11 April 2022

Mr. Scott Sokolowski
Remedial Project Manager
Naval Facilities Engineering Systems Command, Mid-Atlantic
9324 Virginia Avenue, Building Z-144
Norfolk, VA 23511-3095

Subject: **March 2022 Monthly Operating Report**
Full Scale Liquid-Phase Granular Activated Carbon Treatment System
Liberty New York Water, Seamans Neck Road Water Plant
NWIRP Bethpage, New York
Contract No. N40085-16-D-2288, Task Order N4008518F5125

Dear Mr. Sokolowski,

The Full Scale Liquid-Phase Granulated Activated Carbon (GAC) Treatment System is located at the Liberty New York Water (LNYW), Seamans Neck Road Water Treatment Plant in Levittown, NY. The GAC System was installed at the effluent of the potable water treatment plant and consists of six GAC vessels operating in parallel to remove low levels of trichloroethene (TCE) from Well No. 3S and Well No. 4S. After processing through the GAC units, the water is treated with sodium hypochlorite and sodium tripolyphosphate before distribution. Startup of the GAC Treatment System occurred on 8 January 2015 by CH2MHill. KOMAN Government Solutions, LLC (KGS) began operation and maintenance (O&M) activities in March 2015.

In May 2018, production Well No. 3S was decommissioned and has been replaced with a new production well designated as Well No. 3A. Well No. 4S is normally in operation during the entire month, while well No. 3A is operated infrequently, typically during the periods of higher water demand.

This report documents the routine operation and maintenance of the GAC System performed during the month of March 2022. **Attachment 1** presents the field logs detailing system operating data as recorded during the month. These readings include flow rate and total flows of the overall GAC System and each GAC unit, pressures across the GAC System, effluent chlorine residual and pH values, chemical usage levels of sodium hypochlorite and sodium tripolyphosphate for each chemical tank, and chemical metering pump settings and pressures.

Electricity use is no longer monitored and recorded using the Leviton Series 2000 Multiple Meter Unit. Summary energy consumption reports will be provided separately to the Navy representative.

A summary of the system operating data recorded in March 2022 is presented below in **Table 1**.

