Mak, Jay

From: i.motnenko@osorno.ca
Sent: November 29, 2023 11:34 PM
To: Mak, Jay
Cc: Sahulka, Danette; Mike.Matview@wsp.com
Subject: Re: SPWS 3104.50; Monarch Colony; WTP upgrades
Attachments: monarch-colony_wtp_environmental_231125_for-record.pdf

Good Evening Jay:
As discussed, please find attached two Monarch Colony new WTP Environmental Overviews. One is stamped "confidential" and another is for public record. I spoke with the customer. They are fine to make WTP process diagram public.
Thank you.
Irena Motnenko
Osorno Enterprises Inc.

November 25, 2023

Environmental Approvals Branch
Att.: Jay Mak, P.Eng.
Re: Monarch Colony new WTP Environmental Overview

Current Project Status

At the current stage the facility (building) with concrete in-ground reservoirs is built. The equipment is partially delivered to the site, but nothing is installed yet and consequently there is no equipment in use. The WTP process diagram is included as Exhibit 1.

Treatment process

The WTP's design is based on an estimated daily water consumption of 120 m^3. This value is based on the average daily water consumption of other Hutterite colonies. This consumption is a sum of the so called domestic water consumption (maximum population of Hutterite colonies is about 100 people, includes hard potable water and soft water for showers and appliances) and livestock consumption (combined animal operations).

The raw well water will be delivered to the new WTP via a pipe line designed by WSP. The raw water supply to the water plant is regulated by an actuated valve that is controlled by a float level switch in the in-ground reservoir chamber #1. The oxidation chemical KMPS (potassium monopersulfate, estimated dosing rate 10-20 mg/l) will be injected flow proportionally (flow signal from magmeter) via metering pump into the raw water stream. The raw water with injected oxidant will enter mixing chamber #1 of the in-ground concrete reservoir. The water with oxidation chemical will overflow from mixing reservoir chamber #1 into contact chamber #2. The estimated oxidant contact time is 2.5 hours. An average time required for full oxidation by KMPS is 30-40 minutes (includes metals and organic matter).

Oxidized water is pumped into hard water reservoir chamber #3 via a set of 3 x zeolite media filters (the media is Nextsand), the filters are connected in parallel, total estimated flow rate is 9-12 m^3/h). The refilling of the hard water reservoir is controlled by the float level switches installed in chamber #3. Immediately after the media filters and before entry into the hard water reservoir, chlorine dioxide is injected into the line flow proportionally (estimated dosing rate is 1.2 mg/l). The hard water reservoir has 3 chambers (#3, #4, and #5 interconnected with flow through 4" valves).

Hard water (potable) is pumped into the hard water distribution line from chambers #4 and #5. Each chamber is equipped with submersible well pumps, the estimated flow rate per pump is 6 m^3/h. The hard water distribution line at the water plant is equipped with a magmeter and metering pump. In the event that the residual concentration of chlorine dioxide in the hard water reservoir will be insufficient (less than 0.5 mg/l) due to long contact time (24 hours or more), the concentration of disinfectant in the water will be boosted. Based on the measured concentration of chlorite in the distribution water (MAC 1 mg/l), chlorine dioxide or chlorine (sodium hypochlorite 12%) will be used (subject for verification during commissioning).

Soft water (showers, kitchen appliances and laundry machines) is produced from hard water that is

