

MONTHLY OPERATION REPORT OF THE CITY OF BENTON HARBOR WATER FILTRATION PLANT
SUPPLY NAME: CITY OF BENTON HARBOR | WSSN: 0600

For the month/year of
March 2022

County:
Berrien

Abul D. Ahmed
 Certified Operator

F-1
 Water Plant Classification

Abul D. Ahmed
 Signature

Operator-in-Charge
 Title

Treatment Rate and Filter Data

1. Maximum Treatment Rate	<u>5.090</u>	million gallons per day
2. Approved Rated Plant Capacity	<u>8</u>	million gallons per day
3. Average Filter Run	<u>94.6</u>	hours
4. Average Filtration Rate	<u>0.43</u>	gallons per square ft. per minute
5. Maximum Filtration Rate	<u>2.11</u>	gallons per square ft. per minute
6. Average Wash Water Use	<u>0.01</u>	percent of treated water

Chemical Data

7. Chlorine on hand	<u>70639</u> lbs.	Est. Supply	<u>268</u> days
8. Alum (Al ³⁺) on hand	<u>74267</u> lbs.	Est. Supply	<u>251</u> days
9. Cost of All Chemicals	<u>158.35</u>	dollars per million gallons	
10. Total Power Cost	<u>0.00</u>	dollars per million gallons	

Remarks

	North Filter	South Filter
Number of filter confluence samples >0.3 NTU	<u>0</u>	<u>0</u>
Number of filter confluence samples collected	<u>81</u>	<u>93</u>
Percent of filter confluence samples >0.3 NTU	<u>0%</u>	<u>0%</u>
Number of filter confluence samples >1 NTU	<u>0</u>	<u>0</u>

Did any individual filter exceed:

- 1.0 NTU in two consecutive measurements taken 15 minutes apart? No
If yes, attach specific filter(s) information and indicate required follow up status.
- 0.5 NTU in two consecutive measurements taken 15 minutes apart after 4 hours of operation? No
If yes, attach specific filter(s) information and indicate required follow up status.
- 1.0 NTU in two consecutive measurements taken 15 minutes apart for 3 consecutive months? No
If yes, attach specific filter(s) information and indicate required follow up status.
- 2.0 NTU in two consecutive measurements taken 15 minutes apart for 2 consecutive months? No
If yes, attach specific filter(s) information and indicate required follow up status.
- Did plant tap disinfectant residual fall below 0.2 ppm during the month? No
If yes, indicate date(s) and duration on a separate sheet
- Was minimum C*T credit achieved for the entire month? Yes
If no, indicate on a separate sheet the date(s) not achieved
- Was continuous POE chlorine residual monitoring equipment off-line during the month? No
If yes, indicate date(s) and duration on a separate sheet
- Was continuous (every 15 minutes) filter monitoring equipment off-line during the month? No
If yes, indicate date(s) and duration on a separate sheet.