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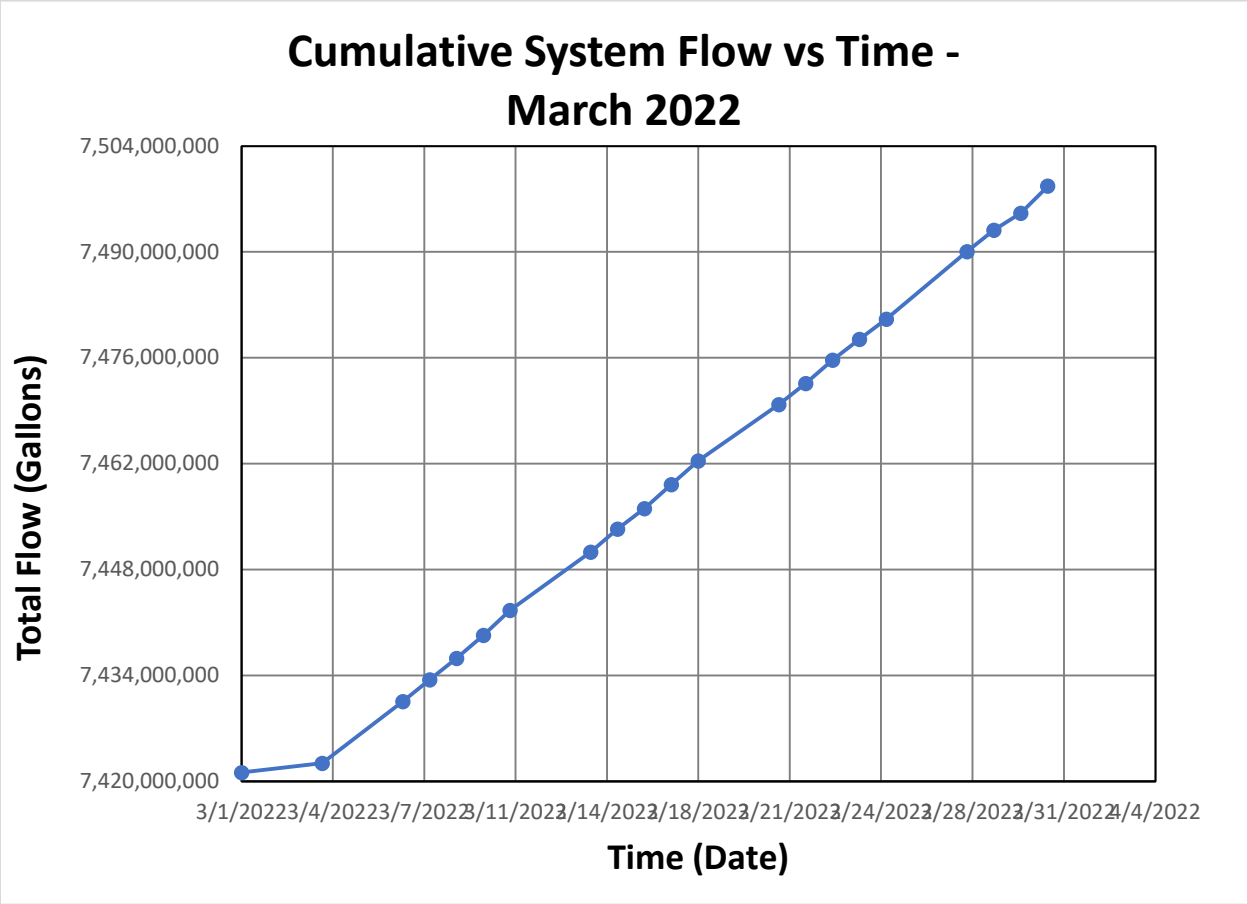
Table 1 - *System Operating Data for March 2022*

Date	Total Flow	Flow Rate	Influent Pressure	Effluent Pressure	Differential Pressure	Effluent Chlorine Residual	Effluent pH
	(Gallons)	(GPM)	(PSI)	(PSI)	(PSI)	(mg/L)[1]	(SU)[1]
3/1/2022	7,421,169,000	2,025	68	65	3.9	1.84 read 1.82 manual	6.80 read
3/2/2022	--	--	--	--	--	--	--
3/3/2022	--	--	--	--	--	--	--
3/4/2022	7,422,413,000	2,250	58	55	7.1	1.89 read 1.87 manual	6.70 read
3/7/2022	7,430,567,000	2,000	70	65	5.5	1.56 read 1.55 manual	7.00 read
3/8/2022	7,433,425,000	2,050	68	64	3.7	1.83 read 1.81 manual	6.80 read
3/9/2022	7,436,283,000	2,000	71	68	3.7	1.86 read 1.85 manual	7.00 read
3/10/2022	7,439,325,000	1,900	77	74	3.5	1.70 read 1.68 manual	6.95 read
3/11/2022	7,442,615,000	2,100	79	76	3.6	1.83 read 1.81 manual	6.95 read
3/14/2022	7,450,311,000	2,150	63	59	3.9	1.52 read 1.53 manual	6.75 read
3/15/2022	7,453,382,000	2,150	64	60	4.1	1.48 read 1.49 manual	6.90 read
3/16/2022	7,456,090,000	2,000	74	70	3.8	1.57 read 1.55 manual	6.90 read
3/17/2022	7,459,245,000	2,050	68	64	4.0	1.67 read 1.65 manual	6.90 read
3/18/2022	7,462,399,000	2,100	67	64	3.8	1.67 read 1.65 manual	6.90 read
3/21/2022	7,469,849,000	2,300	56	50	6.9	1.83 read 1.83 manual	6.60 read
3/22/2022	7,472,622,000	2,100	72	66	7.7	1.66 read 1.65 manual	6.70 read
3/23/2022	7,475,717,000	1,900	71	67	5.2	1.66 read 1.65 manual	6.60 read
3/24/2022	7,478,479,000	1,900	80	73	3.1	1.66 read 1.65 manual	1.65 read
3/25/2022	7,481,136,000	2,100	60	57	3.1	1.67 read 1.65 manual	6.80 read
3/28/2022	7,490,053,000	2,150	55	51	3.5	1.64 read 1.64 manual	6.75 read
3/29/2022	7,492,900,000	2,000	69	65	3.4	1.67 read 1.66 manual	6.60 read
3/30/2022	7,495,150,000	2,200	55	52	3.4	1.41 read 1.41 manual	6.80 read
3/31/2022	7,498,723,000	2,050	69	66	3.4	1.45 read 1.44 manual	6.80 read

