

Water Treatment Plant Year-end Report for 2016

Water demand

The total influent volume of water drawn from the Assiniboine River for treatment was approximately 11.53 % lower in 2016 than in 2015. 2015 had an influent volume of 6,724,230 m³, as compared to 5,948,692 m³ in 2016.

Total treated water volume decreased by 5.5 % from 6,046,386 m³ in 2015 as compared to 5,712,198 m³ in 2016.

The volume of water used internally for the treatment process in 2016 was 290,085 m³.

This water is used in the process production for mixing chemicals, dilution of chemicals for pumping purposes, and flushing pipes after sludge removal from process systems.

Raw Water Quality

The raw water quality for the past year has had lower turbidity and hardness in 2016 than what has been seen in recent years. The average raw water hardness for the winter months; January, February, March, October, November and December 2016, was 434 ppm. The raw water hardness average for the other six months was 374 ppm. The treated water average hardness was 230 ppm and 190 ppm for the respective periods. The 2015 yearly average hardness for Raw Water was 404 and Treated Water was 210 ppm.

Turbidity peaks were coincident with the spring runoff, flooding and the draining of the Assiniboine River impoundment area in the fall. The Actiflo clarifier was able to reduce the high levels of turbidity to minimize the impact on the downstream treatment process. Removal of sand and silt from the north side of the river impoundment area was scheduled for early 2016.

Operator overtime and shift changes were required during the spring runoff to service equipment around the clock to ensure water production continued. The problems with the River impoundment area are being addressed by the Province and they are removing the silt and sand from the south side of the impoundment area. This will provide temporary reprieve from the excessive overtime requirements and pump damage as they plan to remove more sediment over the next few years.

Distribution System Water Quality

Distribution testing for 2016 was done on a weekly basis for Total Coliforms and Escherichia Coli. All Drinking Water Regulation treatment parameters were met. Metals sampling and testing was conducted on quarterly basis for the assessment of lead concentrations found in

some household service lines. The samples were sent to an independent lab and all results were forwarded, by the lab, to the Manitoba Sustainable Development Office of Drinking Water Officer for our area. The practice of running cold water for 2 to 3 minutes, following extended periods of non-use, and before consuming, is recommended for all homes with lead services. More information may be obtained from the City's web page.

Water Quality Monitoring and Analyses

The 2016 annual audit report from the Office of Manitoba Sustainable Development, as prepared by the Drinking Water Officer for the Portage la Prairie area, was submitted to the City in March 30, 2017. Manitoba Sustainable Development and the City of Portage la Prairie will continue implementing testing changes at the Water Treatment Plant to enhance the water quality and will continue to work jointly with the local Drinking Water Officer.

The attached graphs for the Hardness shows the Raw Water was lower than the seasonal trend from March to July. Lower hardness levels were prevalent during the year and the effluent hardness rose accordingly. The low levels of hardness are shown during the spring runoff also.

The attached graph for the Turbidity shows the Raw Water peaks in the spring during run off and again in the fall during the river reservoir maintenance drain down for service work on the Dam. The effluent turbidity follows the yearly trend also. There were several peak turbidity events that followed rainfall entering the river flow.

The graph for the effluent pH shows some peaks above 8.5 due to over-feed of sodium hydroxide. The raw water pH tends to follow seasonal trends for highs and lows and the effluent pH is adjusted with Sodium Hydroxide to maintain positive Langelier Index to prevent metal corrosion and metals from leaching into the water from too low of a pH.

The graph for Fluoride shows a consistent feed throughout the year. The test results are from the morning sample and represent the reading in the effluent water at that time and not as a daily average. Cost of chemical testing negates the continuous sampling over a 24 hour time line. The average level of Fluoride feed is 0.80 mg/L. A concentration of 0.70 mg/l has been deemed optimum by Health Canada.