Distribution MGD

Total 30.506 **Average** 0.984 **Max** 1.199 **Min** 0.849

Comments

DATE	Million Gallons Treated	Alum Added lbs	Alum Applied as Product mg/L <i>NSF Max 400 mg/L</i>	Alum as Al ³⁺ mg/L	Turbidity Units														
					Raw			Applied	North Filter			South Filter			No. of 2 hr Compliance periods	No. of 4 hr Compliance periods >0.3 NTU	No. of samples >0.3 NTU	Plant Tap	
					Number of Samples	Avg.	Max.	Avg.	Number of Samples	Avg.	Max.	Number of Samples	Avg.	Max.				Avg.	Max.
1	1.099	317	34.6	1.52	3	4.80	5.90	1.40	3	0.11	0.12	3	0.11	0.13	6	0	0	0.16	0.17
2	1.055	482	54.7	2.40	3	5.50	7.50	0.91	3	0.12	0.15	3	0.10	0.12	6	0	0	0.12	0.13
3	1.080	469	52.0	2.29	3	6.00	8.40	1.10	3	0.11	0.12	3	0.13	0.16	6	0	0	0.09	0.11
4	0.914	354	46.4	2.04	3	4.20	4.60	0.67	3	0.08	0.08	3	0.08	0.11	6	0	0	0.12	0.15
5	1.040	381	43.9	1.93	3	4.10	6.40	0.70	3	0.12	0.12	3	0.12	0.14	6	0	0	0.10	0.11
6	0.992	309	37.3	1.64	3	7.20	8.40	0.91	3	0.09	0.11	3	0.09	0.10	6	0	0	0.10	0.10
7	0.913	293	38.4	1.69	3	4.30	6.70	0.68	3	0.11	0.11	3	0.09	0.11	6	0	0	0.10	0.11
8	1.067	328	36.9	1.62	3	6.00	6.60	0.65	3	0.08	0.10	3	0.09	0.11	6	0	0	0.09	0.09
9	1.047	324	37.1	1.63	3	5.40	9.90	0.92	3	0.09	0.11	3	0.11	0.13	6	0	0	0.09	0.10
10	1.047	330	37.8	1.66	3	3.40	4.20	0.63	3	0.09	0.10	3	0.10	0.11	6	0	0	0.09	0.09
11	1.023	323	37.8	1.66	3	4.80	5.40	0.50	3	0.10	0.11	3	0.10	0.11	6	0	0	0.10	0.10
12	1.090	349	38.4	1.68	3	3.80	7.40	0.56	3	0.10	0.11	3	0.10	0.12	6	0	0	0.08	0.09
13	1.182	360	36.5	1.60	3	6.40	7.50	0.70	3	0.09	0.09	3	0.11	0.11	6	0	0	0.09	0.10
14	1.104	343	37.2	1.63	3	4.60	8.00	0.93				3	0.08	0.09	3	0	0	0.08	0.08
15	1.077	346	38.5	1.69	3	4.20	7.20	0.63				3	0.07	0.08	3	0	0	0.09	0.10
16	0.925	300	38.9	1.71	3	3.10	5.20	0.72				3	0.09	0.12	3	0	0	0.10	0.11
17	1.167	257	26.4	1.16	3	3.40	5.80	0.50				3	0.10	0.13	3	0	0	0.10	0.12
18	1.248	337	32.4	1.42	3	4.60	7.10	1.00	3	0.10	0.11	3	0.10	0.11	6	0	0	0.10	0.11
19	0.978	237	29.0	1.28	3	4.30	6.90	0.71	3	0.10	0.11	3	0.09	0.10	6	0	0	0.11	0.11
20	0.916	210	27.5	1.21	3	4.10	4.50	0.79	3	0.10	0.13	3	0.10	0.12	6	0	0	0.10	0.11
21	1.027	248	28.9	1.27	3	3.70	4.90	0.89	3	0.11	0.11	3	0.09	0.10	6	0	0	0.10	0.10
22	0.954	231	29.0	1.27	3	2.60	3.90	0.71	3	0.09	0.10	3	0.11	0.12	6	0	0	0.10	0.11
23	1.098	244	26.6	1.17	3	2.10	2.90	0.54	3	0.09	0.10	3	0.11	0.12	6	0	0	0.09	0.10
24	1.157	261	27.0	1.19	3	3.50	4.50	0.56	3	0.09	0.12	3	0.09	0.11	6	0	0	0.09	0.10
25	1.183	263	26.7	1.17	3	3.30	3.50	0.68	3	0.11	0.12	3	0.11	0.12	6	0	0	0.09	0.11
26	0.848	223	31.5	1.38	3	6.80	7.20	0.74	3	0.09	0.09	3	0.11	0.11	6	0	0	0.09	0.10
27	1.205	308	30.6	1.34	3	5.40	7.50	0.75	3	0.10	0.12	3	0.11	0.11	6	0	0	0.13	0.14
28	1.024	272	31.8	1.40	3	4.90	5.80	0.60	3	0.13	0.20	3	0.09	0.10	6	0	0	0.11	0.15
29	0.992	266	32.1	1.41	3	4.90	6.30	0.89	3	0.09	0.10	3	0.10	0.10	6	0	0	0.09	0.10
30	0.964	262	32.6	1.43	3	4.60	5.20	0.67	3	0.09	0.10	3	0.09	0.11	6	0	0	0.09	0.09
31	0.959	257	32.1	1.41	3	5.90	7.70	1.02	3	0.11	0.12	3	0.11	0.12	6	0	0	0.1	0.12
AVG	1.044			1.54	3	4.58		0.76		0.10			0.10					0.10	0.11
MAX	1.248			2.40	3	7.20	9.90	1.40		0.13	0.2		0.13	0.16				0.16	0.17
MIN	0.848			1.16	3	2.10		0.50		0.08			0.07					0.08	0.08
TOTAL	32.373	9484			93											0	0		