(1) Effluent pH and chlorine residual readings are recorded by the in-line pH meter and chlorine analyzer. Chlorine is also checked with a manual chlorine residual meter for comparison, while manual pH is only checked occasionally. Both in-line and manual readings are presented, if collected, as noted above.

Figure 1, below, illustrates the volume of water treated by the GAC System since system startup, with the increment for the month of March 2022. Over 77.5 million gallons of water were treated in March 2022, bringing the total cumulative volume of water treated since startup to over 7.49 billion gallons.

Figure 1 - ***Volume of Water Treated through Full Scale GAC System (March 2022)***



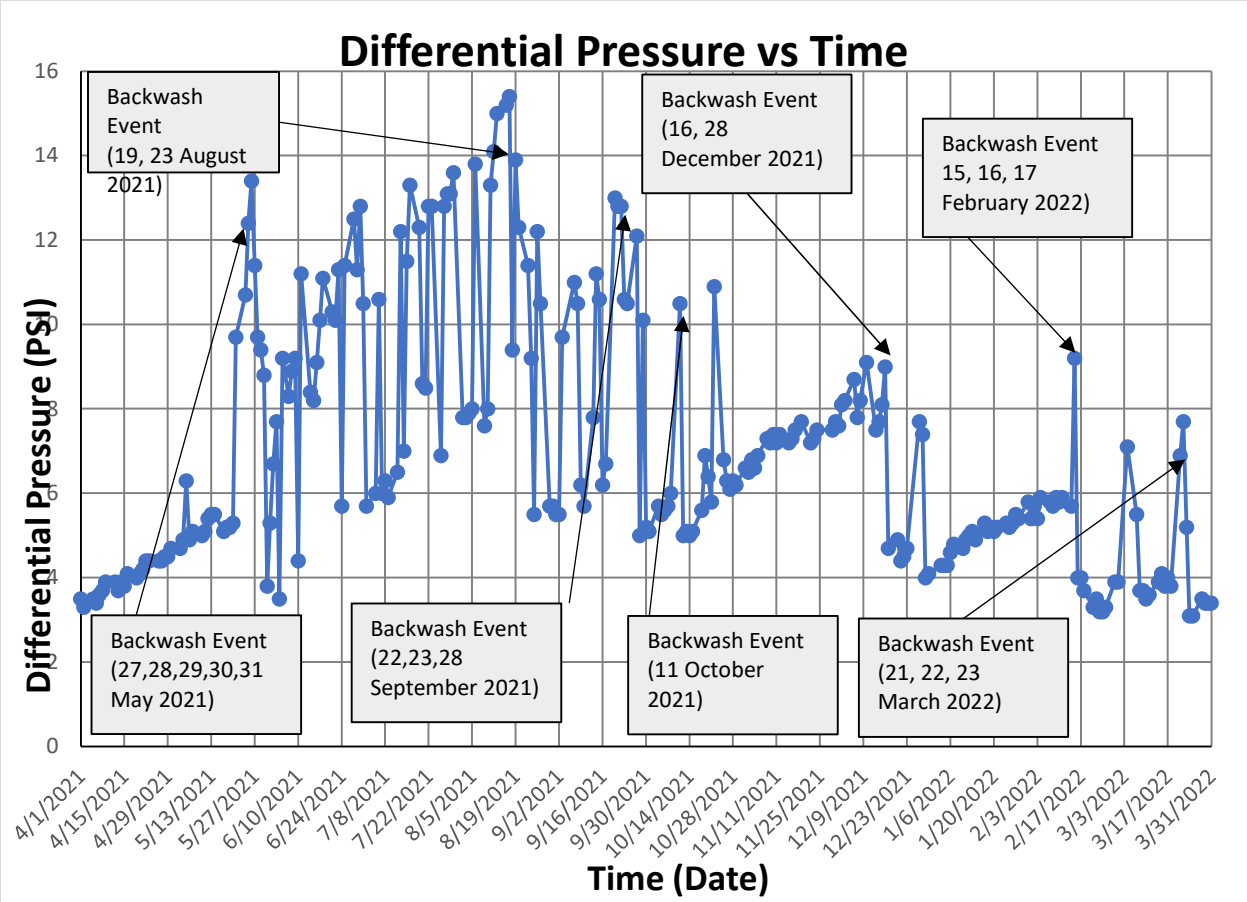
In general, differential pressure increases as the system continues to operate, and decreases after a backwashing event. The increasing trend then continues until the next backwashing event is performed. Also, lower differential pressures are observed during times of low water demand (e.g., typically over the winter months). **Figure 2,** below, depicts the pressure loss across the GAC System and subsequent backwashing dates, from April 2021 through the current reporting period.

