



# ANALYTICAL SUMMARY REPORT

September 23, 2021

Goldn Humates LLC  
PO Box 275  
Byron, WY 82412-0275

Work Order: B21090732  
Project Name: 30 East Main St

Energy Laboratories Inc Billings MT received the following 1 sample for Goldn Humates LLC on 9/9/2021 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B21090732-001	Well 01Z Catalytic Alt. Water @ AW	09/09/21 08:00	09/09/21	Drinking Water	Metals by ICP/ICPMS, Acid Soluble Alkalinity Anion - Cation Balance Bacteria, Private Water Supply Conductivity Hardness Hardness as CaCO3, grains/gallon Anions by Ion Chromatography Langelier Index Livestock Suitability; Irrigation Classification Nitrogen, Nitrate + Nitrite pH Sodium Adsorption Ratio Solids, Total Dissolved - Calculated

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the report package. Any issues encountered during sample receipt are documented in the Work Order Receipt Checklist.

The results as reported relate only to the item(s) submitted for testing. This report shall be used or copied only in its entirety. Energy Laboratories, Inc. is not responsible for the consequences arising from the use of a partial report.

If you have any questions regarding these test results, please contact your Project Manager.

Report Approved By:

## Understanding Your Test Results

### Example Test Result

#### LABORATORY ANALYTICAL REPORT

Analyses	Result	Units	Qual	MCL/		Method	Analysis Date / By
				RL	QCL		
<b>INORGANICS</b>							
Alkalinity, Total as CaCO <sub>3</sub>	254	mg/L		1		A2320 B	03/21/06 17:40 / qed
Chloride	27	mg/L		1		E300.0	03/22/06 19:13 / qed
Sulfate	318	mg/L		1		E300.0	03/22/06 19:13 / qed
Fluoride	1.0	mg/L		0.1		E300.0	03/22/06 19:13 / qed
Nitrogen, Nitrate+Nitrite as N	0.24	mg/L		0.05		E300.0	03/22/06 19:13 / qed

The following interpretation is based on public drinking water system standards. These standards only apply to public water systems but the health implications are the same for private well water users.

#### Definitions:

**ND** stands for no detection meaning the parameter was not detected in the sample  
**ppm** (parts per million) is often used interchangeably with **mg/L** (milligrams per liter)  
**RL** (reporting limit) is basically the smallest concentration a test can detect  
**MCL** (maximum contaminant level) is a USEPA drinking water standard

Parameter Name	Possible Results	Quick Interp.	Warnings and Suggestions
<b>Alkalinity (Total as CaCO<sub>3</sub>)</b>  The ability of water to compensate for changes in pH. Higher alkalinity means water is less likely to experience big changes in acidity.	ND or less than 100 (mg/L)	Corrosion Potential	As alkalinity decreases below 100, if pH is lower than 6.5 there is increased potential for corrosion of pipes releasing metals into the water .
	100 to 200 (mg/L)	Satisfactory	Sufficient buffer potential to resist changes in pH and generally not significant scaling in pipes.
	200 or more (mg/L)	Scaling Potential	Possible scaling in pipes and water heaters.
<b>Aluminum</b>  A naturally occurring metal generally found in concentrations between 0.01 and 0.3 mg/L in groundwater. The EPA secondary standard for aluminum is 0.050 to 0.2 mg/L because high concentrations can cause coloring of water.	ND or less than 0.05 (mg/L)	Satisfactory	No action necessary.
	0.05 or more (mg/L)	Objectionable	Standard based on aesthetics not health; if water discoloration is troublesome, consider treatment.
<b>Antimony</b>  Antimony is not commonly found in nature; sources of contamination include petroleum refinery discharge, fire retardants, ceramics, electronics and solder.	ND or less than 0.006 (mg/L)	Satisfactory	Result generally shouldn't change dramatically through time, consider retesting next year if result is 0.005 or more.
	0.006 or more (mg/L)	Unsatisfactory	Health risk exists; consider water treatment and/or alternative sources; see fact sheet for more information
<b>Arsenic</b>  Groundwater contamination can happen from mining, pesticides and wood preservatives; contamination can also occur naturally.	ND	Satisfactory	Retesting not necessary unless a change is suspected.
	0 to 0.010 (mg/L)	Satisfactory	Ideally, drinking water should contain no detectable arsenic; consider retesting next year if result is 0.008 mg/L or more.
	0.010 or more (mg/L)	Unsatisfactory	Health risk exists; consider water treatment and/or alternative drinking water sources; see fact sheet for more information.

