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24 June 2022

Tony Snow
Element Specialty Products
PO Box 789
Bloomfield, NM 87413
RE: API +

Enclosed are the results of analyses for samples received by the laboratory on 06/13/22 16:35. The data to follow was performed, in whole or in part, by Green Analytical Laboratories. Any data that was performed by a subcontract laboratory is included within the GAL report, or with an additional report attached.

If you need any further assistance, please feel free to contact me.

Sincerely,

A handwritten signature in blue ink that reads "Brenna Kampf". The signature is written in a cursive, flowing style.

Brenna Kampf
Project Manager

All accredited analytes contained in this report are denoted by an asterisk (*). For a complete list of accredited analytes please do not hesitate to contact us via any of the contact information contained in this report. All of our certifications can be viewed at <http://greenanalytical.com/certifications/>

Green Analytical Laboratories is NELAP accredited through the Texas Commission on Environmental Quality. Accreditation applies to drinking water and non-potable water matrices for trace metals and a variety of inorganic parameters. Green Analytical Laboratories is also accredited through the Colorado Department of Public Health and Environment and EPA region 8 for trace metals, Cyanide, Fluoride, Nitrate, and Nitrite in drinking water. TNI Certificate Number: T104704514-22-14

Our affiliate laboratory, Cardinal Laboratories, is also NELAP accredited through the Texas Commission on Environmental Quality for a variety of organic constituents in drinking water, non-potable water and solid matrices. Cardinal is also accredited for regulated VOCs, TTHM, and HAA-5 in drinking water through the Colorado Department of Public Health and Environment and EPA region 8. TNI Certificate Number: T104704398-22-15



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Project: API +
Project Name / Number: [none]
Project Manager: Tony Snow

Reported:
06/24/22 09:46

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
WO Hughes #3	2206147-01	Water	06/13/22 16:35	06/13/22 16:35	

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Brenna Kampf, Project Manager

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WO Hughes #3**2206147-01 (Produced Water)**

Analyte	Result	RL	MDL	Units	Dilution	Analyzed	Method	Notes	Analyst
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General Chemistry

Alkalinity, Bicarbonate as CaCO ₃ *	500	10.0	2.27	mg/L	5	06/20/22 14:50	2320 B		VJW
Alkalinity, Carbonate as CaCO ₃ *	140	10.0	2.27	mg/L	5	06/20/22 14:50	2320 B		VJW
Alkalinity, Hydroxide as CaCO ₃ *	<10.0	10.0	2.27	mg/L	5	06/20/22 14:50	2320 B		VJW
Alkalinity, Total as CaCO ₃ *	640	10.0	2.27	mg/L	5	06/20/22 14:50	2320 B		VJW
Chloride*	<20.0	20.0	1.11	mg/L	20	06/21/22 17:25	EPA300.0		AES
Conductivity*	1120	1.00		umho/cm @ 25.0°C	1	06/15/22 15:00	2510 B		PMS
pH*	8.69			pH Units	1	06/15/22 15:00	EPA150.1		PMS
pH Temperature, degrees C	19.7			pH Units	1	06/15/22 15:00	EPA150.1		PMS
Resistivity	893			ohm/cm	1	06/15/22 15:00	2510 B		VJW
Total Dissolved Solids*	690	10.0		mg/L	1	06/15/22 16:25	EPA160.1		VJW
Specific Gravity	1.002	0.8000		No Unit	1	06/14/22 15:20	ASTM D1429-03		VJW
Sulfate*	<20.0	20.0	2.48	mg/L	20	06/21/22 17:25	EPA300.0		AES