Backwashing events during the summer and fall are performed more often because of the higher demand during that time of year. The exchange of carbon in each of the six GAC vessels with virgin coconut shell carbon was completed in August 2020 and the Seamans Neck Road facility is able to operate at full capacity. In support of the 2020 Fourth Quarter bacteria sampling conducted in December 2020, it was identified that each vessel required additional backwashing and/or flushing prior to returning to service to address a colored water issue attributable to the remobilization of iron-impacted materials released when flow through the vessels was stopped

for a mandatory 12-hour period prior to bacteria sampling, per NCDOH requirements. The additional backwashing/flushing events have been incorporated into the standard process for bacteria sampling.

The facility is operating at full design capacity and pressure loss across the overall GAC System is monitored regularly, and it is expected that backwashing events will occur on a periodic basis as needed. In addition, it is expected that backwashing of each vessel will be conducted following each quarterly bacteria sampling event to address potential colored water issues and to ensure the timely return to service for each vessel.

Figure 2 - S*ystem Differential Pressure vs. Time*



System Maintenance

Routine maintenance of the GAC System during this reporting period consisted of:

- General monitoring of the system flow rates, totalized flows, influent and effluent pressures, differential pressure, chlorine residual, and pH readings.
- Changing paper for the chlorine/pH chart recorder and flow/differential pressure chart recorder on a weekly basis.
- Calibration of the pH meter on a weekly basis.

- Periodic running of Well 3A in place of or concurrently with Well 4S had previously been initiated by NYAW; Well 3A operated in place of Well 4S on 21 March.

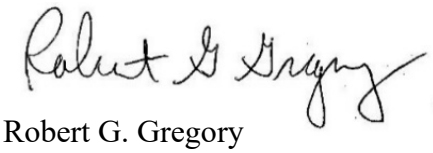
In addition, the following non-routine activities or operation issues occurred during the March 2022 reporting period:

- 1 March to 4 March - the plant was shut down to support AOP electrical work.
- 4 March - system backwashed prior to return to service.
- 21 March - GACs #1 and #2 were backwashed following the bacteria sampling event.
- 22 March - GACs #5 and #6 were backwashed following the bacteria sampling event.
- 23 March - GACs #3 and #4 were backwashed following the bacteria sampling event.
- 24 March - valves replaced on #3 and #4 influent piping.

