

Performance Indicator Summary

Performance indicator: Taste & Odors PI

Technical Workgroup: Water Uses TWG

Research by: Carrière and Barbeau.

Modeled by: Bill Werick in the STELLA Shared Vision Model

Activity represented by this indicator: The costs of upgrading municipal drinking water treatment plants to treat taste & odors compounds.

Link to water levels: Based on anecdotal evidence, severe taste and odors episodes are linked to low water levels. A precise level at which problems arise is unknown. The level used here {20.53 m (67.36 ft.) at Pointe-Claire} is based on past observation.

Importance: Taste and Odors problems are not regulated and are considered as aesthetics problems. However, it is a serious nuisance as it affects both the comfort and the confidence of the population. This performance indicator presents the costs of adaptation. This indicator is of secondary importance as it does not represent an availability concern or serious known quality problems, possibly translating into health risks.

Performance Indicator Metrics: The PI is expressed as a lump sum (49 millions \$Can) that is engaged if the critical water level of 20.53 m (67.36 ft.) at Pointe-Clair} is reached for three consecutive years.

Temporal validity: It is valid all year long. *(It could however be modified to include the summer period only)*

Spatial validity: Valid for the Lower St. Lawrence between Lake St. Francis and Lake St. Pierre.

Links with hydrology used to create the PI algorithm:

As observed in the past, taste and odors problems tend to be more severe in low water level conditions. This information was obtained from plant superintendents during the site survey. The level at which the problem increases depends on the situation prevailing at each plant and can hardly be measured. The level selected for the PI {20.53 m (67.36 ft.) at Pointe-Claire} was chosen as it is the minimum level observed in 1999 and 2001, two very low water level years during which severe problems occurred.

The rationale for the three consecutive years aspect of the PI is that it takes some time for a municipality to invest money. They have to be convinced that the problem is not sporadic.

The costs of modifying the infrastructure to treat taste & odors problems were calculated for the 14 plants not presently equipped (out of 29). The treatment solutions evaluated were ozonation or powder activated carbon. Both capital and operation and maintenance (O&M) costs were estimated based on cost curves. The most probable solution for each plant was selected and the total costs (including 101 years of O&M) were expressed as a lump sum in present value money, considering 5% interest rate.

Validation: No validation was performed for this PI as far as possibility of occurrence or links to water level are concerned. The costs on the other hand are fairly precise estimates.

Documentation and References:

Barbeau, B. & Carrière, A. 2003. *Impacts of level fluctuations in the St. Lawrence River on water treatment plant operation*. Report presented to the International Joint Commission.

Risk and uncertainty assessment: This PI can be useful to realize the potential, non negligible, problems arising from lower water levels. This problematic can be solved by adaptation strategies. The risks associated are low as health or water availability are not threatened. The PI can be used to evaluate plans, supposing the costs are not engaged in all candidate plans.