Potentially Dissolved Metals by ICP

Hardness	3.63	3.31	0.928	mg/L	5	06/22/22 19:27	2340 B		AES
Silica Potentially Dissolved	5.77	5.35	0.341	mg/L	5	06/22/22 19:27	2340 B		AES
Barium*	<0.100	0.100	0.042	mg/L	5	06/22/22 19:27	EPA200.7		AES
Calcium*	1.45	0.500	0.118	mg/L	5	06/22/22 19:27	EPA200.7		AES
Iron*	0.346	0.250	0.178	mg/L	5	06/22/22 19:27	EPA200.7		AES
Lead*	<0.500	0.500	0.0960	mg/L	5	06/22/22 19:27	EPA200.7		AES
Magnesium*	<0.500	0.500	0.154	mg/L	5	06/22/22 19:27	EPA200.7		AES
Manganese*	<0.100	0.100	0.037	mg/L	5	06/22/22 19:27	EPA200.7		AES
Potassium*	<5.00	5.00	0.325	mg/L	5	06/22/22 19:26	EPA200.7		AES
Silicon	2.70	2.50	0.160	mg/L	5	06/22/22 19:27	EPA200.7		AES
Sodium*	272	5.00	0.528	mg/L	5	06/22/22 19:26	EPA200.7		AES
Strontium*	<0.500	0.500	0.021	mg/L	5	06/22/22 19:26	EPA200.7		AES
Zinc*	<0.500	0.500	0.037	mg/L	5	06/22/22 19:27	EPA200.7		AES

Cation/Anion Balance -6.05

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Brenna Kampf, Project Manager

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Project Manager: Tony Snow

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General Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B221571 - General Prep - Wet Chem										
Duplicate (B221571-DUP1) Source: 2206109-01 Prepared & Analyzed: 06/14/22										
Specific Gravity	1.035	0.8000	No Unit		1.037			0.193	20	
Batch B221577 - General Prep - Wet Chem										
Blank (B221577-BLK1) Prepared & Analyzed: 06/15/22										
Total Dissolved Solids	ND	10.0	mg/L							
Duplicate (B221577-DUP1) Source: 2206128-01 Prepared & Analyzed: 06/15/22										
Total Dissolved Solids	155	10.0	mg/L		145			6.61	20	
Reference (B221577-SRM1) Prepared & Analyzed: 06/15/22										
Total Dissolved Solids	390	10.0	mg/L	380		103	85-115			
Batch B221594 - General Prep - Wet Chem										
Duplicate (B221594-DUP1) Source: 2206147-01 Prepared & Analyzed: 06/15/22										
pH	8.70		pH Units		8.69			0.115	20	
pH Temperature, degrees C	19.7		pH Units		19.7			0.00	200	
Reference (B221594-SRM1) Prepared & Analyzed: 06/15/22										
pH	7.02		pH Units	7.00		100	98.57-101.42			
Batch B221595 - General Prep - Wet Chem										
Duplicate (B221595-DUP1) Source: 2206147-01 Prepared & Analyzed: 06/15/22										
Conductivity	1110	1.00	umho/cm @ 25.0°C		1120			0.627	20	
Reference (B221595-SRM1) Prepared & Analyzed: 06/15/22										
Conductivity	1020	1.00	umho/cm @ 25.0°C	1000		102	90-110			
Batch B221626 - General Prep - Wet Chem										
Blank (B221626-BLK1) Prepared & Analyzed: 06/20/22										
Alkalinity, Bicarbonate as CaCO3	ND	10.0	mg/L							
Alkalinity, Carbonate as CaCO3	ND	10.0	mg/L							
Alkalinity, Hydroxide as CaCO3	ND	10.0	mg/L							
Alkalinity, Total as CaCO3	ND	10.0	mg/L							
LCS (B221626-BS1) Prepared & Analyzed: 06/20/22										

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**General Chemistry - Quality Control
(Continued)**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B221626 - General Prep - Wet Chem (Continued)

LCS (B221626-BS1) (Continued)

Prepared & Analyzed: 06/20/22

Alkalinity, Bicarbonate as CaCO3	106	10.0	mg/L	100		106	85-115			
Alkalinity, Carbonate as CaCO3	ND	10.0	mg/L				85-115			
Alkalinity, Hydroxide as CaCO3	ND	10.0	mg/L				85-115			
Alkalinity, Total as CaCO3	106	10.0	mg/L	100		106	85-115			

LCS Dup (B221626-BS1)

Prepared & Analyzed: 06/20/22

Alkalinity, Bicarbonate as CaCO3	104	10.0	mg/L	100		104	85-115	1.90	20	
Alkalinity, Carbonate as CaCO3	ND	10.0	mg/L				85-115		20	
Alkalinity, Hydroxide as CaCO3	ND	10.0	mg/L				85-115		20	
Alkalinity, Total as CaCO3	104	10.0	mg/L	100		104	85-115	1.90	20	