Parameter Name	Possible Results	Quick Interp.	Warnings and Suggestions
<p><b>Barium</b></p> <p>Found abundantly in nature and is used in the production of many household items; it can enter drinking water through industrial discharge and natural erosion.</p>	ND or less than 2 (mg/L)	Satisfactory	Result generally shouldn't change dramatically through time, consider retesting next year if result is 1.6 mg/L or more.
	2 or more (mg/L)	Unsatisfactory	Health risk exists; consider water treatment and/or alternative drinking water sources; see fact sheet for more information.
<p><b>Beryllium</b></p> <p>A naturally occurring metal used in metal refining; coal combustion; and electrical, aerospace and defense industries.</p>	ND or less than 0.004 (mg/L)	Satisfactory	Result generally shouldn't change dramatically through time, consider retesting next year if result is 0.003 mg/L or more.
	0.004 or more (mg/L)	Unsatisfactory	Health risk exists; consider water treatment and/or alternative sources; see fact sheet for more information.
<p><b>Bicarbonate as HCO<sub>3</sub></b></p> <p>Bicarbonate is the principle alkaline constituent in drinking water. See alkalinity.</p>	Any Value	Satisfactory (depending on alkalinity)	Bicarbonate does not pose a health risk; bicarbonate and carbonate are closely related to alkalinity.
<p><b>Cadmium</b></p> <p>A metallic element that can enter drinking water through corrosion of pipes, erosion of natural deposits, metal refining and runoff from waste batteries and paints.</p>	ND or less than 0.005 (mg/L)	Satisfactory	Result generally shouldn't change dramatically through time, consider retesting next year if result is 0.004 mg/L or more.
	0.005 or more (mg/L)	Unsatisfactory	Health risk exists; consider water treatment and/or alternative sources; see fact sheet for more information.
<p><b>Calcium</b></p> <p>A naturally occurring metal essential in the human diet and common in groundwater with concentrations ranging from zero up to several hundred mg/L. A major contributor to the hardness of water which can cause scaling problems in pipes and hot water heaters.</p>	Any Value	Satisfactory (depending on hardness)	Calcium does not pose a health risk; calcium and magnesium together make up the hardness; see hardness.
<p><b>Carbonate as CO<sub>3</sub></b></p> <p>Mineral found in groundwater. See alkalinity.</p>	Any Value	Satisfactory (depending on alkalinity)	Carbonate does not pose a health risk; carbonate and bicarbonate are closely related to alkalinity; see alkalinity.
<p><b>Chloride</b></p> <p>A common natural salt in groundwater. The EPA secondary standard for chloride is 250 mg/L; higher concentrations can cause a salty taste.</p>	ND or less than 250 (mg/L)	Satisfactory	No action necessary.
	250 or more (mg/L)	Objectionable	Standard based on aesthetics not health; if salty taste is troublesome, consider treatment.

Parameter Name	Possible Results	Quick Interp.	Warnings and Suggestions
<p><b>Chromium</b></p> <p>A metallic element commonly found in nature; contamination of groundwater can happen through discharge from leather tanning, steel and pulp mills or erosion of natural deposits.</p>	ND or less than 0.10 (mg/L)	Satisfactory	Result generally shouldn't change dramatically through time, consider retesting next year if result is 0.08 mg/L or more.
	0.10 or more (mg/L)	Unsatisfactory	Health risk exists; consider water treatment and/or alternative sources; see fact sheet for more information.
<p><b>Coliform Bacteria (Total)</b></p> <p>A type of bacteria which should not be present in groundwater; indicates potential contamination.</p>	Absent	Satisfactory	Continue testing annually to monitor for contamination.
	Present	Objectionable	No direct health threat, but coliforms should not be present in groundwater; see fact sheet for more information.
<p><b>Coliform Bacteria (<i>E. coli</i>)</b></p> <p>A type of bacteria found in feces of warm blooded animals which indicates fecal pollution. If <i>E. coli</i> is present in a sample, the water is unsafe to drink without treatment.</p>	Absent	Satisfactory	Continue testing annually to monitor for contamination.
	Present	Unsatisfactory	Direct health threat; treat water for drinking and cooking; see fact sheet for more information.
<p><b>Conductivity</b></p> <p>A measure of how easily electric current will pass through a water sample. This measurement is related to and often used to estimate total dissolved solids. Also used to estimate the tendency of water to corrode metal.</p>	Any Value	Satisfactory	Conductivity does not pose a health risk; it is related to total dissolved solids and is used in calculating the corrosivity.
<p><b>Corrosivity (Langelier Index)</b></p> <p>Corrosive water can mobilize metals (especially lead and copper) from pipes into drinking water and can eventually cause leaks in plumbing. While not a perfect tool, the Langelier Index is a useful guide for assessing the corrosive ability of water.</p>	Less than -2.5	High Corrosion Potential	Corrosive water can leach metals from minerals in the earth or from pipes and fixtures; treatment and/or testing for metals is recommended.
	-2.5 to -0.5	Moderate Corrosion Potential	Corrosive water can leach metals from minerals in the earth or from pipes and fixtures; Consider treatment and/or testing for metals.
	-0.5 to 0.5	Satisfactory	Ideal range to minimize corrosion and scaling.
	0.5 to 2.5	Moderate Scaling Potential	Moderate potential for scaling in pipes and hot water heaters; consider treatment.
	More than 2.5	High Scaling Potential	High potential for scaling in pipes and hot water heaters; consider treatment.
<p><b>Copper</b></p> <p>Potential health risks; copper is a metallic element that is rarely found in groundwater, but can be introduced into drinking water by corrosion of pipes.</p>	ND or less than 1.3 (mg/L)	Satisfactory	Pipe corrosion is a common copper source; if water is corrosive, copper concentration could change through time; consider retesting next year if result is 1.0 mg/L or more. See fact sheet for more information.
	1.3 or more (mg/L)	Unsatisfactory	Health risk exists; consider water treatment and/or alternative drinking water sources; see fact sheet for more information.

