Water Analysis

Sample ID: 1. Catoosa Makeup
2. Roland Makeup
3. WSS Makeup
4. WRD Makeup

Sample ID Date Obtained	**1** 10/5/2023	**2** 10/5/2023	**3** 10/5/2023	**4** 10/5/2023
Anions				
p Alkalinity (mg/L as $CaCO_3$)	0	0	0	0
m Alkalinity (mg/L as $CaCO_3$)	104	34.6	115	86.6
Chloride (mg/L as Cl^-)	15.2	13.9	15.8	13.9
Silica (mg/L as SiO_2)	2.5	3.4	9.6	5.1
Sulfate (mg/L as SO_4^{2-})	46.8	3.3	17.1	39.6
Ortho-Phosphate (mg/L as PO_4^{3-})	0.8	2.1	< 0.1	2.3
Total Phosphate (mg/L as PO_4^{3-})	< 1.6	2.5	< 1.6	2.8
Cations				
Calcium (mg/L as Ca^{2+})	47.2	4.5	54.1	42.0
Magnesium (mg/L as Mg^{2+})	10.8	1.9	2.5	4.7
Calcium Hardness (mg/L as $CaCO_3$)	118	11.3	135	105
Magnesium Hardness (mg/L as $CaCO_3$)	44.3	7.8	10.3	19.3
Total Hardness (mg/L as $CaCO_3$)	162	19.1	146	124
Iron, Total (mg/L as Fe)	< 0.1	< 0.1	< 0.1	< 0.1
Copper (mg/L as Cu)	0.1	0.1	0.3	0.3
Sodium (mg/L as Na^+)	11.1	15.2	12.3	16.9
Potassium (mg/L as K^+)	3.4	1.6	3.4	3.1
Antimony (mg/L as Sb)	0.1	0.1	0.1	0.1
Miscellaneous				
pH	8.0	7.6	7.9	7.9
Conductivity (micromhos)	447	158	406	387

Comments: mg/L = ppm
An anion/cation balance performed on the sample was acceptable.

Note: If an element is not listed above, it is below detection. See page 5 for detection limits.

Water Analysis

Sample ID: 5. Fort Gibson Makeup
6. Grove Makeup
7. Ramona Makeup
8. Tahlequah Makeup

Sample ID Date Obtained	**5** 10/5/2023	**6** 10/5/2023	**7** 10/5/2023	**8** 10/5/2023
Anions				
p Alkalinity (mg/L as $CaCO_3$)	0	0	0	0
m Alkalinity (mg/L as $CaCO_3$)	66.1	84.1	135	71.8
Chloride (mg/L as Cl^-)	27.0	16.1	35.8	13.1
Silica (mg/L as SiO_2)	5.4	4.7	6.2	6.0
Sulfate (mg/L as SO_4^{2-})	18.6	19.5	12.9	11.1
Ortho-Phosphate (mg/L as PO_4^{3-})	2.6	< 0.1	1.0	< 0.1
Total Phosphate (mg/L as PO_4^{3-})	3.4	< 1.6	1.6	< 1.6
Cations				
Calcium (mg/L as Ca^{2+})	38.2	37.5	50.2	33.0
Magnesium (mg/L as Mg^{2+})	4.7	4.8	8.0	2.2
Calcium Hardness (mg/L as $CaCO_3$)	95.5	93.8	126	82.5
Magnesium Hardness (mg/L as $CaCO_3$)	19.3	19.7	32.8	9.0
Total Hardness (mg/L as $CaCO_3$)	115	114	158	91.5
Iron, Total (mg/L as Fe)	< 0.1	< 0.1	< 0.1	< 0.1
Copper (mg/L as Cu)	0.2	1.5	< 0.1	0.2
Sodium (mg/L as Na^+)	8.4	7.7	22.8	7.7
Potassium (mg/L as K^+)	3.9	3.3	3.9	3.1
Barium (mg/L as Ba^{2+})			0.1	
Aluminum (mg/L as Al^{3+})			0.1	
Antimony (mg/L as Sb)	0.1	0.1	0.1	0.1
Nickel (mg/L as Ni)				1.3
Zinc (mg/L as Zn^{2+})			0.4	0.5
Miscellaneous				
pH	7.6	7.9	8.0	7.9
Conductivity (micromhos)	339	329	518	267

Comments: mg/L = ppm
An anion/cation balance performed on the sample was acceptable.

Note: If an element is not listed above, it is below detection. See page 5 for detection limits.

All water samples are analyzed for the additional elements listed below. If the analytical result is not listed in the main report, then the result was below the detection limit. The detection limits are:

Element	Normal Detection Limit (ppm)	High Purity Detection Limit (ppm)
Aluminum (Al)	0.1	0.005
Antimony (Sb)	0.1	0.010
Barium (Ba)	0.1	0.001
Cadmium (Cd)	0.1	0.001
Chloride (Cl^-)	0.1	n/a
Chromium (Cr)	0.1	0.001
Cobalt (Co)	0.1	0.001
Lead (Pb)	0.1	0.005
Manganese (Mn)	0.1	0.001
Molybdenum (Mo)	0.1	0.005
Nickel (Ni)	0.1	0.005
Ortho-Phosphate (PO_4^{3-})	0.1	n/a
Phosphorus (P)	0.5	0.010
Potassium (K)	1.0	0.005
Strontium (Sr)	0.1	0.001
Titanium (Ti)	0.1	0.005
Vanadium (V)	0.1	0.005
Zinc (Zn)	0.1	0.001

High Purity analyses are usually performed only on specific boiler and RO waters.