Please contact me at 610-400-0636 or rgregory@komangs.com with any questions or concerns regarding this report.

Sincerely,

KOMAN Government Solutions, LLC



Robert G. Gregory
Project Manager

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R. Kern - LNYW
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R. Hoffmaster – KGS
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ATTACHMENT 1

O&M LOGS – MARCH 2022

Daily Readings
Granular Activated Carbon Treatment System

Description	Date	3.1.2022	3.2.2022	3.3.2022	3.4.2022	3.7.2022	3.8.2022
System Flow Rate	GPM	2025	O/C	O/C	2250	2000	2050
Total System Flow	Gallons	7505041	↓	↓	7506285	7514439	2517481
Well 3 Status	ON OR OFF	OFF			OFF	OFF	OFF
Well 4 Status	ON OR OFF	ON			ON	ON	ON
Tank 100 Flow Rate	GPM	250	O/C	O/C	450	350	250
Tank 200 Flow Rate	GPM	250	↓	↓	450	300	300
Tank 300 Flow Rate	GPM	350			O/C	350	400
Tank 400 Flow Rate	GPM	350			O/C	350	350
Tank 500 Flow Rate	GPM	350			500	350	350
Tank 600 Flow Rate	GPM	250			450	250	250
Tank 100 Total Flow	Gallons	27738,000	O/C	O/C	27874,000	29550,000	29797,000
Tank 200 Total Flow	Gallons	69748,000	↓	↓	69,875,000	71,433,000	71,711,000
Tank 300 Total Flow	Gallons	45271,000			45,271,000	45,774,000	46,287,000
Tank 400 Total Flow	Gallons	36850,000			36,850,000	37,384,000	37,802,000
Tank 500 Total Flow	Gallons	54741,000			54,914,000	56,958,000	57,473,000
Tank 600 Total Flow	Gallons	32,250,000			33,381,000	34,031,000	34,294,000
System Influent Pressure	PSI	68	O/C	O/C	58	70	68
System Effluent Pressure	PSI	65	↓	↓	55	65	64
System Differential Pressure	PSI	3.9			7.1	5.5	3.7
Chlorine Analyzer: Free Chlorine Residual - Inline	PPM	1.84	O/C	O/C	1.89	1.56	1.83
Effluent Water pH - Inline	Units	6.8	↓	↓	6.70	7.0	6.8
Manual Chlorine Reading (ex: Hach Kit)	PPM	1.82			1.87	1,55	1.81
Manual pH check (ex: Henna)	Units						

Daily Readings
Granular Activated Carbon Treatment System

Description	Date	3.1.2022	3.2.2022	3.3.2022	3.4.2022	3.7.2022	3.8.2022
Tank 909A Hypochlorite Level	Gallons	70	O/C	O/C	155	130	100
Tank 909B Hypochlorite Level	Gallons	100	↓	↓	155	120	120
Tank 909C Hypochlorite Level	Gallons	50	↓	↓	158	70	70
Tank 909A Polyphosphate Level	Gallons	140	↓	↓	137	115	95
Tank 909B Polyphosphate Level	Gallons	147	↓	↓	147	147	147
Metering Pump 909A: Hypochlorite Output Pressure	PSI		O/C	O/C			
Metering Pump 909B: Hypochlorite Output Pressure	PSI		↓	↓			
Metering Pump 909A: Phosphate Output Pressure	PSI		↓	↓			
Metering Pump 909B: Phosphate Output Pressure	PSI		↓	↓			
Metering Pump 909A: Stroke/Speed	Units		O/C	O/C			
Metering Pump 909B: Stroke/Speed	Units		↓	↓			
Metering Pump 909A: Stroke/Speed	Units		↓	↓			
Metering Pump 909B: Stroke/Speed	Units		↓	↓			
Generator Operating Hours	Hours		↓	↓			
Main Facility Electric Meter Reading							
Comments (additional tasks performed, maintenance needed, contractors on site, etc.)		Phos. Delv. Shut Down Plant for Elect. (Liberty)	Plant down for AOP elect.	Plant Down for AOP elect	Putting System back in Service / Backwashing		

