Drinking Water

City of Winkler, Manitoba

Green Sand Filtration and Reverse Osmosis

SITUATION

In October 2007, seeing its water treatment plant becoming obsolete, the City of Winkler took action to improve it. Since the City was time restricted, the administration chose an unconventional approach: create a new engineering department led by an engineer with strong water knowledge to design and supervise the project. By doing so, the City had a hands-on approach which made the project move along quickly.

The project was realized by the City's new engineering department who teamed up with H_2O Innovation, North American leader in the design of custom-built high performance water treatment solutions. Based on a pilot unit testing, they identified the best process chain: a green sand filtration pre-treatment followed by reverse osmosis. This system, considered as the most reliable and cost efficient, would also meet the City's expectations and ensure on-schedule delivery and start-up.

TREATMENT SEQUENCE

Firstly, the water is pumped from either the deep well or one of the 12 shallow wells. It is then treated with chlorine and hydrogen sulfide and ammonium which eliminate iron and manganese, before entering the six green sand filtration tanks. Depending on the origin of the water, deep or shallow well, the system automatically adjusts the quantity of chlorine required. No manual intervention is required.

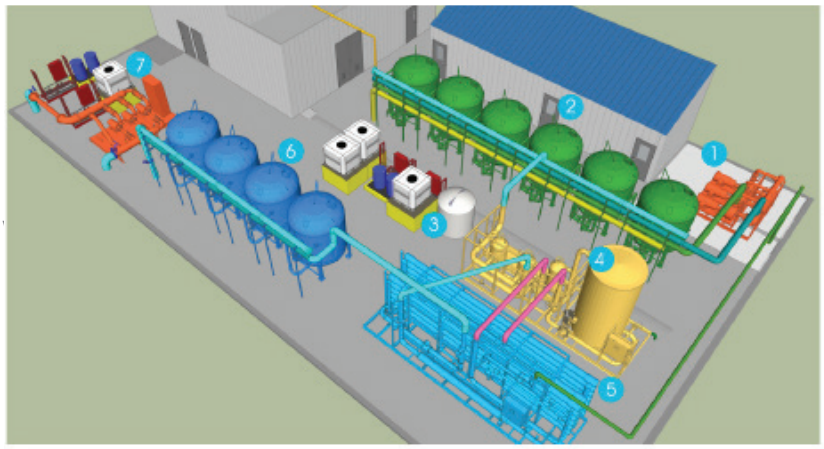
Secondly, the water leaves the green sand filtration pre-treatment and is treated with potassium permanganate ($KMnO_4$) and chlorine to ensure the complete elimination of iron and manganese, two elements not tolerated by membranes. The water is then analysed to detect any residue of those two chemicals. If the $KMnO_4$ level is too high, the system will stop injecting this chemical until the level is satisfactory. And to ensure the elimination of chlorine, sodium metalbisulfite is injected in the water to remove any residue.

Thirdly, the water is blended with an anti-scaling agent before entering the membrane filtration unit. This step is required to ensure there is no sand left in the water.

Finally, the water is pushed through the membranes and re-mineralized before reaching the holding tanks and being redistributed through the City's aqueduct system.

KEY STRENGTHS

- 70% recovery rate
- Fully automated system
- Produced flow: 2, 725 m^3/d (500 gpm)
- H_2O Innovation remains engaged with the City of Winkler to offer support in their daily operations.



1. Feed pump
2. Green sand filters
3. $KMnO_4$ treatment
4. Prefilters
5. Reverse osmosis unit
6. Re-mineralization
7. To the City's aqueduct system

3D graphic courtesy of the City of Winkler, Engineering Department

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1. Greensand filters
2. Membrane filtration
3. Overview

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