

**Company:** Thermal Dynamics  
**Location:** Bemidji, MN  
**Representative:** Brett Alsleben  
**Report By:** Alli Hinz

**Sample ID:** 238955  
**Sample Date:** 8/31/2023  
**Date Received:** 9/11/2023  
**Report Date:** 9/13/2023

**Results:** Results are listed down to the detection limit of the instrument used. Where results fall below these limits they are reported as less than the detection limit. A dash indicates testing was not requested or was unable to be run.

System	Bemidji VA Home Geothermal Loop
Lab Sample ID	238955
pH (units)	8.84
Conductivity ( $\mu\text{mhos/cm}$ )	1,981
P-Alkalinity (ppm $\text{CaCO}_3$ )	71.8
M-Alkalinity (ppm $\text{CaCO}_3$ )	1,280
Total Phosphate (ppm $\text{PO}_4^{3-}$ )	4,288
Ortho-Phosphate (ppm $\text{PO}_4^{3-}$ )	2,511
Fluoride (ppm F)	<0.40
Chloride (ppm Cl)	1.22
Nitrite (ppm $\text{NO}_2^-$ )	<0.50
Bromide (ppm Br)	<0.50
Nitrate (ppm $\text{NO}_3^-$ )	<1.00
Sulfate (ppm $\text{SO}_4^{2-}$ )	<1.00
Total Hardness (ppm $\text{CaCO}_3$ )	11.4
Calcium (ppm $\text{CaCO}_3$ )	5.40
Magnesium (ppm $\text{CaCO}_3$ )	6.00
Aluminum (ppm Al)	0.711
Arsenic (ppm As)	<0.25
Barium (ppm Ba)	<0.25
Boron (ppm B)	<0.25
Chromium (ppm Cr)	<0.25
Copper (ppm Cu)	<0.25
Iron (ppm Fe)	0.427
Manganese (ppm Mn)	<0.125
Molybdenum (ppm Mo)	0.328
Nickel (ppm Ni)	<0.25
Potassium (ppm K)	1,473
Selenium (ppm Se)	<0.5
Silica (ppm $\text{SiO}_2$ )	4.47
Sodium (ppm Na)	11.1
Tin (ppm Sn)	<0.5
Vanadium (ppm V)	<0.25
Zinc (ppm Zn)	<0.25
Glycol Type	Propylene
Percent Glycol (%)	27.1
Freeze Point ( $^{\circ}\text{F}$ )	12
Reserve Alkalinity (mL)	1.73