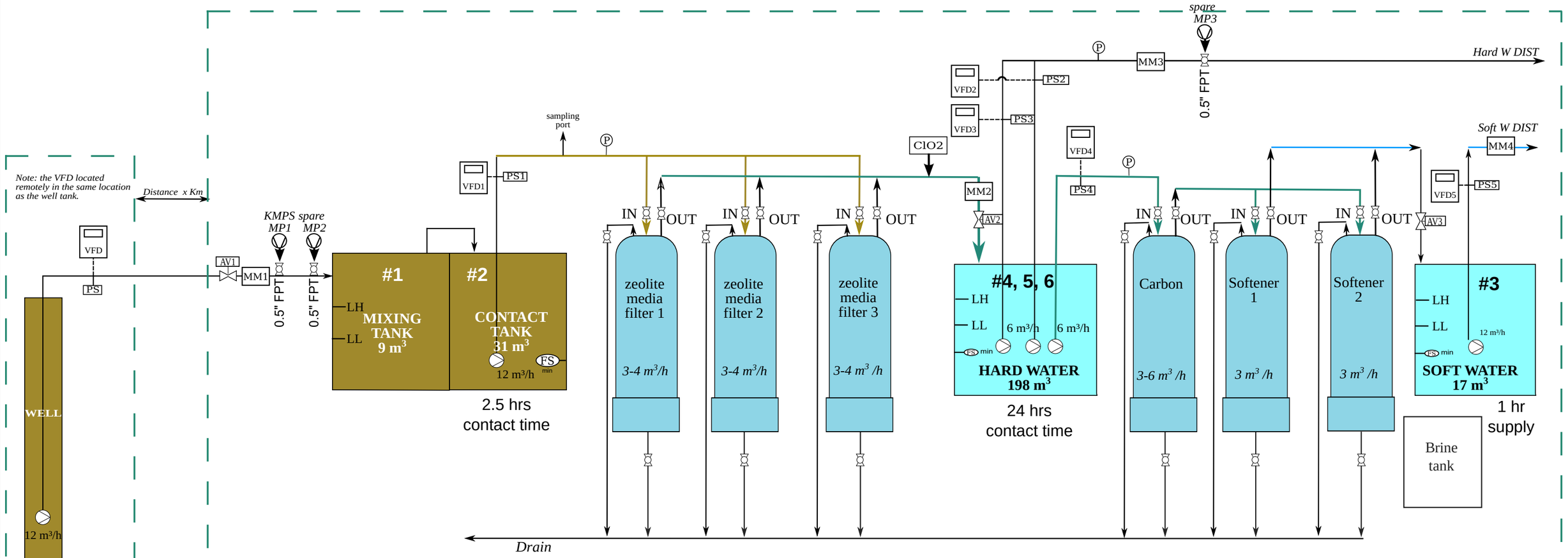
pumped in sequence through a carbon media filter (Aquafine media, for disinfectant removal to prevent damage of softener media, est. flow 3-6 m^3/h), then 2 softeners (Aquafine media, in parallel, est. flow 3 m^3/h per softener). The hard water is pumped from hard water chamber #3 into soft water reservoir chamber #6. The refilling of the soft water reservoir is controlled by the float level switches installed in soft water chamber #6. Soft water is pumped from the soft water reservoir into the soft water distribution, estimated flow rate is about 12 m^3/h.

Additional Information about Water Treatment

Exhibit 1 – WTP process diagram.

Exhibit 1

WTP Process Diagram



P	Pressure Gauge
PS	Pressure Sensor
LA , LH / LL	Float level switches - tanks (LH/LL is one switch)
FS min	float switch - pump control
ClO2	Chlorine dioxide Generator
VFD	Variable Frequency Drive
MM	Magmeter
	Ball valve
	Check valve
AV	Actuated valve
	Metering pump (chemical)
P	Transfer/booster pump

All calculations are based on the assumption that:
- water consumption is estimated around 120 m^3/day
- plant production capacity is 12 m^3/h
- water production cycle for above consumption is about 10 hrs/day

NO TO SCALE

PROJECT DESCRIPTION	PAGE DESCRIPTION	DRAWING	PAGE	
Monarch Colony Canada WTP	PID-plumbing Sketch	BY: J. Garcia DATE: Aug. 23, 2023 REV: 2.0.3	THIS: 1 PREV: NONE NEXT: NONE	OSORNO 976 Elgin Ave. Winnipeg MB, R3E 1B4