Parameter Name	Possible Results	Quick Interp.	Warnings and Suggestions
<p><b>Fluoride</b></p> <p>A naturally occurring nonmetal which promotes dental health at concentrations between 0.7 and 1.5 mg/L, but can cause health problems at high concentrations.</p>	ND or less than 0.7 (mg/L)	Satisfactory	Concentrations below 0.7 mg/L are out of the ideal range for protection of tooth enamel.
	0.7 to 1.5 (mg/L)	Satisfactory	Ideal range for development and protection of tooth enamel.
	1.5 to 2.0 (mg/L)	Satisfactory	Concentrations above 1.5 mg/L are out of the ideal range for protection of tooth enamel.
	2.0 to 4.0 (mg/L)	Objectionable	Dental fluorosis or brownish discoloration of teeth can occur; a report by the National Research Council suggests possible health effects at concentrations in this range.
	4.0 or more (mg/L)	Unsatisfactory	Health risk exists; consider water treatment and/or alternative sources; see fact sheet for more information.
<p><b>Hardness (as CaCO<sub>3</sub>)</b></p> <p>Primarily caused by compounds of calcium and magnesium in water and can result in scaling in pipes/water heaters; it also decreases the lather and effectiveness of soaps and detergents.</p>	ND or less than 60 (mg/L)	Corrosion Potential	Softer water can be more corrosive; see corrosivity.
	61 to 120 (mg/L)	Satisfactory	Generally a satisfactory intermediate between corrosion and scaling; see corrosivity.
	121 or more (mg/L)	Scaling Potential	Harder water can cause scaling in pipes and hot water heaters; if scaling is troublesome, consider softening.
<p><b>Iron (Total)</b></p> <p>Iron is a metallic element found in nature. Aesthetic problems such as staining of clothes and pipes, as well as sediment problems in plumbing are associated with iron.</p>	ND or less than 0.3 (mg/L)	Satisfactory	No action is necessary
	0.3 or more (mg/L)	Objectionable	High iron can cause discoloration of fixtures and/or clothing and can support iron bacteria growth leading to taste and odor problems; if troublesome, consider treatment.
<p><b>Lead</b></p> <p>A metallic element that often enters drinking water through corrosion of pipes.</p>	ND	Satisfactory	If water is corrosive, lead concentration could change through time; see corrosivity.
	0 to 0.015 (mg/L)	Satisfactory	Pipe corrosion is a common lead source; if water is corrosive, lead concentration could increase; consider retesting next year if result is 0.012 mg/L or more; see fact sheet for more information.
	0.015 or more (mg/L)	Unsatisfactory	Health risk exists; consider water treatment and/or alternative drinking water sources; see fact sheet for more information.
<p><b>Magnesium</b></p> <p>A naturally occurring metal important in human diet and common in groundwater; with calcium, magnesium is a major contributor to the hardness of water.</p>	Any Value	Satisfactory (depending on hardness)	Magnesium does not pose a health risk; calcium and magnesium together make up the hardness; hard water can cause scaling in pipes; see hardness.
<p><b>Manganese</b></p> <p>A naturally occurring metal important in the human diet; the EPA secondary standard for manganese is 0.05 mg/L; high concentrations can cause black to brown color, black staining, and a bitter taste.</p>	ND or less than 0.05 (mg/L)	Satisfactory	No action necessary.
	0.010 or more (mg/L)	Objectionable	Standard based on aesthetics not health; if black/brown staining or bitter taste is troublesome, consider treatment.

Parameter Name	Possible Results	Quick Interp.	Warnings and Suggestions
<b>Mercury</b> A metallic element; sources of contamination of drinking water include erosion of natural deposits, discharge from refineries and factories and runoff from landfills and croplands.	ND or less than 0.002 (mg/L)	Satisfactory	Result generally shouldn't change dramatically through time, consider retesting next year if result is 0.0016 mg/L or more.
	0.002 or more (mg/L)	Unsatisfactory	Health risk exists; consider water treatment and/or alternative sources; see fact sheet for more information.
<b>Nitrate + Nitrite as N or Nitrate as N</b> Can occur naturally, from septic tanks/wastewater treatment, or from agricultural practices and causes oxygen deficiency in infants under 6 months of age; nitrate moves easily in groundwater so increasing nitrate levels can be an early warning that other contaminants are moving toward a well.	ND or less than 1 (mg/L)	Satisfactory	Continue testing annually to monitor for contamination.
	1 to 4 (mg/L)	Possible Impairment	Potential pollution exists; continue testing annually to monitor for changes.
	4 to 10 (mg/L)	Above Normal Natural Levels	Above normal levels; possible contamination; continue monitoring annually for changes; Monitor more regularly if infants under the age of 1 year are consuming the water.
	10 or more (mg/L)	Unsatisfactory	Health risk exists, discontinue use of water for infants under 1 year of age and persons with cardiovascular conditions; see fact sheet for more information.
<b>pH</b> The measure of acidity of water; pH is related to the ability of water to corrode pipes and release metals into water.	6.5 to 8.5	Satisfactory	pH of groundwater does not generally change rapidly so retesting is not necessary unless a change is suspected.
	Less than 6.5 or More than 8.5	Objectionable	pH slightly out of the ideal range is not a direct health threat but can affect corrosivity which can leach metals from minerals in the earth or from pipes; consider a corrosivity test.
<b>Potassium</b> A common salt in groundwater-essential in the human diet; concentrations are typically less than 10 mg/L.	Any Value	Satisfactory	Tap water concentrations generally range from 0.5 to 8 mg/l; no action is necessary .
<b>Selenium</b> A non-metallic element found in sedimentary rocks; sources of contamination include: discharge from petroleum refineries, erosion of natural deposits, and discharge from mines.	ND or less than 0.05 (mg/L)	Satisfactory	Result generally shouldn't change dramatically through time, consider retesting next year if result is 0.04 mg/L or more.
	0.05 or more (mg/L)	Unsatisfactory	Health risk exists; consider water treatment and/or alternative sources; see fact sheet for more information.
<b>Sodium</b> A common salt in groundwater which can impart a salty taste at concentrations over 250 mg/L; sodium can contribute to hypertension and high levels in drinking water should be noted by people on low sodium diets.	Any Value	Satisfactory	Sodium in drinking water supplies can range from 0.4 to 1,900 mg/l; sodium intake in drinking water should be considered by people on low sodium diets in association with reducing risk of cardiovascular disease.

