NAME OF WATER UTILITY CUMBERLAND UTILITY DISTRICT
NAME OF WATER TREATMENT PLANT
COUNTY ROANE PWSID# 531

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION
Divison of Water Supply
COMPREHENSIVE MONTHLY OPERATION REPORT

MONTH OF Brushy April 2024

PHYSICAL AND CHEMICAL CHARACTERISTICS (columns 4–33) — CHEMICALS USED (columns 34–48)

FINISHED WATER TURBIDITY MUST BE MEASURED EVERY 4 HOURS AND RECORDED

DATE	RAW WATER TREATED - 1,000 GALLONS	FINISHED PUMPED TO SYSTEM - 1,000 GALLONS	Raw Water Temperature °C	TURBIDITY: Raw	TURBIDITY: AM 12-4	AM 4-8	AM 8-12	PM 12-4	PM 4-8	PM 8-12	CHLORINE RESIDUAL MG/L: DISTRIBUTION SYSTEM	LOWEST PLANT EFFLUENT	ALKALINITY MG/L: TOTAL RAW	PHENOLPHTHALEIN FINISH	TOTAL FINISHED	Ph: RAW	Ph: FINISHED	HARDNESS MG/L: RAW	HARDNESS MG/L: FINISHED	PHOSPHATE MG/L: DISTRIBUTION SYSTEM	PHOSPHATE MG/L: FINISHED	IRON MG/L: RAW	IRON MG/L: FINISHED	MANGANESE MG/L: RAW	MANGANESE MG/L: FINISHED	Sodium Permanganate MG/L: RAW - NaMnO4	Sodium Permanganate MG/L: FINISHED	FLUORIDE MG/L: RAW	FLUORIDE MG/L: FINISHED	FLUORIDE MG/L: DISTRIBUTION SYSTEM	POUNDS PER 24 HOURS: COAGULANT - COAGULANT AID	DISINFECTION Sodium Hypochlorite	DISINFECTION PRE	pH ADJUSTMENT	FLUORIDE	TASTE AND ODOR - NaMnO4	MINERAL OXIDATION / SOFTENING Hydrogen Peroxide	STABILIZATION AND CORROSION CONTROL	CALCULATED DOSAGE: COAGULANT - COAGULANT AID	DISINFECTION	pH ADJUSTMENT	FLUORIDE	TASTE AND ODOR NaMnO4	MINERAL OXIDATION / SOFTENING HYDROGEN PEROXIDE	MG/L: STABILIZATION AND CORROSION CONTROL
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
1	229	210	14.5	1.2		0.05	0.04					1.51	64		68	7.39	7.58	60	62		0.98	0.14	0.05	0.041	0.000	0.49		0.25	0.84		71	69			4	10		5	37.18	2.36	0.00	0.42	1.04		0.57
2	297	265	14.8	1.3		0.05	0.05					1.55	69		66	7.33	7.49	60	64		0.78	0.18	0.01	0.029	0.000	0.61		0.39	0.64		71	63			4	10		4	28.66	1.71	0.00	0.33	0.82		0.36
3	293	206	14.9	1.0		0.05	0.05					1.30	69		72	7.35	7.52	60	64		0.84	0.12	0.00	0.044	0.003	0.55		0.35	0.73		70	73			3	10		4	28.65	2.55	0.00	0.32	1.06		0.32
4	434	421	14.7	1.1		0.05	0.05	0.05				2.03	66		70	7.35	7.55	60	61		0.78	0.14	0.01	0.036	0.008	0.46		0.29	0.61		104	97			6	13		6	28.73	1.66	0.00	0.31	0.67		0.33
5	217	195	15.0	1.2		0.05	0.04					1.68	68		68	7.39	7.56	59	60		0.65	0.14	0.04	0.034	0.008	0.44		0.29	0.58		53	46			3	7		3	29.29	1.70	0.00	0.34	0.78		0.33
6																																								0.00	0.00	0.00	0.00		0.00
7																																								0.00	0.00	0.00	0.00		0.00
8	289	222	14.9	0.9		0.06	0.05					1.50	71		68	7.52	7.58	62	60		0.80	0.14	0.00	0.050	0.007	0.44		0.55	0.78		70	63			4	9		5	29.04	2.04	0.00	0.39	0.89		0.41
9	120	89				0.05	0.05					1.49														0.36					29	26			1	4		2	28.98	2.10	0.00	0.25	0.98		0.40
10	229	218	14.3	0.9		0.05	0.05					2.60	71		68	7.49	7.59	62	60		0.91	0.17	0.02	0.038	0.005	0.52		0.32	0.77		56	47			3	8		3	29.32	1.55	0.00	0.30	0.80		0.31