Date	pH		Total Hardness as CaCO ₃ mg/L		Total Alkalinity as CaCO ₃ mg/L		Non-Carb. Hardness as CaCO ₃ mg/L		Calcium as Ca ⁺⁺ mg/L		Magnesium as Mg ⁺⁺ mg/L		Chloride as Cl ⁻ mg/L		Conductivity umhos	Sulfate mg/L	CSMR
	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Raw	Tap	Tap	Tap	Tap
1	7.9	7.5	206	196	131	124	75	72	49	46	18	17		23	413	38	0.61
2	7.9	7.5	198	188	134	124	64	64	51	45	16	16		25	406	33	0.76
3	7.9	7.7	192	182	130	122	62	60	46	45	15	15		27	392	39	0.68
4	7.8	7.7	170	196	125	120	45	76	41	51	11	18		25	397	35	0.71
5	7.9	7.8	196	184	127	118	69	66	48	43	17	16		26	381	41	0.63
6	7.8	7.6	190	170	135	117	55	57	42	44	13	13		26	380	39	0.65
7	7.9	7.5	192	186	125	120	67	66	49	46	16	16		26	384	41	0.62
8	7.9	7.4	186	178	120	118	66	60	43	42	16	15		27	378	41	0.66
9	7.9	7.6	216	182	148	114	68	68	49	43	17	17		24	376	41	0.59
10	8.0	7.5	196	188	124	121	72	67	47	45	17	16		26	403	41	0.62
11	8.0	7.5	188	182	121	121	67	61	45	47	16	15		27	388	40	0.66
12	8.1	7.5	196	186	129	117	67	69	46	47	16	17		26	362	36	0.71
13	7.8	7.8	210	192	140	120	70	72	57	50	17	17		27	363	41	0.65
14	8.0	7.4	176	161	141	115	35	46	50	47	9	11		18	424	38	0.46
15	7.9	7.7	204	196	140	131	64	65	51	47	16	16		26	403	42	0.61
16	8.0	7.7	216	184	153	130	63	54	51	46	15	13		27	435	47	0.57
17	7.8	7.8	196	188	138	136	58	52	48	46	14	13		27	435	40	0.68
18	8.1	8.0	162	188	128	132	34	56	53	54	8	14		31	373	42	0.73
19	8.2	8.1	158	174	127	126	31	48	42	55	8	12		29	361	39	0.73
20	8.3	8.1	204	168	159	124	45	44	62	51	11	11		28	362	39	0.71
21	8.3	7.9	218	164	159	120	59	44	59	51	14	11	27	28	381	40	0.70
22	8.2	7.9	192	174	139	132	53	42	51	54	13	10		31	398	39	0.78
23	8.1	8.0	164	186	131	133	43	53	46	52	8	13		30	405	41	0.73
24	8.2	8.0	182	170	131	126	51	44	55	59	12	11		31	349	40	0.76
25	8.1	7.9	186	172	139	119	47	53	59	67	11	13		27	342	39	0.69
26	8.0	7.6	226	192	160	123	66	69	57	50	16	17		27	401	36	0.74
27	7.9	7.7	206	192	150	129	56	63	47	46	14	15					
28	7.7	7.5	196	206	122	136	74	70	42	54	18	17		28	443	35	0.80
29	8.0	7.9	158	176	115	128	43	48	50	55	10	12	26	28	307	39	0.72
30	8.0	8.0	154	164	129	119	25	45	45	46	6	11		28	379	41	0.68
31	8.0	7.9	164	158	122	114	42	44	44	46	10	11		29	350	41	0.71

