



City of Toronto Highland Creek Treatment Plant Dechlorination Upgrade Project: Continued Regulatory Compliance and Lower Operating Costs

Dechlorination Restrictions from the Ministry of Environment (MOE).

Balancing regulatory compliance while maintaining or reducing operating budgets is a challenge faced by municipalities and operational staff of water and wastewater treatment facilities across Canada.



The Highland Creek Treatment Plant (HCTP) wasn't the exemption. This plant began operating in 1956 and serves an area of approximately 37,682 acres and a connected population of over 450,000. The facility operates 24/7 and treats well over 170 million litres per day for the residents of Scarborough.

Different dechlorination methods had been attempted at the HCTP, including the overdose of neutralization chemicals into the plant effluent water to ensure that the residual chlorine levels had been reduced sufficiently to adhere to MOE requirements. This resulted in higher than necessary operating costs for purchase of chemicals used to neutralize the residual chlorine in the plant effluent water, resulting from disinfection using sodium hypochlorite upstream.

To achieve non-toxic effluent quality at a reasonable cost, the City of Toronto invested in the plant's Dechlorination Upgrade project. The goal was to create a closed loop process that would sufficiently neutralize the residual chlorine present in the effluent water, while also reducing the amount of disinfection and dechlorination chemicals used during day-to-day operations.

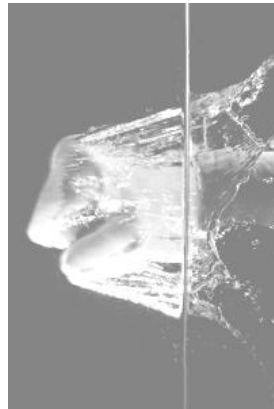
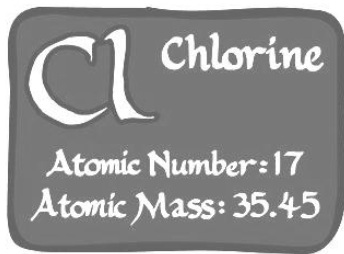
Highland Creek Treatment Plant Dechlorination Upgrade Project.

The design concept was based upon dividing the plant's existing outfall piping into chlorination and dechlorination zones. The new dechlorination facility would house an on-site pilot simulator consisting of (2) pipe spools scaled in diameter and length to simulate the chlorination and dechlorination zones of the outfall piping, as well as (3) effluent water sampling pumps, numerous control valves to direct sample flows to the dechlorination facility, (6) chemical analyzers (chlorine residual, ORP and sulphite residual), flow meters and other miscellaneous process instrumentation.

Based upon the measurements and flow rates obtained from the instruments, the system would automatically adjust the dosage of sodium bisulphite (the chemical used for chlorine neutralization in the proposed design) into the actual plant effluent water to ensure that the residual chlorine was sufficiently neutralized per MOE regulations, while using the minimum amount of chemical required to obtain those results.

In addition, a feedback loop would be implemented with the plant's existing chlorination process where the amount of sodium hypochlorite dosed by the disinfection process to treat the effluent water would be automatically adjusted based upon residual chlorine levels measured at the simulator in the dechlorination facility.

This would allow the plant to minimize its sodium hypochlorite usage while still ensuring sufficient disinfection to meet MOE regulations, with reduced residual chlorine levels as a result. At the same time, those lower residual chlorine levels at the outfall would result in further reductions to the amount of sodium bisulphite required to neutralize the residual chlorine in the effluent water.



The new dechlorination facility has operated continuously in automatic mode since its completion, with no reported failures or downtime. The sodium hypochlorite usage has decreased 27%, and the savings will continue to increase.

Having successfully implemented dozens of major capital projects at nearly all of the City's Water and Wastewater treatment facilities, RTS was trusted to provide the same high level of technical expertise and experience that the City is accustomed to receiving. RTS' ability to complete projects on time, within budget, while working effectively within a multidiscipline contractor environment has allowed the plant to achieve measureable reductions in operating costs and continued adherence to strict government regulations as an MOE classified Class IV wastewater treatment facility.



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RTS: The City of Toronto's Preferred Systems Integrator

To help ensure successful implementation of the dechlorination project, the City of Toronto identified RTS as the preferred Systems Integrator from its list of companies approved to perform system integration work for city projects. The scope of work for RTS was to provide control system design, control panel fabrication, process instrumentation supply, PLC /SCADA software programming, commissioning/site calibration, start-up support, operations/maintenance training to achieve the intended process functionality and closed loop operation of the chlorination and dechlorination processes. In addition to these professional services, RTS was also contracted to integrate the new controls for the dechlorination system into the City of Toronto's existing plant-wide SCADA infrastructure.