11	233	226	15.7	0.9			0.06	0.05				1.97	62		65	7.63	7.34	64	60		0.76	0.08	0.04	0.039	0.010	0.58		0.28	0.44		63	62			4	9		4	32.42	1.97	0.00	0.39	0.87		0.41
12	176	124	15.1	0.9		0.06	0.06					1.91	67		72	7.01	7.47	59	64		0.66	0.12	0.00	0.049	0.008	0.45		0.12	0.44		43	42			2	5		3	29.29	2.44	0.00	0.35	0.88		0.40
13																																								0.00	0.00	0.00	0.00		0.00
14																																								0.00	0.00	0.00	0.00		0.00
15	297	249	14.8	1.3		0.07	0.07					0.75	65		71	7.21	7.52	62	62		0.75	0.10	0.00	0.066	0.014	0.46		0.18	0.69		4	61			8	10		4	1.61	1.76	0.00	0.70	0.88		0.32
16																																								0.00	0.00	0.00	0.00		0.00
17	301	202	15.6	1.7		0.07	0.07	0.06				1.58	67		71	7.36	7.56	63	59		0.82	0.28	0.00	0.053	0.006	0.48		0.22	0.33		73	60			3	11		5	29.08	2.14	0.00	0.32	1.19		0.39
18	124	70					0.07																			0.41					30	20			2	3		1	29.01	2.06	0.00	0.62	0.94		0.19
19							0.07					1.73						62	63		1.00	0.17	0.00	0.050	0.004	0.41					25	19			2	3		2		0.00	0.00	0.00	0.00		0.00
20																																								0.00	0.00	0.00	0.00		0.00
21																																								0.00	0.00	0.00	0.00		0.00
22	297	249	15.5	1.6		0.08	0.07					2.20	65		71	7.28	7.52	62	64		0.92	0.14	0.05	0.062	0.010	0.53		0.20	0.68		71	58			5	9		3	28.66	1.68	0.00	0.44	0.79		0.24
23	148	128					0.07					1.97														0.55					36	29			2	5		3	29.17	1.63	0.00	0.34	0.85		0.48
24	237	183	16.0	1.3			0.07					2.00	65		70	7.31	7.57	62	60		0.87	0.09	0.05	0.053	0.009	0.55		0.11	0.56			42			4	8		3	0.00	1.65	0.00	0.48	0.95		0.30
25	152	132				0.07	0.07					2.26														0.53					37	28			3	5		3	29.19	1.53	0.00	0.50	0.83		0.47
26	281	249	16.4	1.1		0.07						2.12	75		66	7.33	7.56	62	63		1.00	0.17	0.00	0.050	0.004	0.54		0.16	0.63		69	55			3	9		4	29.44	1.59	0.00	0.26	0.79		0.34
27																																								0.00	0.00	0.00	0.00		0.00
28																																								0.00	0.00	0.00	0.00		0.00
29			16.6	1.0				0.07				2.40	64		68	7.27	7.57	62	63		0.95	0.18	0.05	0.680	0.016	0.49		0.13	0.40		89	73			6	11		5		0.00	#####	0.00	0.00		0.00
30	265	245	17.0	1.1			0.05	0.05				2.28	72		66	7.33	7.60	64	62		0.89	0.21	0.01	0.055	0.017	0.63		0.05	0.44		65	52			2	9		4	29.41	1.53	0.00	0.18	0.80		0.36
31																																								0.00	0.00	0.00	0.00		0.00
TOTAL	4,619	3,883																													1,129	1,085	0	0	74	168	0	76							
AVE.	243	204	15.4	1.2		0.06	0.06	0.06				1.84	68		69	7.35	7.54	61	62		0.84	0.15	0.02	0.084	0.008	0.49		0.24	0.60		56	52			4			4	26.69	1.15	#####	0.23	0.54		0.22
MAX	434	421	17.0	1.7		0.08	0.07	0.07				2.60	75		72	7.63	7.60	64	64		1.00	0.28	0.05	0.680	0.017	0.63		0.55	0.84		104	97			8	13		6	37.18	2.55	#####	0.70	1.19		0.57
MIN.	120	70	14.3	0.9		0.05	0.04	0.05				0.75	62		65	7.01	7.34	59	59		0.65	0.08	0.00	0.029	0.000	0.36		0.05	0.33		4	19			1	3		1	0.00	0.00	#####	0.00	0.00		0.00