AVG	8.0	7.7	190	181	135	124	56	58	49	49	14	14	26	27	386	39.4667	0.68
MAX	8.3	8.1	226	206	160	136	75	76	62	67	18	18	27	31	443	47	0.80
MIN	7.7	7.4	154	158	115	114	25	42	41	42	6	10	26	18	307	33	0.46

Date	Number of Samples	Colilert P/A	Heterotrophic Plate Count - CFU/mL		Temperature °C	
	Tap		Tap	Raw	Tap	Raw
1	1	A	92	0	4.2	3.0
2	1	A	179	0	3.5	4.0
3	1	A	117	0	3.2	3.5
4	1	A	59	0	3.0	3.5
5	1	A	47	0	2.8	3.5
6	1	A	313	0	4.2	3.5
7	1	A	102	0	4.0	4.0
8	1	A	72	0	3.7	4.0
9	1	A	64	0	4.5	4.0
10	1	A	79	0	4.5	4.5
11	1	A	61	0	3.7	4.5
12	1	A	36	0	4.1	4.5
13	1	A	81	0	3.8	4.0
14	1	A	62	0	4.7	4.0
15	1	A	55	1	4.0	4.0
16	1	A	78	0	4.3	4.5
17	1	A	38	0	4.7	4.5
18	1	A	78	0	4.0	6.0
19	1	A	23	0	4.5	5.0
20	1	A	107	0	6.0	5.5
21	1	A	97	0	6.0	6.0
22	1	A	74	0	6.0	6.0
23	1	A	83	0	6.0	6.0
24	1	A	44	1	6.0	6.0
25	1	A	36	0	7.0	7.0
26	1	A	43	0	7.8	7.0
27	1	A	105	0	6.5	7.0
28	1	A	64	2	5.8	7.5
29	1	A	24	0	6.5	7.5
30	1	A	23	0	5.0	7.0
31	1	A	137	0	5.0	6.0

AVG	1		80	0	4.8	5.1
MAX	1		313	2	7.8	7.5
MIN	1		23	0	2.8	3.0

Date	Free Chlorine Residual mg/L																	
	City Hall		Wolf Marine		Bait Shed		Sunny Spot		B&Z									
1																		
2	1.51		1.60		1.65		1.31		1.23									
3																		
4																		
5																		
6																		
7																		
8																		
9	1.29		1.28		1.34		0.51		0.91									
10																		
11																		
12																		
13																		
14																		
15																		
16	1.23		1.16		1.07		0.76		0.69									
17																		
18																		
19																		
20																		
21																		
22																		
23	1.31		1.38		1.32		0.66		1.00									
24																		
25																		
26																		
27																		
28																		
29																		
30	1.82		1.70		1.47		0.39		1.05									
31																		

DISTRIBUTION SAMPLES BACTERIOLOGICAL SUMMARY			
	AVG	MAX	MIN
Chlorine Residuals, mg/L	1.19	1.82	0.39
Total Number of routine distribution samples analyzed	25		
Total number of positive routine distribution samples	0		
Total number of routine distribution samples required	10		
Total number of check samples	0		
Total number of positive check samples	0		