Parameter Name	Possible Results	Quick Interp.	Warnings and Suggestions
<p><b>Sodium Adsorption Ratio (SAR)</b></p> <p>SAR is the amount of sodium relative to calcium and magnesium in the water; high SAR can damage soil and reduce crop productivity.</p>	Any Value	Depends on conductivity and soil type	SAR is not relevant for drinking water, but irrigation water with an SAR value above 6 can pose a risk to physical soil characteristics; SAR risk is evaluated based on its relationship to conductivity and the texture of the soil being irrigated; see fact sheet for more information.
<p><b>Sulfate</b></p> <p>A common salt in groundwater which can impart a salty taste; high quantities can cause gastrointestinal distress in people unaccustomed to the water.</p>	ND or less than 250 (mg/L)	Satisfactory	No action necessary.
	250 or more (mg/L)	Objectionable	Standard based on aesthetics not health; if salty taste is troublesome, consider treatment.
<p><b>Thallium</b></p> <p>A metallic element; sources of contamination include: leaching from ore-processing sites, discharge from electronics, glass and drug factories.</p>	ND (mg/L)	Satisfactory	No action necessary.
	0.001 to 0.002 (mg/L)	Satisfactory	Ideally, drinking water should contain less than 0.001 mg/l of thallium; consider retesting next year if result is 0.001 mg/L.
	0.002 or more (mg/L)	Unsatisfactory	Health risk exists; consider water treatment and/or alternative sources; see fact sheet for more information.
<p><b>Total Dissolved Solids</b></p> <p>TDS is the sum of all minerals, metals and salts dissolved in water; high quantities can cause gastrointestinal distress in people unaccustomed to the water.</p>	ND or less than 500 (mg/L)	Satisfactory	Total Dissolved Solids should not change significantly through time; retest if a change is suspected.
	500 or more (mg/L)	Objectionable	High total dissolved solids do not generally pose a serious health risk but can cause water to be colored, taste poor, stain, and cause diarrhea in people not accustomed to the water.
<p><b>Uranium</b></p> <p>A naturally occurring metal that can be ingested through the air, water and plants. The EPA primary standard is 30 µg/L. Water can be contaminated from natural processes, mining, coal combustion, nuclear power plants and phosphate fertilizers.</p>	ND or less than 30 (µg/L)	Satisfactory	Ideally, drinking water should not contain any uranium.; consider retesting next year if value is greater than 24 µg/L.
	30 or more (µg/L)	Unsatisfactory	Health risk exists; consider water treatment or alternative drinking water sources; see fact sheet for more information.
<p><b>Zinc</b></p> <p>A naturally occurring metal essential to the human diet; the EPA secondary standard for zinc is 5 mg/L; high concentrations can cause a metallic taste.</p>	ND or less than 5 (mg/L)	Satisfactory	No action necessary.
	5 or more (mg/L)	Objectionable	Standard based on aesthetics not health; if metallic taste is troublesome; consider treatment.



## Corrosivity

### What is Corrosivity?

Corrosivity is a measure of how aggressive water is at corroding pipes and fixtures. Corrosive water can mobilize lead and copper from pipes into drinking water and can eventually cause leaks in plumbing.

**Corrosive potential of water is increased by:**

- **pH** (lower than 6.5 or higher than 8.5)
- **water flow rate** (faster flow)
- **water temperature** (higher temp)
- **dissolved gases** (more dissolved gas)
- **conductivity** (higher conductivity)
- **dissolved solids** (high dissolved solids)
- **certain bacteria** (more bacteria)
- **suspended solids** (more sediment)
- **chlorine** (more chlorine)

### Determining Corrosivity

One common index of corrosivity is the Langelier Index (LI). The LI is calculated using pH, temperature, total dissolved solids, alkalinity, and total hardness. The LI is a measure of the balance between pH and calcium carbonate (CaCO<sub>3</sub>). As the LI value becomes more negative, the water is increasingly under-saturated with CaCO<sub>3</sub> and therefore has increased corrosion potential. As the LI value becomes more positive, the water is increasingly over-saturated with CaCO<sub>3</sub>.

Over-saturation results in CaCO<sub>3</sub> precipitation which can coat and protect pipes from corrosion but can cause scaling in pipes, hot water heaters, and fixtures. While not a perfect analytical tool, the LI serves as a useful guide for assessing corrosive ability of well water.