CHEMICAL USED		BRAND	ANALYSIS	COST PER LB.	COST PER MONTH
59	Polymer	Kemiron Atlantic	100.0%	$0.232	$576
35	Caustic Soda	Dycho	25.0%	$0.222	$0
34	Bleach	Dycho	6.0%	$0.317	$344
36	Fluoride	Dycho	18.2%	$0.460	$34
39	Phosphate	Dycho	19.8%	$1.570	$119
	Hydrogen Peroxide	Dycho	50.0%	$0.990	$0
37	Na Permanganate	Dycho	20.0%	$1.600	$269
					$1,342

Treatment Chemical Cost
$29.0608 per Million Gallons
$2.9061 per Thousand Gallons

CERTIFIED OPERATOR SIGNATURE

CERIFICATE NUMBER 18063

MONTH OF **Brushy April 2024**

DATE	RAW WATER TREATED - 1,000 GALLONS	JAR TEST DATA: COAGULANT MG/L	JAR TEST DATA: pH ADJUSTMENT MG/L	JAR TEST DATA: pH	JAR TEST DATA:	FILTER DATA: COMPLETE APPLICABLE BLANKS EACH MONTH.	FILTER OPERATION DATA: NUMBER OF FILTERS USED	FILTER HOURS = COL. 54 X HOURS RUN	AVERAGE LENGTH FILTER RUN - HOURS	RATE OF FLOW GAUGES WORKING	LOSS-OF-HEAD GAUGES WORKING	TURBIDIMETERS WORKING	BACKWASH RATE gpm/ft2	BACKWASH WATER USED - 1,000 gallons	Filters Washed	DISINFECTION AND CT VALUES: FIRST DISINFECTION SEQUENCE: FREE CHLORINE END OF SEQUENCE C	CONTACT TIME IN MINUTES T	END OF SEQUENCE pH	CALCULATED CT	REQUIRED CT	SECOND DISINFECTION SEQUENCE: FREE CHLORINE END OF SEQUENCE C	CONTACT TIME IN MINUTES T	END OF SEQUENCE pH	CALCULATED CT	REQUIRED CT	CT CALC or REQ TOTAL INACTIVATION RATIO	MICROBIOLOGICAL EXAMINATION AND SYSTEM PRESSURE: RAW	PLANT EFFLUENT	DISTRIBUTION SYSTEM	FREE CHLORINE MG/L AT POINT OF SAMPLING & DISTRIBUTION SYSTEM	STATIC PRESSURE psi	Location of sampling point in distribution system. **Must vary with system.**
47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	
1	229						6	43.2	7.2	Y	Y	Y	18								1.51	21.7	7.58	32.8	8	4.10						
2	297					(a) Type of Filter -- Gravity (X)	6	44.4	7.4	Y	Y	Y	18								1.55	21.7	7.49	33.6	8	4.20						
3	293					Pressure ( )	6	43.8	7.3	Y	Y	Y	18								1.30	21.7	7.52	28.2	8	3.53						
4	434						6	64.8	10.8	Y	Y	Y	18								2.03	21.7	7.55	44.1	8	5.51						
5	217					(b) Number of Filters -	6	32.4	5.4	Y	Y	Y	18								1.68	21.7	7.56	36.5	8	4.56						
6							6			Y	Y	Y	18												8	#######						
7						© Filter Area - Sq. Ft. (Each)	6			Y	Y	Y	18												8	#######						
8	289						6	43.2	7.2	Y	Y	Y	18								1.50	21.7	7.58	32.6	8	4.07						
