TOWN OF LAKE COWICHAN WATER TREATMENT PLANT

April 2021 Operations Performance Report

Permit to Operate

Operated water treatment plant under Operate Permit dated September 21, 2020.

April Highlights

- Lake turnover event
  - Water temperature increased 4 degrees from 9°C to 13°C.
  - Turbidity of raw water fell from ~0.50 NTU mid-month to ~0.30 NTU by end of month.
  - Water pH:
    - Beginning of month ~7.1 with soda ash pH adjustment
    - Mid-month of ~7.5 with reduced pH adjustment
    - End-month ~7.5 without pH adjustment
  - Chlorine demand increased to 1.50 mg/L from 1.30 mg/L in order to maintain targeted 0.80 mg/L at reservoir outlet.
- Reservoir siding damaged during commissioning repaired April 9.
- Quarterly sampling conducted April 13.

Timeline

Friday, April 9 – Increased soda ash pump speeds to raise pH which was approaching 7.0. Floc tank pH responded rising to 7.4. Reduced soda ash to target 7.2. Contractor on-site to replace siding at rear of reservoir.

Tuesday, April 13 – Quarterly sampling (repeated because March results not received) for THM/HAA and monthly compliance. Soda ash pump speed reduced to bring down pH.

Thursday, April 15 – Terry onsite for generator maintenance.

Wednesday, April 21 – Flushed and cleaned reservoir chlorine analyzers.

Thursday, April 22 – Turned off soda ash system as pH had risen to 7.8. Spring lake turnover event believed to be occurring as in addition to reducing soda ash since earlier in the month, the chlorine dosage had increased from 1.30 to 1.50 mg/L to maintain the target 0.80 mg/L of free available chlorine at the reservoir outlet.

Monday, April 26 – Raw water and filter effluent turbidity analyzers flushed and cleaned.

Tuesday, April 27 – Hydrant flushing in the distribution system.

Performance Standards

The Operating Permit for the Town of Lake Cowichan Water System dated October 21, 2020 stipulates the following performance requirements:

PARAMETER	GUIDELINE
Turbidity	≤ 0.3 NTU in ≥ 95% of samples
	Never to exceed 1 NTU
Giardia and *Cryptosporidium*	2.5-Log (99.7%) removal coagulation, flocculation and filtration
	1-Log (90%) inactivation via UV
Viruses	1-Log (90%) removal coagulation, flocculation and filtration
	3-Log (99.9%) inactivation via UV
Free Available Chlorine	Sufficient for CT_{CALC} and not to exceed 4.0 mg/L
Trihalomethane (THM)	≤ 0.100 mg/L
Haloacetic Acid (HAA)	≤ 0.080 mg/L
Total Aluminum	≤ 0.1 mg/L
pH	Be between 7.0 and 10.5
Microcystin-LR	≤ 1.5 µg/L