<u>Langelier Index</u>	<u>Description</u>	<u>General Recommendation</u>
-4	Severe Corrosion	Treatment Recommended/Consider Lead/Copper Test
-3	Moderate Corrosion	Treatment Recommended/Consider Lead/Copper Test
-2	Moderate Corrosion	Treatment May Be Needed/Consider Lead/Copper Test
-1	Mild Corrosion	Treatment May Be Needed/Consider Lead/Copper Test
-0.5	None-Mild Corrosion	Probably No Treatment
0	Near Balanced	No Treatment
0.5	Some Faint Coating	Probably No Treatment
1	Mild Scale Coating	Treatment May Be Needed
2	Mild to Moderate Coating	Treatment May Be Needed
3	Moderate Scale Forming	Treatment Advisable
4	Severe Scale Forming	Treatment Advisable

Adapted from Wilkes University Center For Environmental Quality;  
 Corrosion, Saturation Index, Balanced Water in Drinking Water Systems

### Controlling Corrosion

Corrosiveness may be increased by installing water softeners, aeration devices, increasing hot water temperatures, chlorinating water or improper matching of metal pipes. Corrosion control options include pretreatment systems, installation of non-conductive unions, reducing hot water temperature, and replacing metal piping with CPVC. Pretreatment systems include neutralizing tank filters and caustic liquid treatment. These systems change the pH, hardness, and/or alkalinity to achieve a less corrosive water chemistry.

#### Additional Resources:

**Corrosion ... in Drinking Water Systems; Wilkes University Center for Environmental Quality**

<http://www.water-research.net/corrosion.htm>

**Lead and Copper Fact Sheet; MSU Extension Water Quality**

<http://waterquality.montana.edu/docs/homeowners.shtml> (listed under "Drinking Water")

**Household Drinking Water Protection and Treatment; MSU Extension Service**

<http://waterquality.montana.edu/docs/homeowners.shtml> (listed under "Drinking Water")

**Northern Plains and Mountains Regional Water Program– Drinking Water Initiative**

<http://region8water.colostate.edu/regional/DrinkingWater/slideshow/projects.shtml>



### LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

**Client:** Goldn Humates LLC  
**Project:** 30 East Main St  
**Client Sample ID:** Well 01Z Catalytic Alt. Water @ AW  
**Sampled By:** Mysen McArthur  
**Lab ID:** B21090732-001D

**Report Date:** 09/23/21  
**Collection Date:** 09/09/21 08:00  
**Received Date:** 09/09/21 13:25  
**Matrix:** Drinking Water

Analyses	Result	Units	Safe/Unsafe	Qualifier	Method	Analysis Date / By
<b>MICROBIOLOGICAL</b>						
Coliform, Total	Absent	per 100ml	SAFE		A9223 B	09/09/21 15:12 / spb
Coliform, E-Coli	Absent	per 100ml			A9223 B	09/09/21 15:12 / spb

**Comments:** The notation "SAFE" indicates that the water was bacteriologically SAFE when sampled.  
The notation "UNSAFE" indicates that the water was bacteriologically UNSAFE when sampled.

**Qualifiers:**



### LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

**Client:** Goldn Humates LLC  
**Project:** 30 East Main St  
**Lab ID:** B21090732-001  
**Client Sample ID:** Well 01Z Catalytic Alt. Water @ AW

**Report Date:** 09/23/21  
**Collection Date:** 09/09/21 08:00  
**Date Received:** 09/09/21  
**Matrix:** Drinking Water

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
<b>PHYSICAL PROPERTIES</b>							
pH	7.9	s.u.	H	0.1		A4500-H B	09/21/21 14:47 / ftk
pH Measurement Temp	19.6	°C		1.0		A4500-H B	09/21/21 14:47 / ftk
Conductivity @ 25 C	1360	umhos/cm		5		A2510 B	09/21/21 14:47 / ftk
Corrosivity (Langelier Index)	1.1					A2330 B	09/23/21 13:16 / bap
Solids, Total Dissolved - Calculated	1000	mg/L		1.0		A1030 E	09/23/21 13:16 / bap
If a sample temperature at the time of collection is not provided, the Langelier is calculated using a default temperature of 20 degrees C.							
<b>INORGANICS</b>							
Alkalinity, Total as CaCO3	353	mg/L		4		A2320 B	09/10/21 22:15 / ftk
Bicarbonate as HCO3	431	mg/L		4		A2320 B	09/10/21 22:15 / ftk
Carbonate as CO3	ND	mg/L		4		A2320 B	09/10/21 22:15 / ftk
Chloride	34	mg/L		1		E300.0	09/10/21 19:31 / car
Sulfate	410	mg/L	D	2		E300.0	09/10/21 19:31 / car
Fluoride	1.1	mg/L		0.2		E300.0	09/10/21 19:31 / car
Hardness as CaCO3	555	mg/L		1		A2340 B	09/14/21 14:37 / bap
Hardness as CaCO3 - Grains	32.4	grains/gal		0.1		A2340 B	09/14/21 14:37 / bap
Sodium Adsorption Ratio (SAR)	1.95	unitless		0.01		Calculation	09/14/21 14:37 / bap
<b>NUTRIENTS</b>							
Nitrogen, Nitrate+Nitrite as N	4.28	mg/L		0.01	10	E353.2	09/17/21 13:28 / jpv
<b>METALS, ACID-SOLUBLE</b>							
Calcium	137	mg/L		1		E200.7	09/14/21 14:37 / rlh
Iron	ND	mg/L		0.03		E200.7	09/14/21 14:37 / rlh
Magnesium	51	mg/L		1		E200.7	09/14/21 14:37 / rlh
Potassium	4	mg/L		1		E200.7	09/14/21 14:37 / rlh
Sodium	106	mg/L		1		E200.7	09/14/21 14:37 / rlh
<b>QUALITY CONTROL</b>							
A/C Balance	-3.48	%				A1030 E	09/23/21 13:16 / bap

**Report Definitions:**  
 RL - Analyte Reporting Limit  
 QCL - Quality Control Limit  
 D - Reporting Limit (RL) increased due to sample matrix  
 MCL - Maximum Contaminant Level  
 ND - Not detected at the Reporting Limit (RL)  
 H - Analysis performed past the method holding time

Sample ID: B21090732-001

Client ID: GLDN-HMTS

### Livestock Suitability

Based on the mineral content only, the water is suitable for all classes of livestock.