Benton Harbor Water Treatment Plant
CT Calculations

Date	Peak	Segment 2 - Flocculation (2)				Segment 3 - Sedimentation (2)			
	Low Service Flow	In Use	Residual	pH	Temp.	In Use	Residual	pH	Temp.
	gpm	%	mg/L		C	%	mg/L		C
3/1/2022	2437	100	2.12	7.7	3.2	100	1.63	7.7	3.2
3/2/2022	2465	100	1.86	7.6	3.5	100	1.83	7.6	3.5
3/3/2022	2422	100	1.92	7.7	3.2	100	1.42	7.7	3.2
3/4/2022	2504	100	2.16	7.8	3.0	100	1.90	7.8	3.0
3/5/2022	2533	100	1.95	7.8	2.8	100	1.87	7.8	2.8
3/6/2022	2349	100	2.06	7.7	3.5	100	1.60	7.7	3.5
3/7/2022	2392	100	1.94	7.7	4.2	100	1.66	7.7	4.2
3/8/2022	2401	100	1.55	7.6	3.7	100	1.18	7.6	3.7
3/9/2022	2351	100	1.59	7.7	4.5	100	1.48	7.7	4.5
3/10/2022	2473	100	2.20	7.7	4.2	100	1.67	7.7	4.2
3/11/2022	2430	100	2.14	7.7	4.1	100	2.00	7.7	4.1
3/12/2022	2494	100	2.10	7.6	3.7	100	1.91	7.6	3.7
3/13/2022	2358	100	1.60	7.8	3.8	100	1.60	7.8	3.8
3/14/2022	2365	100	2.34	7.6	4.7	100	0.97	7.6	4.7
3/15/2022	2463	100	2.50	7.7	4.0	100	1.94	7.7	4.0
3/16/2022	2410	100	1.54	7.9	4.3	100	1.42	7.9	4.3
3/17/2022	3494	100	1.78	7.7	4.7	100	1.17	7.7	4.7
3/18/2022	3535	100	2.56	8.1	4.0	100	1.78	8.1	4.0
3/19/2022	2391	100	1.80	8.1	4.5	100	1.95	8.1	4.5
3/20/2022	2397	100	1.75	8.2	6.0	100	1.75	8.2	6.0
3/21/2022	2350	100	1.59	8.1	6.0	100	1.08	8.1	6.0
3/22/2022	2375	100	2.22	8.0	6.0	100	1.36	8.0	6.0
3/23/2022	2579	100	2.14	8.0	6.0	100	1.84	8.0	6.0
3/24/2022	2650	100	2.39	8.1	6.0	100	2.01	8.1	6.0
3/25/2022	2533	100	1.83	8.0	7.0	100	1.78	8.0	7.0
3/26/2022	2429	100	2.03	7.8	7.8	100	1.38	7.8	7.8
3/27/2022	2738	100	2.60	7.8	6.0	100	1.53	7.8	6.0
3/28/2022	2947	100	2.56	7.6	5.8	100	2.12	7.6	5.8
3/29/2022	2419	100	2.92	7.9	5.5	100	2.84	7.9	5.5
3/30/2022	2411	100	2.48	8.0	5.0	100	2.43	8.0	5.0
3/31/2022	2408	100	2.43	7.9	5.0	100	1.85	7.9	5.0