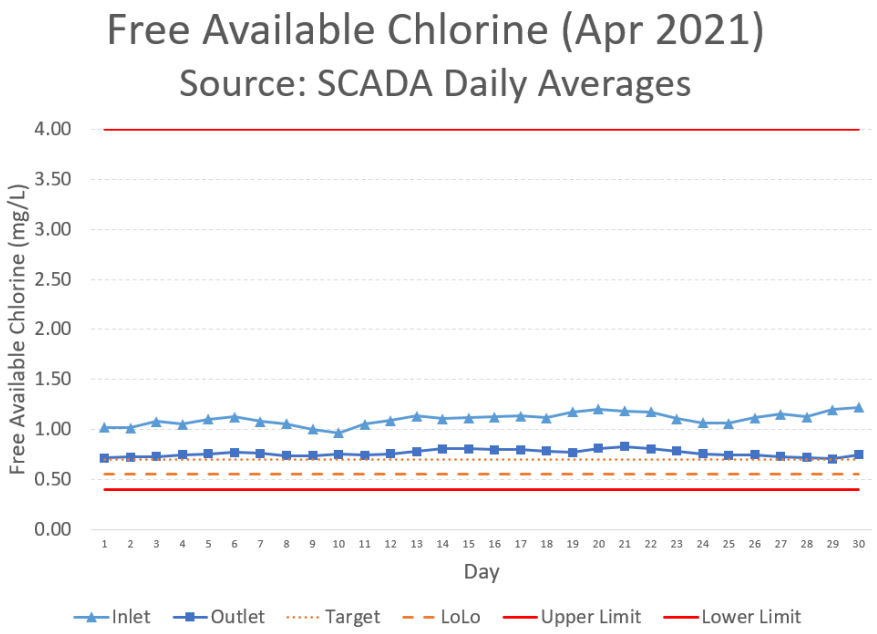
Jan 05, 2021	0.190	0.196	0.175	3.70	0.00	27.3	10.9
Jan 19, 2021	0.104	0.129	-	-	-	-	-
Feb 16, 2021	0.095	0.136	0.111	4.50	0.00	-	-
Mar 02, 2021	0.136	0.242	0.069	23.50	0.00	29.6	2.29
Mar 16, 2021	0.129	0.171	-	-	-	-	-
Mar 31, 2021	0.125	0.352	-	-	-	-	-
Apr 13, 2021	0.130	0.255	0.011	8.00	0.00	<0.100	<0.100