Daily Readings
Granular Activated Carbon Treatment System

Description	Date	3.9.22	3.10.2022	3.11.2022	3.14.2022	3.15.2022	3.16.2022
System Flow Rate	GPM	2000	1900	2100	2150	2150	2000
Total System Flow	Gallons	7520155	7523197	7526487	7534183	7537254	7539962
Well 3 Status	ON OR OFF	OFF	OFF	OFF	OFF	OFF	OFF
Well 4 Status	ON OR OFF	ON	ON	ON	ON	ON	ON
Tank 100 Flow Rate	GPM	250	250	250	250	250	250
Tank 200 Flow Rate	GPM	250	225	250	250	250	225
Tank 300 Flow Rate	GPM	350	350	350	350	350	350
Tank 400 Flow Rate	GPM	350	300	350	350	350	350
Tank 500 Flow Rate	GPM	350	350	350	350	350	350
Tank 600 Flow Rate	GPM	250	250	250	250	300	250
Tank 100 Total Flow	Gallons	30,211,000	30/641,000	30/989.000	38,070,000	32,480,000	32,830,000
Tank 200 Total Flow	Gallons	72,103,000	72/585,000	72,812,000	74,050,000	74,457,000	74,804,000
Tank 300 Total Flow	Gallons	46,587,000	46,957,000	47,411,000	48,983,000	49,525,000	50,015,000
Tank 400 Total Flow	Gallons	38,007,000	38,483,000	38,607,000	40,361,000	40,903,000	41,328,000
Tank 500 Total Flow	Gallons	57,888,000	58,484,000	58,8[illegible],000	60,292,000	60,837,000	61,267,000
Tank 600 Total Flow	Gallons	34,528,000	35,729,000	35,928,000	36,742,000	37,173,000	37,537,000
System Influent Pressure	PSI	71	77	79	63	64	74
System Effluent Pressure	PSI	68	74	76	59	60	70
System Differential Pressure	PSI	3.7	3.5	3.6	3.9	4.1	3.8
Chlorine Analyzer: Free Chlorine Residual - Inline	PPM	1.86	1.70	1.83	1.52	1.48	1.57
Effluent Water pH - Inline	Units	7.0	6.95	6.95	6.95	6.90	6.9
Manual Chlorine Reading (ex: Hach Kit)	PPM	1.85	1.68	1.81	1.53	1.49	1.55
Manual pH check (ex: Hanna)	Units						

Daily Readings
Granular Activated Carbon Treatment System

Description	Date	3.9.2022	3.10.2022	3.11.2022	3.14.2022	3.15.2022	3.16.2022
Tank 909A Hypochlorite Level	Gallons	90	155	120	108	70	110
Tank 909B Hypochlorite Level	Gallons	100	155	155	155	155	130
Tank 909C Hypochlorite Level	Gallons	50	160	160	50	50	10
Tank 909A Polyphosphate Level	Gallons	48	31	150	114	95	75
Tank 909B Polyphosphate Level	Gallons	147	147	147	145	145	145
Metering Pump 909A: Hypochlorite Output Pressure	PSI						
Metering Pump 909B: Hypochlorite Output Pressure	PSI						
Metering Pump 909A: Phosphate Output Pressure	PSI						
Metering Pump 909B: Phosphate Output Pressure	PSI						
Metering Pump 909A: Stroke/Speed	Units						
Metering Pump 909B: Stroke/Speed	Units						
Metering Pump 909A: Stroke/Speed	Units						
Metering Pump 909B: Stroke/Speed	Units						
Generator Operating Hours	Hours						
Main Facility Electric Meter Reading							
Comments (additional tasks performed, maintenance needed, contractors on site, etc.)		Monthly Sampling	Cl Delv.	Phos. Delv.			