### Irrigation Classification

Salinity Hazard	C3	<b>High-Salinity Water:</b>	cannot be used on soils with restricted drainage. Even with adequate drainage, special management for salinity control may be required and plants with good salt tolerance should be selected.
Sodium (Alkali) Hazard	S1	<b>Low-Sodium Water:</b>	can be used for irrigation on almost all soils with little danger of the development of harmful levels of exchangeable sodium. However, sodium-sensitive crops such as stone-fruit trees and avocados may accumulate injurious concentrations of sodium.



# QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Goldn Humates LLC

Work Order: B21090732

Report Date: 09/23/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: A2320 B</b> <span style="float: right;">Batch: R366879</span>										
<b>Lab ID: MBLK</b>		Method Blank								
Alkalinity, Total as CaCO3		ND	mg/L	4						Run: METROHM 2_210910A 09/10/21 20:50
<b>Lab ID: LCS</b>		Laboratory Control Sample								
Alkalinity, Total as CaCO3		102	mg/L	4.0	102	90	110			Run: METROHM 2_210910A 09/10/21 20:54
<b>Lab ID: B21090730-001ADUP</b>	3	Sample Duplicate								
Alkalinity, Total as CaCO3		592	mg/L	4.0				0.2	10	Run: METROHM 2_210910A 09/10/21 21:05
Bicarbonate as HCO3		722	mg/L	4.0				0.2	10	
Carbonate as CO3		ND	mg/L	4.0					10	
<b>Lab ID: B21090732-001ADUP</b>	3	Sample Duplicate								
Alkalinity, Total as CaCO3		353	mg/L	4.0				0.1	10	Run: METROHM 2_210910A 09/10/21 22:22
Bicarbonate as HCO3		430	mg/L	4.0				0.1	10	
Carbonate as CO3		ND	mg/L	4.0					10	

**Qualifiers:**

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)



# QA/QC Summary Report

Prepared by Billings, MT Branch

**Client:** Goldn Humates LLC

**Work Order:** B21090732

**Report Date:** 09/23/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method:</b> A2510 B										Batch: R367323
<b>Lab ID:</b> SC 2nd 1413		Laboratory Control Sample					Run: PHSC_101-B_210921A			09/21/21 09:11
Conductivity @ 25 C		1400 umhos/cm		5.0	99	90	110			
<b>Lab ID:</b> MBLK		Method Blank					Run: PHSC_101-B_210921A			09/21/21 13:11
Conductivity @ 25 C		ND umhos/cm		5						
<b>Lab ID:</b> B21091695-014ADUP		Sample Duplicate					Run: PHSC_101-B_210921A			09/21/21 13:17
Conductivity @ 25 C		9650 umhos/cm		5.0				0.0	10	
<b>Lab ID:</b> B21091728-001ADUP		Sample Duplicate					Run: PHSC_101-B_210921A			09/21/21 15:10
Conductivity @ 25 C		644 umhos/cm		5.0				0.0	10	

**Qualifiers:**

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# QA/QC Summary Report

Prepared by Billings, MT Branch

**Client:** Goldn Humates LLC

**Work Order:** B21090732

**Report Date:** 09/23/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual	
<b>Method:</b> A4500-H B		Analytical Run: PHSC _101-B_210921A									
<b>Lab ID:</b> pH 8	2	Initial Calibration Verification Standard								09/21/21 08:58	
pH		8.0	s.u.	0.1	100	98	102				
pH Measurement Temp		18.2	°C	1.0							
<b>Method:</b> A4500-H B		Batch: R367323									
<b>Lab ID:</b> B21091695-014ADUP	2	Sample Duplicate								Run: PHSC _101-B_210921A	09/21/21 13:17
pH		8.8	s.u.	0.1				0.0	3		
pH Measurement Temp		17.3	°C	1.0							
<b>Lab ID:</b> B21091728-001ADUP	2	Sample Duplicate								Run: PHSC _101-B_210921A	09/21/21 15:10
pH		7.6	s.u.	0.1				0.0	3		
pH Measurement Temp		15.9	°C	1.0							

