on the annual average daily volume of effluent deposited from the final discharge point of the wastewater system.

The regulation would permit operators to obtain “temporary authorizations” allowing the release of un-ionized ammonia under certain circumstances or the bypass of effluents during planned maintenance or construction activities. The temporary authorization to deposit un-ionized ammonia is renewable every three years.

Monitoring and reporting

All owners/operators are required to monitor the volume and the composition of wastewater effluent. The regulations prescribe minimum sampling and reporting frequencies and the type of sample to be collected based on the annual average daily volume of effluent deposited and the type of wastewater system. The quantity and frequency of effluents discharged by combined sewer overflows must be reported for each discharge event. Records, copies of reports and any supporting documents must be retained for at least five years and available for inspection.

Implementation

Environment Canada estimates that compliance will cost more than $9 billion, with operators in Quebec, British Columbia, Manitoba and Atlantic Canada shouldering the largest share. Environment Canada says that the environmental and health benefits – including improvements in the fishing and seafood industry, cleaner drinking water sources, and reductions in beach closures – will outweigh the costs by a factor of three-to-one.

To ease the administrative burden, Environment Canada will develop an electronic reporting tool for use by all regulators and owner/operators. Ottawa is also expected to negotiate bilateral administrative agreements with each of the provinces and Yukon to define authorization, compliance and enforcement functions. The federal government will administer the regulations for those systems not covered by an agreement. More stringent standards and standards for additional conventional pollutants could be imposed by these other jurisdictions.

Changes from First Draft

The first draft of the regulations was released on March 20, 2010, for public review and consultation. As a result of the comments received, the threshold of applicability was increased from 10 m^3 to 100 m^3 of influent per day (thus mitigating affordability concerns for some small facilities), a number of deadlines were extended (for example, facilities handling less than 5,000 m^3 per day were given an extra six years to meet the total residual chlorine standard), definitions clarified, sampling frequencies adjusted, the requirement for environment effects monitoring eliminated, the basis for transitional authorizations amended, and new provisions added to cover intermittent wastewater systems. The proposed requirement that owners/operators prepare a plan to eliminate overflows from all combined sewers has been dropped. Only those owners/operators of medium or high risk wastewater systems that would like to extend the duration of the transitional authorization until the end of 2040 to deal with the combined sewer overflow issue at the same time must prepare a plan that describes the modifications to reduce the quantity of deleterious substances deposited via overflow points.

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Costs of Wastewater Systems Effluent Regulations[1]					
Incremental costs[2]	**Base 2012**	**2021**	**2031**	**2041**	**2065**
Cost to Wastewater System Owners and Operators[3]					
Capital costs	0	3,902	3,700	325	0
Operation & maintenance costs	0	247	411	421	10
Non-capital costs	13	11	11	11	3
Subtotal	13	4,160	4,123	754	13
Cost to Governments[4]					
Enforcement	0.41	1.67	1.67	1.67	0.50
Compliance promotion	1.22	0.16	0.09	0	0
Authorization Officers	2.40	1.14	1.14	1.14	0
Electronic reporting system	0.25	0.03	0.03	0.03	0.03
Subtotal	4.28	3.00	2.93	2.84	0.52
Total costs	**17**	**4,163**	**4,126**	**760**	**13**

1. Taken from Table 4, Cost-benefit Summary Statement, in the Regulatory Impact Analysis Statement to the Wastewater Systems Effluent Regulations, *Canada Gazette, Part ll*, July 18, 2012
2. All of the capital costs were combined into 2021, 2031, and 2041 to illustrate the total capital costs per compliance period.
3. There could be additional costs related to wastewater collection (piping or trucking) if deemed necessary to connect more than one community to a treatment system.
4. The common electronic reporting system to be developed by the federal government should improve overall efficiency and reduce administrative costs for the various jurisdictions.

Number of Facilities Requiring Upgrades				
	Low Risk 2040	**Medium Risk 2030**	**High Risk 2020**	**Total**
Alberta	3	30	2	35
British Columbia	0	4	8	12
Manitoba	0	81	0	81
New Brunswick	13	38	0	51
Newfoundland and Labrador	0	1	45	46
Nova Scotia	8	36	16	60
Ontario	99	4	3	106
Prince Edward Island	17	7	0	24
Quebec	0	144	30	174
Saskatchewan	0	29	1	30
Yukon	0	1	1	2
Federal	162	36	30	228
Total	302	411	136	849

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