Daily Readings
Granular Activated Carbon Treatment System

Description	Date	3.17.2022	3.18.2022	3.21.2022	3.22.2022	5.23.2022	3.24.2022
System Flow Rate	GPM	2050	2100	2300	2100	1900	1900
Total System Flow	Gallons	7543117	7546271	7553721	7556494	7559589	7562351
Well 3 Status	ON OR OFF	OFF	OFF	ON	OFF	OFF	OFF
Well 4 Status	ON OR OFF	ON	ON	OFF	ON	ON	ON
Tank 100 Flow Rate	GPM	250	250	o/c	500	500	250
Tank 200 Flow Rate	GPM	250	300	o/c	450	450	250
Tank 300 Flow Rate	GPM	350	350	500	550	o/c	325
Tank 400 Flow Rate	GPM	350	350	500	500	o/c	350
Tank 500 Flow Rate	GPM	350	350	500	o/c	550	350
Tank 600 Flow Rate	GPM	250	250	500	o/c	450	250
Tank 100 Total Flow	Gallons	33,414,000	33,728,000	–	34,514,000	35,253,000	35,739,000
Tank 200 Total Flow	Gallons	75,098,000	75,392,000	–	76,528,000	77,162,000	77,610,000
Tank 300 Total Flow	Gallons	50,428,000	50,521,000	52,764,000	53,590,000	53,923,000	54,198,000
Tank 400 Total Flow	Gallons	41,723,000	42,178,000	43,936,000	44,582,000	44,939,000	45,172,000
Tank 500 Total Flow	Gallons	61,592,000	61,909,000	63,787,000	–	64,634,000	65,268,000
Tank 600 Total Flow	Gallons	37,866,000	38,092,000	39,588,000	–	40,241,000	40,778,000
System Influent Pressure	PSI	68	67	56	72	71	80
System Effluent Pressure	PSI	64	64	50	66	67	73
System Differential Pressure	PSI	4.6	3.8	6.9	7.7	5.2	3.1
Chlorine Analyzer: Free Chlorine Residual - Inline	PPM	1.67	1.67	1.83	1.66	1.66	1.66
Effluent Water pH - Inline	Units	6.90	6.90	6.6	6.7	6.6	6.7
Manual Chlorine Reading (ex: Hach Kit)	PPM	1.65	1.65	1.83	1.65	1.65	1.65
Manual pH check (ex: Henna)	Units						

Daily Readings
Granular Activated Carbon Treatment System

Description	Date	3.17.2022	3.18.2022	3.21.2022	3.22.2022	3.23.2022	3.24.2022
Tank 909A Hypochlorite Level	Gallons	155	125	151	120	80	145
Tank 909B Hypochlorite Level	Gallons	155	155	135	90	80	145
Tank 909C Hypochlorite Level	Gallons	155	155	25	25	25	141
Tank 909A Polyphosphate Level	Gallons	150	132	150	130	115	98
Tank 909B Polyphosphate Level	Gallons	145	145	88	88	88	88
Metering Pump 909A: Hypochlorite Output Pressure	PSI						
Metering Pump 909B: Hypochlorite Output Pressure	PSI						
Metering Pump 909A: Phosphate Output Pressure	PSI						
Metering Pump 909B: Phosphate Output Pressure	PSI						
Metering Pump 909A: Stroke/Speed	Units						
Metering Pump 909B: Stroke/Speed	Units						
Metering Pump 909A: Stroke/Speed	Units						
Metering Pump 909B: Stroke/Speed	Units						
Generator Operating Hours	Hours						
Main Facility Electric Meter Reading							
Comments (additional tasks performed, maintenance needed, contractors on site, etc.)		CL Delv. Phos. Delv		Bact. Sampling GAC's 1&2 Well 4 Backwashing	Bact. Sampling GAC #5 6 Well 3 Backwashing	Bact Sampling GAC 304 Backwashing	CL2 Delv. GAC's 304 In Service Valve on GAC #3 replaced / Valve on GAC #3 & #4 Inf. replaced