**Qualifiers:**

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# QA/QC Summary Report

Prepared by Billings, MT Branch

**Client:** Goldn Humates LLC

**Work Order:** B21090732

**Report Date:** 09/23/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual	
<b>Method:</b> E200.7		Analytical Run: ICP204-B_210914A									
<b>Lab ID:</b> ICV	5	Continuing Calibration Verification Standard							09/14/21 10:06		
Calcium		25.0	mg/L	1.0	100	95	105				
Iron		2.46	mg/L	0.020	98	95	105				
Magnesium		24.8	mg/L	1.0	99	95	105				
Potassium		24.7	mg/L	1.0	99	95	105				
Sodium		24.8	mg/L	1.0	99	95	105				
<b>Method:</b> E200.7		Batch: R367014									
<b>Lab ID:</b> MB-7400DIS2109014A	5	Method Blank							Run: ICP204-B_210914A 09/14/21 10:14		
Calcium		ND	mg/L	0.3							
Iron		ND	mg/L	0.01							
Magnesium		ND	mg/L	0.02							
Potassium		ND	mg/L	0.1							
Sodium		ND	mg/L	0.3							
<b>Lab ID:</b> LFB-7400DIS210914A	5	Laboratory Fortified Blank							Run: ICP204-B_210914A 09/14/21 10:23		
Calcium		49.1	mg/L	1.0	98	85	115				
Iron		4.59	mg/L	0.020	92	85	115				
Magnesium		49.8	mg/L	1.0	100	85	115				
Potassium		48.0	mg/L	1.0	96	85	115				
Sodium		46.4	mg/L	1.0	93	85	115				
<b>Lab ID:</b> B21090803-001CMS2	5	Sample Matrix Spike							Run: ICP204-B_210914A 09/14/21 14:24		
Calcium		102	mg/L	1.0	101	70	130				
Iron		4.85	mg/L	0.020	97	70	130				
Magnesium		60.9	mg/L	1.0	99	70	130				
Potassium		62.8	mg/L	1.0	100	70	130				
Sodium		119	mg/L	1.0	101	70	130				
<b>Lab ID:</b> B21090803-001CMSD	5	Sample Matrix Spike Duplicate							Run: ICP204-B_210914A 09/14/21 14:28		
Calcium		99.7	mg/L	1.0	97	70	130	2.5	20		
Iron		4.64	mg/L	0.020	93	70	130	4.5	20		
Magnesium		59.0	mg/L	1.0	96	70	130	3.2	20		
Potassium		60.8	mg/L	1.0	96	70	130	3.2	20		
Sodium		115	mg/L	1.0	92	70	130	3.9	20		

**Qualifiers:**

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## QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Goldn Humates LLC

Work Order: B21090732

Report Date: 09/23/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual	
<b>Method: E300.0</b>		Analytical Run: IC METROHM 1_210908A									
<b>Lab ID: ICV</b>	3	Initial Calibration Verification Standard								09/08/21 12:48	
Chloride		24.6	mg/L	1.0	98	90	110				
Sulfate		102	mg/L	1.0	102	90	110				
Fluoride		1.24	mg/L	0.10	99	90	110				
<b>Method: E300.0</b>		Batch: R366808									
<b>Lab ID: ICB</b>	3	Method Blank								Run: IC METROHM 1_210908A	09/08/21 13:03
Chloride		ND	mg/L	0.06							
Sulfate		ND	mg/L	0.1							
Fluoride		0.02	mg/L	0.01							
<b>Lab ID: LFB</b>	3	Laboratory Fortified Blank								Run: IC METROHM 1_210908A	09/08/21 13:50
Chloride		24.5	mg/L	1.0	98	90	110				
Sulfate		103	mg/L	1.0	103	90	110				
Fluoride		1.37	mg/L	0.10	110	90	110				
<b>Lab ID: B21090297-057AMS</b>	3	Sample Matrix Spike								Run: IC METROHM 1_210908A	09/10/21 17:12
Chloride		1480	mg/L	13	110	90	110				
Sulfate		13600	mg/L	26	129	90	110			S	
Fluoride		66.6	mg/L	0.66	107	90	110				
<b>Lab ID: B21090297-057AMSD</b>	3	Sample Matrix Spike Duplicate								Run: IC METROHM 1_210908A	09/10/21 17:28
Chloride		1370	mg/L	13	101	90	110	8.2	20		
Sulfate		12600	mg/L	26	109	90	110	7.6	20		
Fluoride		61.2	mg/L	0.66	98	90	110	8.4	20		

**Qualifiers:**

RL - Analyte Reporting Limit

ND - Not detected at the Reporting Limit (RL)

S - Spike recovery outside of advisory limits



## QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Goldn Humates LLC

Work Order: B21090732

Report Date: 09/23/21

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
<b>Method: E353.2</b>										Analytical Run: FIA203-B_210917A
<b>Lab ID: ICV</b>		Initial Calibration Verification Standard								09/17/21 12:07
Nitrogen, Nitrate+Nitrite as N		0.551	mg/L	0.010	98	90	110			
<b>Lab ID: CCV</b>		Continuing Calibration Verification Standard								09/17/21 13:19
Nitrogen, Nitrate+Nitrite as N		0.992	mg/L	0.010	99	90	110			
<b>Lab ID: CCV</b>		Continuing Calibration Verification Standard								09/17/21 13:35
Nitrogen, Nitrate+Nitrite as N		0.990	mg/L	0.010	99	90	110			
<b>Method: E353.2</b>										Batch: R367209
<b>Lab ID: MBLK</b>		Method Blank								09/17/21 12:08
Nitrogen, Nitrate+Nitrite as N		ND	mg/L	0.006						Run: FIA203-B_210917A
<b>Lab ID: LFB</b>		Laboratory Fortified Blank								09/17/21 12:10
Nitrogen, Nitrate+Nitrite as N		0.999	mg/L	0.010	100	90	110			Run: FIA203-B_210917A
<b>Lab ID: B21090730-007DMS</b>		Sample Matrix Spike								09/17/21 13:23
Nitrogen, Nitrate+Nitrite as N		0.780	mg/L	0.010	78	90	110			S
<b>Lab ID: B21090730-007DMSD</b>		Sample Matrix Spike Duplicate								09/17/21 13:24
Nitrogen, Nitrate+Nitrite as N		0.783	mg/L	0.010	78	90	110	0.4	10	S
<b>Lab ID: B21090743-001DMS</b>		Sample Matrix Spike								09/17/21 13:38
Nitrogen, Nitrate+Nitrite as N		1.37	mg/L	0.010	102	90	110			Run: FIA203-B_210917A
<b>Lab ID: B21090743-001DMSD</b>		Sample Matrix Spike Duplicate								09/17/21 13:39
Nitrogen, Nitrate+Nitrite as N		1.35	mg/L	0.010	99	90	110	1.9	10	