9	120					(d) Filter Area - Sq. Ft. (Each)	6	18.0	3.0	Y	Y	Y	18								1.49	21.7		32.3	8	4.04						
10	229						6	34.2	5.7	Y	Y	Y	18								2.60	21.7	7.59	56.4	8	7.05						
11	233					(e) Total Area - Sq. Ft. -	6	34.8	5.8	Y	Y	Y	18								1.97	21.7	7.34	42.7	8	5.34						
12	176						6	26.4	4.4	Y	Y	Y	18								1.91	21.7	7.47	41.4	8	5.18						
13						(f) Filter Rate gpm/ft2 -	6			Y	Y	Y	18												8	#######						
14							6			Y	Y	Y	18												8	#######						
15	297					(g) Filter Rate gpm/ft2 -	6	44.4	7.4	Y	Y	Y	18								0.75	21.7	7.52	16.3	8	2.03						
16							6			Y	Y	Y	18												8	#######						
17	301					(h) Total Rated Filter Capacity	6	45.0	7.5	Y	Y	Y	18								1.58	21.7	7.56	34.3	8	4.29						
18	124					GPM-	6	18.6	3.1	Y	Y	Y	18												8	#######						
19							6	15.6	2.6	Y	Y	Y	18								1.73	21.7		37.5	8	4.69						
20						(i) Ion Exchange Unit Regenerate	6			Y	Y	Y	18												8	#######						
21						With Salt: ( )	6			Y	Y	Y	18												8	#######						
22	297					KMnO4 ( )	6	44.4	7.4	Y	Y	Y	18								2.20	21.7	7.52	47.7	8	5.97						
23	148					Acid ( )	6	22.2	3.7	Y	Y	Y	18								1.97	21.7		42.7	8	5.34						
24	237						6	35.4	5.9	Y	Y	Y	18								2.00	21.7	7.57	43.4	8	5.43						
25	152						6	22.8	3.8	Y	Y	Y	18								2.26	21.7		49.0	8	6.13						
26	281						6	42.0	7.0	Y	Y	Y	18								2.12	21.7	7.56	46.0	8	5.75						
27							6			Y	Y	Y	18												8	#######						
28							6			Y	Y	Y	18												8	#######						
29							6	36.0	6.0	Y	Y	Y	18								2.40	21.7	7.57	52.1	8	6.51						
30	265						6	39.6	6.6	Y	Y	Y	18								2.28	21.7	7.60	49.5	8	6.18						
31							6			Y	Y	Y	18												8	#######						
Total	4,619							751.2	125.2					0.0																		
Average	149								6					#######																		
Maximum	434								10.8																						
Minimum	0								2.6																				#####		Distribution Average

Cost of Production

(a) Cost of Personel	$	5,000.00
(b) Cost of Chemicals	$	1,342.32
(c) Cost of Energy	$	1,153.57
(d) Insurance & Misc. Cost	$	2,000.00
(e) Total Production Cost	$	9,503.89
(f) Cost Per MG Water Treated	$	2,447.56

Avg. Electrical Cost per KW $ 0.0800

Total Run Time for Month 125.2 Hrs.
Average Daily Run Time 5.7 Hrs.