Daily Readings
Granular Activated Carbon Treatment System

Description	Date	3.25.2022	3.28.2022	3.29.2022	3.30.2022	3.31.2022	
System Flow Rate	GPM	2100	2150	2000	2200	2050	
Total System Flow	Gallons	7565008	7573925	7576772	7579022	7582595	
Well 3 Status	ON OR OFF	OFF	OFF	OFF	OFF	OFF	
Well 4 Status	ON OR OFF	ON	ON	ON	ON	ON	
Tank 100 Flow Rate	GPM	250	225	250	250	250	
Tank 200 Flow Rate	GPM	250	225	225	300	225	
Tank 300 Flow Rate	GPM	350	350	350	350	350	
Tank 400 Flow Rate	GPM	350	350	350	350	350	
Tank 500 Flow Rate	GPM	350	400	350	400	350	
Tank 600 Flow Rate	GPM	300	350	250	300	250	
Tank 100 Total Flow	Gallons	36,098,000	37,328,000	37,711,000	38,135,000	38,514,000	
Tank 200 Total Flow	Gallons	77,964,000	79,169,000	79,551,000	79,963,000	80,377,000	
Tank 300 Total Flow	Gallons	54,658,000	56,224,000	56,919,000	57,231,000	57,737,000	
Tank 400 Total Flow	Gallons	45,646,000	47,163,000	47,692,000	48,135,000	48,623,000	
Tank 500 Total Flow	Gallons	65,751,000	67,406,000	67,928,000	68,491,000	68,998,000	
Tank 600 Total Flow	Gallons	41,104,000	42,384,000	42,788,000	43,226,000	43,621,000	
System Influent Pressure	PSI	60	55	69	55	69	
System Effluent Pressure	PSI	57	51	65	52	66	
System Differential Pressure	PSI	3.1	3.5	3.4	3.4	3.4	
Chlorine Analyzer: Free Chlorine Residual - Inline	PPM	1.67	1.64	1.67	1.41	1.45	
Effluent Water pH - Inline	Units	6.80	6.75	6.60	6.80	6.80	
Manual Chlorine Reading (ex: Hach Kit)	PPM	1.65	1.64	1.66	1.41	1.44	
Manual pH check (ex: Hanna)	Units	—					

Daily Readings
Granular Activated Carbon Treatment System

Description	Date	3.25.2022	3.28.2022	3.29.2022	3.30.2022	3.31.2022	
Tank 908A Hypochlorite Level	Gallons	105	139	98	62	140	
Tank 908B Hypochlorite Level	Gallons	145	80	80	90	145	
Tank 908C Hypochlorite Level	Gallons	147	50	50	50	150	
Tank 909A Polyphosphate Level	Gallons	60	130	99	78	61	
Tank 909B Polyphosphate Level	Gallons	51	160	160	160	160	
Metering Pump 908A: Hypochlorite Output Pressure	PSI						
Metering Pump 908B: Hypochlorite Output Pressure	PSI						
Metering Pump 909A: Phosphate Output Pressure	PSI						
Metering Pump 909B: Phosphate Output Pressure	PSI						
Metering Pump 908A: Stroke/Speed	Units						
Metering Pump 908B: Stroke/Speed	Units						
Metering Pump 909A: Stroke/Speed	Units						
Metering Pump 909B: Stroke/Speed	Units						
Generator Operating Hours	Hours	173.4	173.4	173.4	173.4	173.4	
Main Facility Electric Meter Reading							
Comments (additional tasks performed, maintenance needed, contractors on site, etc.)			Phos. Dely.				