**Qualifiers:**

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S - Spike recovery outside of advisory limits



# Work Order Receipt Checklist

Goldn Humates LLC

B21090732

Login completed by: Taylor K. Burris

Date Received: 9/9/2021

Reviewed by: BL2000\darcy

Received by: dac

Reviewed Date: 9/9/2021

Carrier name: Hand Del

Shipping container/cooler in good condition?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on all shipping container(s)/cooler(s)?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Custody seals intact on all sample bottles?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	Not Present <input checked="" type="checkbox"/>
Chain of custody present?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody signed when relinquished and received?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Chain of custody agrees with sample labels?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Samples in proper container/bottle?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sample containers intact?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Sufficient sample volume for indicated test?	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Not Applicable <input type="checkbox"/>
Container/Temp Blank temperature:	23.8°C No Ice		
Containers requiring zero headspace have no headspace or bubble that is <6mm (1/4").	Yes <input type="checkbox"/>	No <input type="checkbox"/>	No VOA vials submitted <input checked="" type="checkbox"/>
Water - pH acceptable upon receipt?	Yes <input type="checkbox"/>	No <input checked="" type="checkbox"/>	Not Applicable <input type="checkbox"/>

## Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Radiochemical precision results represent a 2-sigma Total Measurement Uncertainty.

## Contact and Corrective Action Comments:

The Domestic water sample was preserved in the laboratory upon receipt. The sample for Metals was preserved to pH <2 with 2 mL of nitric acid per 250 mL and the sample for Nitrate + Nitrite was preserved to pH <2 with 2 mL of sulfuric acid per 250 mL.



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Gallatin, WY 307.686.7175 • Helena MT 406.442.8711

## Domestic plus Bacteria

### Chain-of-Custody

**Payment is expected upon receipt of samples**

The cost of analysis is \$167.00 per sample.

The laboratory must receive the sample within 30 hours of sampling.

The laboratory prefers to receive all bacteria samples before 4:30 Monday-Thursday of each week.

Samples received on Friday are subject to additional weekend fees.

The laboratory will be closed on all major holidays and will not accept bacteria samples one day before any major holiday.

The turnaround time is 7 business days.

Account Information	Report Address <i>(leave blank if same as Account Information)</i>
Company/Name: <u>GOLD'N HUMATES LLC</u>	Company/Name:
Contact: <u>NOEL TANNER</u>	Contact:
Phone: <u>307-250-9092</u>	Phone:
Mailing Address: <u>PO BOX 275</u>	Mailing Address:
City, State, Zip: <u>BYRON, WY 82412</u>	City, State, Zip:
Email: <u>noeltanner@comcast.net</u>	Email:
How would you like to receive the report: <input checked="" type="checkbox"/> Hard Copy <input checked="" type="checkbox"/> Email	How would you like to receive the report: <input type="checkbox"/> Hard Copy <input type="checkbox"/> Email

Physical Address	Source / Site <small>(Well, Cistern, Kitchen Sink, Direct, etc.)</small>	Collection Date	Collection Time
<u>30 E. MAIN ST.</u>	<u>WELL 01Z</u>	<u>09/09/21</u>	<u>8:00 AM</u>

Sampler Name (Printed): Mysen McArthur CATALYTIC ALTERED H<sub>2</sub>O @ A W Company (if applicable): \_\_\_\_\_

Sampler Signature: [Signature]  
I hereby acknowledge that this sample was collected at the above location, date and time.

<b>Custody Record MUST be Signed</b>	Relinquished by Signature: <u>[Signature]</u>	Date/Time: <u>09/09/21 9:26 AM</u>	Received by Signature: <u>[Signature]</u>	Date/Time: <u>9/09/21 9:30</u>
	Relinquished by Signature: <u>[Signature]</u>	Date/Time: <u>9/9/21</u>	Received by Laboratory Signature: <u>[Signature]</u>	Date/Time: <u>9/9/21 13:25</u>

LABORATORY USE ONLY				
Shipped by: _____	Custody Seals: Y N C B Intact: Y N	Receipt Temp: _____ °C	Temp Blank: Y N	On Ice: Y N
Payment Type (circle one) <u>CC</u> CASH CHK _____		Amount: \$ <u>167</u>	Receipt Number: <u>0909211305</u> <small>(Applicable to Cash &amp; Check Payments)</small>	
ELI Laboratory ID: <u>B21090732</u>				

Source site: Catalytic altered water