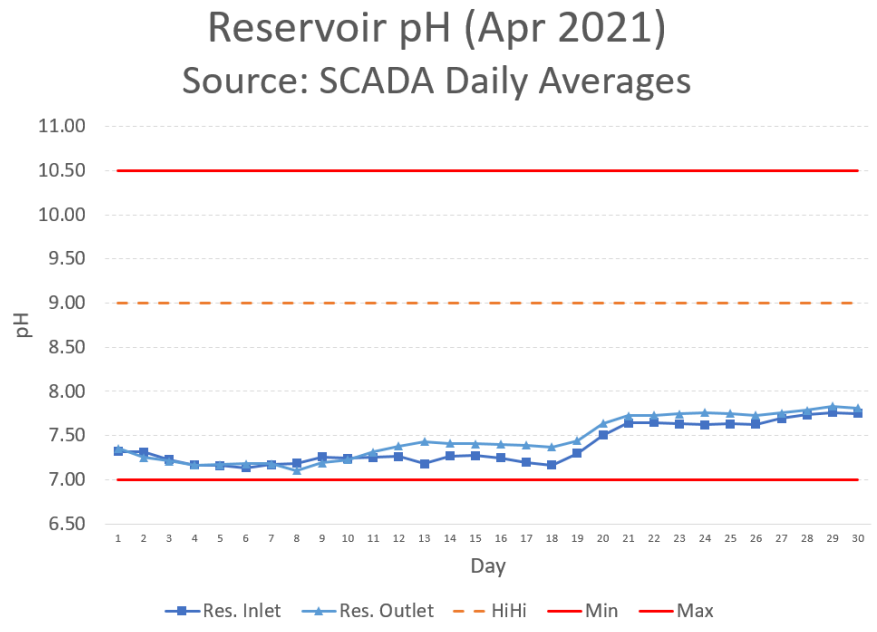
Discussion on Aluminum

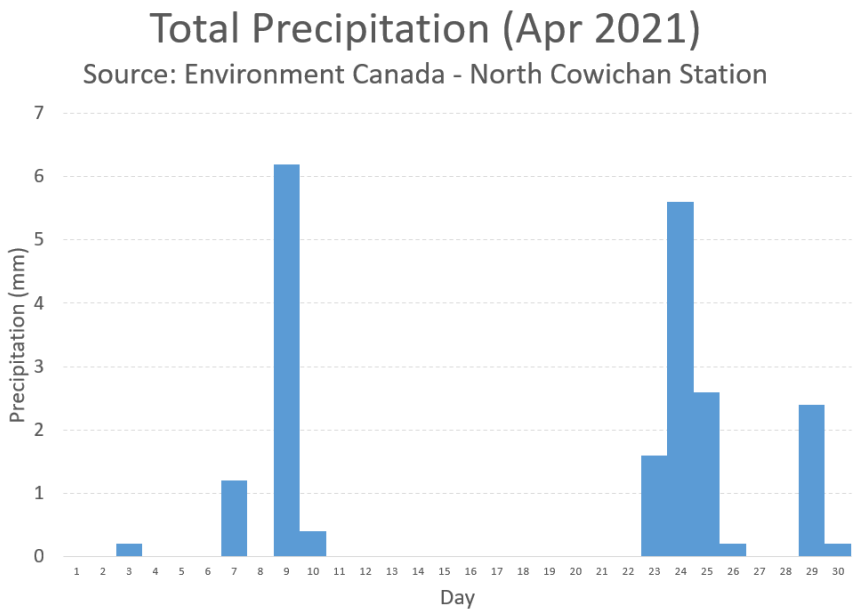
Aluminum results are above the maximum operating guideline (OG) as stipulated in the Operating Permit. The coagulant used in the Town of Lake Cowichan water treatment plant is polyaluminum chloride (PAC) which uses aluminum as the positive charge in the coagulation process to achieve low turbidity.

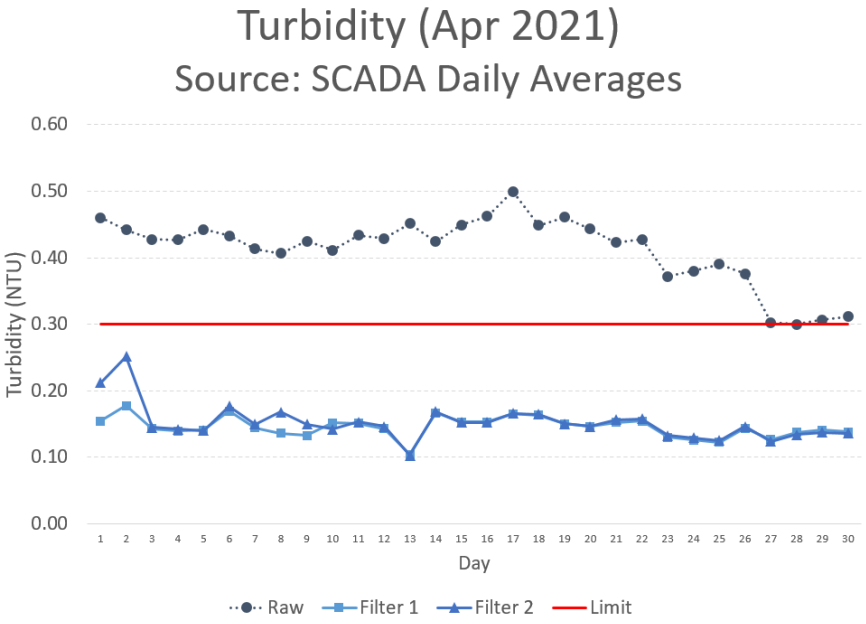
Zeta potential tests are used to maintain coagulation dosages at the low end of the effective curve. For the month of April a zeta potential of -16 mV was targeted. Attempts for lower zeta potential result in higher turbidity.