In 2016, the Tri-halomethane (THM) regulation requirements were met. The taste and odor is removed by the granular activated carbon but shows higher levels of other total organic carbon (TOC) that could react with chlorine to form THM'S. The graphs tend to show a problem that might be in the chemistry of the raw water that could affect the Granular Activated Carbon (GAC) by shortening the effective life of the product. The effective removal of THM-forming compounds is limited. The expected life rating of the GAC media life is well below the original anticipated three years, but the replacement of the GAC media annually, or more frequently, would be cost prohibitive. Monitoring of the raw and treated water will continue in an effort to detect problems within the raw water that would cause this. Further studies with chemical treatment alternatives have continue in 2016 to help find a solution for the elevated THM's.

The Treated Water Quality Study and the Water Treatment Functional Design Upgrades is being coordinated by AECOM Engineering and trials were conducted by the City of Portage la Prairie Water Treatment Plant Staff.

Phase One of the Water Treatment Upgrading design was completed and issued for tender in November 2016.

The City of Portage la Prairie and Manitoba Water Services Board entered into an agreement for the Phase One Water Treatment Upgrades. Upgrades include: Pre-Treatment jet flash mixing, magnetic flowmeters after Pretreatment, Lime batching control alterations, Lime conveyance system upgrades, Post ozonation space ventilation, Dissolved ozone monitoring equipment, Ozone quenching system installation, Chlorination modifications, two pumps at McKay Reservoir and flow control upgrades, Water Treatment Plant Reservoir supply of Variable Frequency Drive, and Fluoride Ventilation. Upgrades are scheduled to begin in early 2017.

The graph for the chlorine feed shows higher free chlorine concentration in August and December due to component failure. The feed unit was put on manual while the feed controller was sent out to be repaired. The effluent chlorine levels are higher as it enters the distribution system. Weekly sampling of the distribution areas for chlorine residual was done and samples sent to an independent lab for analyses and reporting to the Drinking Water Officer and Water Plant Management. All samples were shown to be free of Total Coliform and Escherichia Coli.

Major Maintenance

Changes have been made to the backwash procedure program and the SCADA (supervisory control and data acquisition) System.

Water meter replacement program completed, with the exception of a few larger diameter meters.

Ozone generator #4002 has been rebuilt.

A calcium hypochlorite feed system was installed in the WTP Reservoir for supplemental chlorine addition.

New recirculator motor and VFD installed for # 3 clarifier.

MC3 controller for lime slaker #2 was repaired and installed.

Operating Control Computer Program (Lookout software) was updated.

One pump motor at McKay Reservoir was rebuilt.

One new raw water pump was installed at the raw water pumping station.

New pump and VFD for Poplar Bluff Industrial Park was installed in the WTP Reservoir.

Decommissioning of the old pump control system at McKay Reservoir was completed.

Ongoing Water Quality Studies will result in optimizing the treatment process to treat the raw water so as to continue to have a safe, reliable product for our consumers.

The plant was kept in operation during maintenance work and plant shutdowns were done in a manner so as to keep the consumers supplied with water.

Operating staff will continue to abide by all Government operational requirements and work with the local Drinking Water Officer to ensure the best quality of water for all persons.

City of Portage la Prairie Water Treatment Plant - 2016 Annual Data Summary

	Influent Hardness ppm	Effluent Hardness ppm	Influent Turbidity NTU	Effluent Turbidity NTU	Influent pH	Effluent pH	WTP Effluent Free Cl ₂ (sampled)mg/l	W.T.P. Effluent Fluoride (Sampled) mg/l	WTP Reservoir Influent Flow m3	Reservoir Effluent less process water m3
TOTAL ANNUAL									6,150,590	5,712,198
AVERAGE	404	210	64.39	0.08	8.37	8.29	1.59	0.92	16,805	15,607
PEAK DAY	548	320	596.00	0.36	8.73	9.34	4.90	1.32	26,090	21,052
90th PERCENTILE	470	250	144.00	0.10	8.59	8.60	1.94	1.10		
MEDIAN	392	205	37.50	0.07	8.40	8.28	1.52	0.92		
WINTER AVG	434	230								
SUMMER AVG	374	190								