Benton Harbor Water Treatment Plant
CT Calculations

Date	Seg2 CT-M	Seg2 CT-R	Seg2 Ratio	Seg3 CT-M	Seg3 CT-R	Seg3 Ratio	Total Ratio	Total Inact.
	mg/L-min	mg/L-min	M/R	mg/L-min	mg/L-min	M/R	M/R	Log
3/1/2022	205	43	4.7	54	42	1.3	6.0	3.0
3/2/2022	178	40	4.4	60	40	1.5	5.9	3.0
3/3/2022	187	43	4.4	47	41	1.2	5.5	2.8
3/4/2022	203	45	4.5	61	45	1.4	5.8	2.9
3/5/2022	181	46	4.0	60	45	1.3	5.3	2.6
3/6/2022	207	42	4.9	55	41	1.3	6.2	3.1
3/7/2022	191	40	4.8	56	39	1.4	6.2	3.1
3/8/2022	152	39	3.9	40	37	1.1	5.0	2.5
3/9/2022	159	38	4.2	51	38	1.4	5.5	2.8
3/10/2022	210	41	5.1	55	39	1.4	6.5	3.3
3/11/2022	208	41	5.1	66	40	1.6	6.7	3.4
3/12/2022	198	40	4.9	62	40	1.5	6.5	3.2
3/13/2022	160	41	3.9	55	41	1.3	5.2	2.6
3/14/2022	233	39	6.0	33	34	1.0	7.0	3.5
3/15/2022	239	42	5.7	64	41	1.6	7.2	3.6
3/16/2022	151	41	3.7	48	41	1.2	4.8	2.4
3/17/2022	120	38	3.1	27	36	0.8	3.9	1.9
3/18/2022	171	48	3.5	41	46	0.9	4.4	2.2
3/19/2022	177	44	4.0	66	45	1.5	5.5	2.7
3/20/2022	172	41	4.2	59	41	1.4	5.6	2.8
3/21/2022	159	39	4.1	37	37	1.0	5.1	2.5
3/22/2022	220	40	5.5	46	37	1.2	6.8	3.4
3/23/2022	196	40	4.9	58	39	1.5	6.4	3.2
3/24/2022	213	42	5.1	61	41	1.5	6.6	3.3
3/25/2022	170	36	4.7	57	36	1.6	6.3	3.1
3/26/2022	197	33	6.1	46	31	1.5	7.6	3.8
3/27/2022	224	38	5.9	45	35	1.3	7.1	3.6
3/28/2022	205	36	5.7	58	35	1.7	7.3	3.7
3/29/2022	284	42	6.8	95	41	2.3	9.1	4.6
3/30/2022	242	44	5.6	81	43	1.9	7.4	3.7
3/31/2022	238	42	5.7	62	40	1.5	7.2	3.6

Date	Filter Number											
	1	2	3	4	5	6	7	8	9	10	11	12
1					0.08	0.07	0.17	0.13			0.12	0.07
2					0.05	0.05					0.05	0.03
3					0.06	0.03					0.06	0.03
4					0.19	0.04	0.08	0.05			0.12	0.03
5					0.05	0.04	0.04	0.04				
6					0.06	0.04	0.05	0.05				
7					0.07	0.04	0.04	0.04			0.05	0.03
8					0.04	0.04	0.04	0.04				0.04
9					0.04	0.04					0.05	0.03
10					0.03	0.03					0.12	0.12
11					0.03	0.04					0.03	0.03
12					0.03	0.03					0.03	0.03
13					0.05	0.03	0.05	0.05			0.04	0.04
14							0.05	0.05			0.04	0.03
15							0.05	0.05			0.05	0.05
16							0.05	0.04			0.03	0.03
17					0.03	0.04					0.04	0.14
18					0.04	0.06	0.04				0.07	0.10
19					0.04	0.04	0.04	0.03				
20					0.03	0.04	0.04	0.03				
21					0.03	0.04	0.05	0.04				
22					0.04	0.04	0.09	0.03				
23					0.03	0.03	0.05	0.03				
24					0.03	0.03	0.04	0.03			0.04	0.04
25					0.03	0.03					0.03	0.03
26					0.03	0.03					0.03	0.03
27					0.03	0.02					0.04	0.04
28					0.03	0.03					0.03	0.03
29					0.02	0.02					0.03	0.03
30					0.02	0.03					0.03	0.03
31					0.03	0.03					0.03	0.03
MAX					0.19	0.07	0.17	0.13	0	0	0.12	0.14

ENTRY POINT TO THE DISTRIBUTION SYSTEM WQP

Daily Excursions	Jan.	Feb.	Mar.	Apr.	May	Jun.	Total	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
pH	0	1	0				1							0
Ortho-phosphate	0	0	0				0							0
# Days with Excursions (9 days allowed per 6 months)	0	1	0				1							0

EPTDS WQP Range

pH minimum of 7.2 s.u.
Ortho-phosphate minimum of 3.0 mg/L as PO₄

DISTRIBUTION WQP 10 Samples Quarterly

Daily excursions	Jan.	Feb.	Mar.	Apr.	May	Jun.	Total	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total
pH	0	0	0				0							0
Ortho-phosphate	1	0	0				1							0
# Days with Excursions (9 days allowed per 6 months)	1	0	0				1							0

Distribution WQP Range

pH minimum of 7.2 s.u.
Ortho-phosphate minimum of 3.0 mg/L as PO₄