Batch B221639 - IC- Ion Chromatograph

Blank (B221639-BLK1)

Prepared & Analyzed: 06/21/22

Chloride	ND	1.00	mg/L							
Sulfate	ND	1.00	mg/L							

LCS (B221639-BS1)

Prepared & Analyzed: 06/21/22

Chloride	24.6	1.00	mg/L	25.0		98.6	90-110			
Sulfate	24.1	1.00	mg/L	25.0		96.3	90-110			

LCS Dup (B221639-BS1)

Prepared & Analyzed: 06/21/22

Chloride	24.6	1.00	mg/L	25.0		98.5	90-110	0.130	20	
Sulfate	24.0	1.00	mg/L	25.0		96.2	90-110	0.158	20	

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Potentially Dissolved Metals by ICP - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B221665 - Potentially Dissolved ICP

Blank (B221665-BLK1)

Prepared & Analyzed: 06/22/22

Barium	ND	0.020	mg/L							
Calcium	ND	0.100	mg/L							
Iron	ND	0.050	mg/L							
Lead	ND	0.100	mg/L							
Magnesium	ND	0.100	mg/L							
Manganese	ND	0.020	mg/L							
Potassium	ND	1.00	mg/L							
Silicon	ND	0.500	mg/L							
Sodium	ND	1.00	mg/L							
Strontium	ND	0.100	mg/L							
Zinc	ND	0.100	mg/L							

LCS (B221665-BS1)

Prepared & Analyzed: 06/22/22

Barium	2.41	0.020	mg/L	2.50	96.4	85-115				
Calcium	4.64	0.100	mg/L	5.00	92.9	85-115				
Iron	4.60	0.050	mg/L	5.00	92.0	85-115				
Lead	2.34	0.100	mg/L	2.50	93.8	85-115				
Magnesium	24.4	0.100	mg/L	25.0	97.5	85-115				
Manganese	2.33	0.020	mg/L	2.50	93.1	85-115				
Potassium	9.47	1.00	mg/L	10.0	94.7	85-115				
Silicon	4.98	0.500	mg/L	5.00	99.6	85-115				
Sodium	3.92	1.00	mg/L	4.05	96.7	85-115				
Strontium	4.72	0.100	mg/L	5.00	94.3	85-115				
Zinc	2.32	0.100	mg/L	2.50	92.9	85-115				

LCS Dup (B221665-BSD1)

Prepared & Analyzed: 06/22/22

Barium	2.46	0.020	mg/L	2.50	98.3	85-115	1.88	20		
Calcium	4.66	0.100	mg/L	5.00	93.2	85-115	0.303	20		
Iron	4.61	0.050	mg/L	5.00	92.2	85-115	0.266	20		
Lead	2.36	0.100	mg/L	2.50	94.5	85-115	0.720	20		
Magnesium	24.5	0.100	mg/L	25.0	98.2	85-115	0.721	20		
Manganese	2.37	0.020	mg/L	2.50	94.6	85-115	1.57	20		
Potassium	9.64	1.00	mg/L	10.0	96.4	85-115	1.77	20		
Silicon	4.87	0.500	mg/L	5.00	97.5	85-115	2.23	20		
Sodium	3.97	1.00	mg/L	4.05	98.0	85-115	1.26	20		
Strontium	4.78	0.100	mg/L	5.00	95.7	85-115	1.44	20		
Zinc	2.33	0.100	mg/L	2.50	93.3	85-115	0.377	20		

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Notes and Definitions

- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
*Results reported on as received basis unless designated as dry.
- RPD Relative Percent Difference
- LCS Laboratory Control Sample (Blank Spike)
- RL Report Limit
- MDL Method Detection Limit

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State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 137739

CONDITIONS

Operator: LOGOS OPERATING, LLC 2010 Afton Place Farmington, NM 87401	OGRID: 289408
	Action Number: 137739
	Action Type: [UF-BHT] Bradenhead Test (BRADENHEAD TEST)

CONDITIONS

Created By	Condition	Condition Date
mkuehling	for record only	8/26/2022