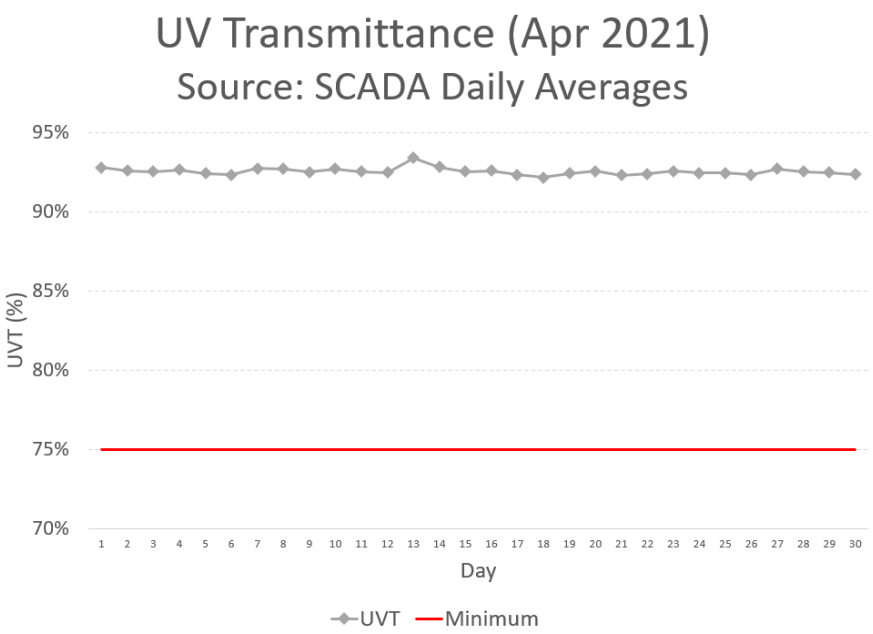
Individual Parameter Charts

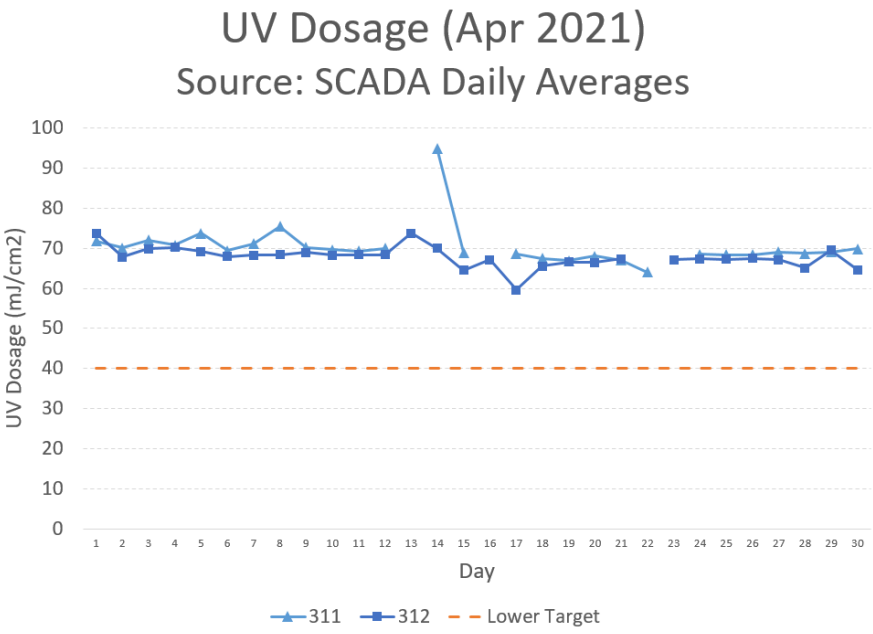





Total Precipitation (Apr 2021)
Source: Environment Canada - North Cowichan Station
Precipitation (mm)
0
1
2
3
4
5
6
7
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Day


Turbidity (Apr 2021)
Source: SCADA Daily Averages
Turbidity (NTU)
0.00
0.10
0.20
0.30
0.40
0.50
0.60
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Day
Raw
Filter 1
Filter 2
Limit


UV Transmittance (Apr 2021)
Source: SCADA Daily Averages
95%
90%
85%
80%
75%
70%
UVT (%)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Day
UVT
Minimum


UV Dosage (Apr 2021)
Source: SCADA Daily Averages
100
90
80
70
60
50
40
30
20
10
0
UV Dosage (mJ/cm2)
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30
Day
311
312
Lower Target