Remarks:

MONTH OF April-24

DATE	RAW WATER TREATED - 1,000 GALLONS	JAR TEST DATA: COAGULANT MG/L	JAR TEST DATA: pH ADJUSTMENT MG/L	JAR TEST DATA: pH	JAR TEST DATA:	FILTER DATA: COMPLETE APPLICABLE BLANKS EACH MONTH.	FILTER OPERATION DATA: NUMBER OF FILTERS USED	FILTER HOURS = COL. 54 X HOURS RUN	AVERAGE LENGTH FILTER RUN - HOURS	RATE OF FLOW GAUGES WORKING	LOSS-OF-HEAD GAUGES WORKING	TURBIDIMETERS WORKING	BACKWASH RATE gpm/ft2	BACKWASH WATER USED - 1,000 gallons	Filters Washed	DISINFECTION AND CT VALUES: FIRST DISINFECTION SEQUENCE: FREE CHLORINE END OF SEQUENCE C	CONTACT TIME IN MINUTES T	END OF SEQUENCE pH	CALCULATED CT	REQUIRED CT	SECOND DISINFECTION SEQUENCE: FREE CHLORINE END OF SEQUENCE C	CONTACT TIME IN MINUTES T	END OF SEQUENCE pH	CALCULATED CT	REQUIRED CT	CT CAL OR REQ: TOTAL INACTIOATION RATIO	MICROBIOLOGICAL EXAMINATION AND SYSTEM PRESSURE: RAW	PLANT EFFLUENT	DISTRIBUTION SYSTEM	FREE CHLORINE MG/L AT POINT OF SAMPLING & DISTRIBUTION SYSTEM	STATIC PRESSURE PSI	Location of sampling point in distribution system. Must vary with system.
47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	
1	1,500						6	96.0	16.0	Y	Y	Y	18	718.0							1.75	21.7	7.13	38.0	8	4.75						1309 Webster Rd.
2	1,350					(a) Type of Filter -- Gravity (X)	6	138.0	23.0	Y	Y	Y	18	885.0							1.79	21.7	7.30	38.8	8	4.86						Big Emory Church
3	1,332					Pressure ( )	6	102.0	17.0	Y	Y	Y	18	506.0							1.44	21.7	7.20	31.2	8	3.91						Bitter Creek P.S.
4	1,405						6	108.0	18.0	Y	Y	Y	18	465.0							1.88	21.7	7.35	40.8	8	5.10						Freels & Russell Ln.
5	1,236					(b) Number of Filters -	6	108.0	18.0	Y	Y	Y	18	558.0							2.22	21.7	7.25	48.2	8	6.02						Tangle Wood
6	1,341						6	102.0	17.0	Y	Y	Y	18	728.0							1.85	21.7	7.53	40.1	8	5.02						
7	1,386					© Filter Area - Sq. Ft. (Each)	6	108.0	18.0	Y	Y	Y	18	403.0							1.91	21.7	7.48	41.4	8	5.18						
8	1,016						6	78.0	13.0	Y	Y	Y	18	609.0							1.84	21.7	7.24	39.9	8	4.99						
9	1,208					(d) Filter Area - Sq. Ft. (Each)	6	108.0	18.0	Y	Y	Y	18	413.0							1.75	21.7	7.42	38.0	8	4.75						Heartland Estates P.S.
10	1,221						6	108.0	18.0	Y	Y	Y	18	600.0							1.55	21.7	7.30	33.6	8	4.20						Coal Hill P. S.
11	999					(e) Total Area - Sq. Ft. -	6	108.0	18.0	Y	Y	Y	18	458.0							1.86	21.7	7.23	40.4	8	5.05						Webster Rd.
12	1,646						6	138.0	23.0	Y	Y	Y	18	591.0							0.60	21.7	7.09	13.0	8	1.63						
13	811					(f) Filter Rate gpm/ft2 -	6	36.0	6.0	Y	Y	Y	18	624.0							1.76	21.7		38.2	8	4.77						
14	1,588						6	144.0	24.0	Y	Y	Y	18	269.0							2.30	21.7	7.56	49.9	8	6.24						
15	1,752					(g) Filter Rate gpm/ft2 -	6	132.0	22.0	Y	Y	Y	18	455.0							1.84	21.7	7.60	39.9	8	4.99						Webster Rd.
16	1,914						6	144.0	24.0	Y	Y	Y	18	656.0							1.79	21.7	7.51	38.8	8	4.86						Holiday Shores P. S.
17	1,838					(h) Total Rated Filter Capacity	6	144.0	24.0	Y	Y	Y	18	903.0							1.87	21.7	7.42	40.6	8	5.07						Holiday Shores P. S.
18	1,338					GPM-	6	72.0	12.0	Y	Y	Y	18	758.0							1.75	21.7	7.29	38.0	8	4.75						Mossy Grove P. S.
19	1,745						6	138.0	23.0	Y	Y	Y	18	716.0							2.12	21.7	7.34	46.0	8	5.75						Tangle Wood
20	1,334					(i) Ion Exchange Unit Regeherate	6	102.0	17.0	Y	Y	Y	18	831.0							1.92	21.7	7.29	41.7	8	5.21						
21	1,194					With Salt: ( )	6	96.0	16.0	Y	Y	Y	18	645.0							2.14	21.7	7.35	46.4	8	5.80						
22	1,207					KMnO4 ( )	6	144.0	24.0	Y	Y	Y	18	587.0							2.25	21.7	7.31	48.8	8	6.10						Cofer Circle
23	1,506					Acid ( )	6	144.0	24.0	Y	Y	Y	18	458.0							2.23	21.7	7.37	48.4	8	6.05						Hwy 27 Bitter Creek
24	1,440						6	144.0	24.0	Y	Y	Y	18	814.0							0.98	21.7	7.18	21.3	8	2.66						
25	1,116						6	102.0	17.0	Y	Y	Y	18	266.0							1.91	21.7	7.13	41.4	8	5.18						Old Elverton Rd.
26	997						6	96.0	16.0	Y	Y	Y	18	604.0							1.94	21.7	7.43	42.1	8	5.26						Big Emory Church
27	1,235						6	144.0	24.0	Y	Y	Y	18	682.0							0.57	21.7	7.23	12.4	8	1.55						
28	1,542						6	138.0	23.0	Y	Y	Y	18	259.0							2.00	21.7	7.32	43.4	8							
29	1,213						6	102.0	17.0	Y	Y	Y	18	766.0							1.96	21.7	7.23	42.5	8	5.32						Suddath
30	1,342						6	114.0	19.0	Y	Y	Y	18	630.0							1.93	21.7	7.16	41.9	8	5.24						Holly Street
31							6			Y	Y	Y	18												8	#######						
Total	40,752							3438.0	573.0					17857.0																		
Average	1,315								19					595.2																		
Maximum	1,914								24.0					903.0																		
Minimum	811								6.0					259.0																#####		Distribution Average

Cost of Production

(a) Cost of Personel	$	22,920.00
(b) Cost of Chemicals	$	9,811.15
(c) Cost of Energy	$	10,789.97
(d) Insurance & Misc. Cost	$	2,000.00
(e) Total Production Cost	$	45,521.12
(f) Cost Per MG Water Treated	$	1,228.91

Avg. Electrical Cost per KW $ 0.0800

Total Run Time for Month 573.0 Hrs.

Average Daily Run Time 18.5 Hrs.

Remarks: