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28 July 2022

Kyle Siesser
Cottonwood Consulting
PO Box 1653
Durango, CO 81302
RE: Rule 615

Enclosed are the results of analyses for samples received by the laboratory on 07/15/22 15:16. 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 'Jeremy D. Allen'.

Jeremy D Allen For 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



Cottonwood Consulting	Project: Rule 615	
PO Box 1653	Project Name / Number: Bryce (OWP) #1-X	Reported:
Durango CO, 81302	Project Manager: Kyle Siesser	07/28/22 11:01

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received	Notes
Bryce (OWP) 1-X Wellbore Fluid	2207181-01	Water	07/15/22 14:00	07/15/22 15:16	

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Jeremy D Allen For Brenna Kampf, Project Manager

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Bryce (OWP) 1-X Wellbore Fluid

2207181-01 (Water)

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

Alkalinity, Bicarbonate as CaCO3*	3420	10.0	2.27	mg/L	20	07/25/22 14:45	2320 B		VJW
Alkalinity, Carbonate as CaCO3*	<10.0	10.0	2.27	mg/L	20	07/25/22 14:45	2320 B		VJW
Alkalinity, Hydroxide as CaCO3*	<10.0	10.0	2.27	mg/L	20	07/25/22 14:45	2320 B		VJW
Alkalinity, Total as CaCO3*	3420	10.0	2.27	mg/L	20	07/25/22 14:45	2320 B		VJW
Bromide	4.45	0.800	0.219	mg/L	8	07/26/22 15:26	EPA300.0		AES
Chloride*	881	8.00	0.444	mg/L	8	07/26/22 15:26	EPA300.0		AES
Conductivity*	7500	1.00		umho/cm @ 25.0°C	1	07/15/22 16:41	2510 B		QEB
Fluoride*	0.936	0.800	0.0777	mg/L	8	07/26/22 15:26	EPA300.0		AES
Nitrate/Nitrite as N*	<0.100	0.100	0.059	mg/L as N	5	07/19/22 12:10	EPA353.2		HTB
pH*	7.01			pH Units	1	07/15/22 16:41	EPA150.1		QEB
pH Temperature, degrees C	20.3			pH Units	1	07/15/22 16:41	EPA150.1		QEB
Phosphorus, Total	<0.250	0.250	0.0819	mg P/L	5	07/20/22 09:28	EPA365.1		HTB
SAR	47.8			No Unit	1	07/26/22 17:09	Calculation		AES
Total Dissolved Solids*	4870	10.0		mg/L	1	07/21/22 16:22	EPA160.1		VJW
Sulfate*	<8.00	8.00	0.992	mg/L	8	07/26/22 15:26	EPA300.0		AES

Total Recoverable Metals by ICP (E200.7)

Boron	<1.50	1.50	0.465	mg/L	5	07/26/22 17:09	EPA200.7		AES
Calcium*	96.7	0.500	0.192	mg/L	5	07/26/22 17:09	EPA200.7		AES
Hardness as CaCO3	262	3.31	1.09	mg/L	5	07/26/22 17:09	2340 B		AES
Iron*	155	0.250	0.189	mg/L	5	07/26/22 17:09	EPA200.7		AES
Magnesium*	5.08	0.500	0.148	mg/L	5	07/26/22 17:09	EPA200.7		AES
Potassium*	5.70	5.00	0.888	mg/L	5	07/26/22 17:09	EPA200.7		AES
Sodium*	1780	5.00	0.380	mg/L	5	07/26/22 17:09	EPA200.7		AES
Strontium*	7.65	0.500	0.091	mg/L	5	07/26/22 17:09	EPA200.7		AES

Total Recoverable Metals by ICPMS (E200.8)

Barium*	8.77	0.0025	0.0015	mg/L	5	07/19/22 15:20	EPA200.8		AES
Manganese*	1.11	0.0100	0.0009	mg/L	5	07/19/22 15:20	EPA200.8		AES
Selenium*	<0.0050	0.0050	0.0035	mg/L	5	07/19/22 15:20	EPA200.8		AES

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Bryce (OWP) 1-X Wellbore Fluid

2207181-01 (Water)

Analyte	Result	RL	MDL	Units	Dilution	Analyzed	Method	Notes	Analyst
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Other

Iron-Related Bacteria	High Aggressivity			CFU/mL	1	07/15/22 16:00	Lab Procedure		LLG
Slime-Forming Bacteria	Medium Aggressivity			CFU/mL	1	07/15/22 16:00	Lab Procedure		LLG
Sulfate-Reducing Bacteria	High Aggressivity			CFU/mL	1	07/15/22 16:00	Lab Procedure		LLG

Subcontracted -- Cardinal Laboratories 101 East Marland Hobbs, NM 88240

Volatile Organic Compounds by EPA Method 8021

Benzene*	2.69	0.050	0.004	mg/L	50	07/21/22 11:01	8021B		JH/
Toluene*	<0.050	0.050	0.006	mg/L	50	07/21/22 11:01	8021B		JH/
Ethylbenzene*	0.137	0.050	0.008	mg/L	50	07/21/22 11:01	8021B		JH/
Total Xylenes*	0.220	0.150	0.016	mg/L	50	07/21/22 11:01	8021B		JH/
Total BTEX	3.06	0.300	0.049	mg/L	50	07/21/22 11:01	8021B		JH/

Surrogate: 4-Bromofluorobenzene (PID) 97.6 % 77.1-124 07/21/22 11:01 8021B JH/

Petroleum Hydrocarbons by GC FID

GRO C6-C10*	5.72	1.00	0.295	mg/L	0.1	07/22/22 11:23	8015B		MS
DRO >C10-C28*	5.31	1.00	0.670	mg/L	0.1	07/22/22 11:23	8015B		MS
EXT DRO >C28-C36	1.39	1.00	0.670	mg/L	0.1	07/22/22 11:23	8015B		MS

Surrogate: 1-Chlorooctane 76.0 % 44.9-146 07/22/22 11:23 8015B MS

Surrogate: 1-Chlorooctadecane 81.5 % 39.8-162 07/22/22 11:23 8015B MS

Subcontracted -- SunStar Laboratories, Inc. 25712 Commercentre Drive Lake Forest, CA 92630

RSK-175

Methane	9200	3.28	0.364	ug/l	1	07/22/22 10:57	RSK-175		TL
Ethane	689	6.15	1.16	ug/l	1	07/22/22 10:57	RSK-175		TL
Propane	245	9.02	0.577	ug/l	1	07/22/22 10:57	RSK-175		TL

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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 B221915 - General Prep - Wet Chem										
Reference (B221915-SRM1) Prepared & Analyzed: 07/15/22										
pH	7.03		pH Units	7.00		100	98.57-101.42			
Batch B221916 - General Prep - Wet Chem										
Reference (B221916-SRM1) Prepared & Analyzed: 07/15/22										
Conductivity	1030	1.00	umho/cm @ 25.0°C	1000		103	90-110			
Batch B221921 - Total Recoverable by ICP										
Blank (B221921-BLK1) Prepared: 07/18/22 Analyzed: 07/26/22										
SAR	0.00		No Unit							
Batch B221938 - Lachat										
Blank (B221938-BLK1) Prepared & Analyzed: 07/19/22										
Nitrate/Nitrite as N	ND	0.020	mg/L as N							
LCS (B221938-BS1) Prepared & Analyzed: 07/19/22										
Nitrate/Nitrite as N	1.06	0.020	mg/L as N	1.00		106	90-110			
LCS Dup (B221938-BSD1) Prepared & Analyzed: 07/19/22										
Nitrate/Nitrite as N	1.06	0.020	mg/L as N	1.00		106	90-110	0.254	20	
Batch B221943 - Lachat										
Blank (B221943-BLK1) Prepared: 07/19/22 Analyzed: 07/20/22										
Phosphorus, Total	ND	0.0500	mg P/L							
LCS (B221943-BS1) Prepared: 07/19/22 Analyzed: 07/20/22										
Phosphorus, Total	2.67	0.0500	mg P/L	2.50		107	90-110			
LCS Dup (B221943-BSD1) Prepared: 07/19/22 Analyzed: 07/20/22										
Phosphorus, Total	2.68	0.0500	mg P/L	2.50		107	90-110	0.628	20	
Batch B221982 - General Prep - Wet Chem										
Blank (B221982-BLK1) Prepared & Analyzed: 07/21/22										
Total Dissolved Solids	ND	10.0	mg/L							
Reference (B221982-SRM1) Prepared & Analyzed: 07/21/22										

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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 B221982 - General Prep - Wet Chem (Continued)

Reference (B221982-SRM1) (Continued)

Prepared & Analyzed: 07/21/22

Total Dissolved Solids	380	10.0	mg/L	380		100	85-115			
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Batch B222004 - General Prep - Wet Chem

Blank (B222004-BLK1)

Prepared & Analyzed: 07/25/22

Alkalinity, Total as CaCO3	ND	10.0	mg/L							
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LCS (B222004-BS1)

Prepared & Analyzed: 07/25/22

Alkalinity, Bicarbonate as CaCO3	104	10.0	mg/L	100		104	85-115			
Alkalinity, Total as CaCO3	104	10.0	mg/L	100		104	85-115			

LCS Dup (B222004-BSD1)

Prepared & Analyzed: 07/25/22

Alkalinity, Bicarbonate as CaCO3	107	10.0	mg/L	100		107	85-115	2.84	20	
Alkalinity, Total as CaCO3	107	10.0	mg/L	100		107	85-115	2.84	20	

Batch B222013 - IC- Ion Chromatograph

Blank (B222013-BLK1)

Prepared & Analyzed: 07/26/22

Bromide	ND	0.100	mg/L							
Chloride	ND	1.00	mg/L							
Fluoride	ND	0.100	mg/L							
Sulfate	ND	1.00	mg/L							

LCS (B222013-BS1)

Prepared & Analyzed: 07/26/22

Bromide	2.40	0.100	mg/L	2.50		96.0	90-110			
Chloride	24.8	1.00	mg/L	25.0		99.2	90-110			
Fluoride	2.39	0.100	mg/L	2.50		95.6	90-110			
Sulfate	24.3	1.00	mg/L	25.0		97.2	90-110			

LCS Dup (B222013-BSD1)

Prepared & Analyzed: 07/26/22

Bromide	2.42	0.100	mg/L	2.50		96.6	90-110	0.623	20	
Chloride	24.8	1.00	mg/L	25.0		99.1	90-110	0.101	20	
Fluoride	2.39	0.100	mg/L	2.50		95.6	90-110	0.00	20	
Sulfate	24.3	1.00	mg/L	25.0		97.1	90-110	0.148	20	

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Durango CO, 81302	Project Manager: Kyle Siesser	07/28/22 11:01

Total Recoverable Metals by ICP (E200.7) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B221921 - Total Recoverable by ICP

Blank (B221921-BLK1)

Prepared: 07/18/22 Analyzed: 07/26/22

Boron	ND	0.300	mg/L							
Calcium	ND	0.100	mg/L							
Iron	ND	0.050	mg/L							
Magnesium	ND	0.100	mg/L							
Potassium	ND	1.00	mg/L							
Sodium	ND	1.00	mg/L							
Strontium	ND	0.100	mg/L							

LCS (B221921-BS1)

Prepared: 07/18/22 Analyzed: 07/26/22

Boron	1.97	0.300	mg/L	2.00		98.7	85-115			
Calcium	1.96	0.100	mg/L	2.00		97.8	85-115			
Iron	1.98	0.050	mg/L	2.00		98.8	85-115			
Magnesium	9.95	0.100	mg/L	10.0		99.5	85-115			
Potassium	3.93	1.00	mg/L	4.00		98.2	85-115			
Sodium	1.63	1.00	mg/L	1.62		100	85-115			
Strontium	1.96	0.100	mg/L	2.00		98.0	85-115			

LCS Dup (B221921-BS1)

Prepared: 07/18/22 Analyzed: 07/26/22

Boron	1.98	0.300	mg/L	2.00		99.0	85-115	0.389	20	
Calcium	1.95	0.100	mg/L	2.00		97.5	85-115	0.317	20	
Iron	1.99	0.050	mg/L	2.00		99.3	85-115	0.453	20	
Magnesium	9.95	0.100	mg/L	10.0		99.5	85-115	0.0363	20	
Potassium	3.97	1.00	mg/L	4.00		99.3	85-115	1.06	20	
Sodium	1.62	1.00	mg/L	1.62		99.8	85-115	0.602	20	
Strontium	1.96	0.100	mg/L	2.00		98.1	85-115	0.135	20	

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Durango CO, 81302	Project Manager: Kyle Siesser	07/28/22 11:01

Total Recoverable Metals by ICPMS (E200.8) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B221923 - Total Recoverable by ICPMS

Blank (B221923-BLK1)

Prepared: 07/18/22 Analyzed: 07/19/22

Barium	ND	0.0005	mg/L							
Manganese	ND	0.0020	mg/L							
Selenium	ND	0.0010	mg/L							

LCS (B221923-BS1)

Prepared: 07/18/22 Analyzed: 07/19/22

Barium	0.0496	0.0005	mg/L	0.0500		99.2	85-115			
Manganese	0.0474	0.0020	mg/L	0.0500		94.7	85-115			
Selenium	0.248	0.0010	mg/L	0.250		99.2	85-115			

LCS Dup (B221923-BSD1)

Prepared: 07/18/22 Analyzed: 07/19/22

Barium	0.0483	0.0005	mg/L	0.0500		96.7	85-115	2.62	20	
Manganese	0.0489	0.0020	mg/L	0.0500		97.8	85-115	3.19	20	
Selenium	0.245	0.0010	mg/L	0.250		98.1	85-115	1.17	20	

RSK-175 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 22G0308 - EPA 3810m Headspace

Blank (22G0308-BLK1)

Prepared: 07/20/22 Analyzed: 07/22/22

Ethane	ND	6.15	ug/l							
Ethene	ND	5.74	ug/l							
Methane	ND	3.28	ug/l							
Propane	ND	9.02	ug/l							

LCS (22G0308-BS1)

Prepared: 07/20/22 Analyzed: 07/22/22

Ethane	1140	6.15	ug/l	1230		92.6	75-125			
Ethene	1090	5.74	ug/l	1150		94.5	75-125			
Methane	661	3.28	ug/l	656		101	75-125			

Duplicate (22G0308-DUP1)

Source: T222076-04

Prepared: 07/20/22 Analyzed: 07/22/22

Ethane	ND	6.15	ug/l		ND				20	
Ethene	ND	5.74	ug/l		ND				20	
Methane	9.67	3.28	ug/l		8.27			15.6	20	
Propane	ND	9.02	ug/l		ND				20	

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Durango CO, 81302	Project Manager: Kyle Siesser	07/28/22 11:01

Volatile Organic Compounds by EPA Method 8021 - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2071924 - Volatiles

Blank (2071924-BLK1)

Prepared: 07/19/22 Analyzed: 07/20/22

Surrogate: 4-Bromofluorobenzene (PID)	0.0499		mg/L	0.0500		99.7	77.1-124			
Benzene	ND	0.001	mg/L							
Ethylbenzene	ND	0.001	mg/L							
Toluene	ND	0.001	mg/L							
Total BTEX	ND	0.006	mg/L							
Total Xylenes	ND	0.003	mg/L							

LCS (2071924-BS1)

Prepared: 07/19/22 Analyzed: 07/20/22

Surrogate: 4-Bromofluorobenzene (PID)	0.0501		mg/L	0.0500		100	77.1-124			
Benzene	0.020	0.001	mg/L	0.0200		97.8	94.7-118			
Ethylbenzene	0.020	0.001	mg/L	0.0200		97.8	94-114			
m,p-Xylene	0.041	0.002	mg/L	0.0400		102	94.6-114			
o-Xylene	0.020	0.001	mg/L	0.0200		99.1	94.6-114			
Toluene	0.019	0.001	mg/L	0.0200		96.8	89-115			
Total Xylenes	0.061	0.003	mg/L	0.0600		101	94.6-114			

LCS Dup (2071924-BSD1)

Prepared: 07/19/22 Analyzed: 07/20/22

Surrogate: 4-Bromofluorobenzene (PID)	0.0496		mg/L	0.0500		99.2	77.1-124			
Benzene	0.018	0.001	mg/L	0.0200		92.4	94.7-118	5.67	3.83	BS-3, QR-04
Ethylbenzene	0.018	0.001	mg/L	0.0200		92.0	94-114	6.05	3.79	BS-3, QR-04
m,p-Xylene	0.039	0.002	mg/L	0.0400		96.6	94.6-114	5.70	3.91	QR-04
o-Xylene	0.019	0.001	mg/L	0.0200		93.2	94.6-114	6.06	3.91	BS-3, QR-04
Toluene	0.018	0.001	mg/L	0.0200		90.4	89-115	6.85	3.48	QR-04
Total Xylenes	0.057	0.003	mg/L	0.0600		95.5	94.6-114	5.82	3.91	QR-04

Green Analytical Laboratories

Jeremy D Allen For Brenna Kampf, Project Manager

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Cottonwood Consulting	Project: Rule 615	
PO Box 1653	Project Name / Number: Bryce (OWP) #1-X	Reported:
Durango CO, 81302	Project Manager: Kyle Siesser	07/28/22 11:01

Petroleum Hydrocarbons by GC FID - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch 2072210 - General Prep - Organics

Blank (2072210-BLK1)

Prepared & Analyzed: 07/22/22

Surrogate: 1-Chlorooctadecane	4.31		mg/L	5.00		86.2	39.8-162			
Surrogate: 1-Chlorooctane	3.66		mg/L	5.00		73.2	44.9-146			
DRO >C10-C28	ND	1.00	mg/L							
EXT DRO >C28-C36	ND	1.00	mg/L							
GRO C6-C10	ND	1.00	mg/L							

LCS (2072210-BS1)

Prepared & Analyzed: 07/22/22

Surrogate: 1-Chlorooctadecane	4.22		mg/L	5.00		84.5	39.8-162			
Surrogate: 1-Chlorooctane	4.44		mg/L	5.00		88.7	44.9-146			
DRO >C10-C28	45.5	1.00	mg/L	50.0		91.0	70-121			
GRO C6-C10	43.3	1.00	mg/L	50.0		86.6	72.4-116			

LCS Dup (2072210-BSD1)

Prepared & Analyzed: 07/22/22

Surrogate: 1-Chlorooctadecane	4.25		mg/L	5.00		85.0	39.8-162			
Surrogate: 1-Chlorooctane	4.48		mg/L	5.00		89.6	44.9-146			
DRO >C10-C28	45.2	1.00	mg/L	50.0		90.4	70-121	0.617	24.8	
GRO C6-C10	43.0	1.00	mg/L	50.0		86.0	72.4-116	0.749	8.73	

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Cottonwood Consulting
PO Box 1653
Durango CO, 81302

Project: Rule 615
Project Name / Number: Bryce (OWP) #1-X
Project Manager: Kyle Siesser

Reported:
07/28/22 11:01

Notes and Definitions

- QR-04 The RPD for the BS/BSD was outside of historical limits.
- BS-3 Blank spike recovery outside of lab established statistical limits, but still within method limits. Data is not adversely affected.
- 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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Laboratory Sample ID: 2207-181-01

Start Date: 07/15/22

Sample Name: Bryce (OWP) 1-X Wellbore Fluid

BART Type :

APB
Purple
(Acid Producing Bacteria)

	1	2	3	4	5	6	7	8	9	10
Time Lag (days)										
Approx. Population	475,000	82,000	14000	4500	450	75	10	< 2	n/a	n/a
Reaction Code										

IRB
Red
(Iron Related Bacteria)

	07/16	07/17	07/18	07/19	07/20	07/21	7/22	7/23	7/24	7/25
Time Lag (days)	1	2	3	4	5	6	7	8	9	10
Approx. Population	570,000	140,000	35,000	9000	2200	500	150	25	8	< 1
Reaction Code	A	A	A	BR	BR	FO/BR	FO/BR	FO/BR	FO/BR/BC	FO/BR/BC

SLYM
Green
(Slime Forming Bacteria)

	07/16	07/17	07/18	07/19	07/20	07/21	7/22	7/23	7/24	7/25
Time Lag (days)	1	2	3	4	5	6	7	8	9	10
Approx. Population	1,750,000	440,000	67,000	13,000	2500	500	100	< 20	n/a	n/a
Reaction Code	A	A	A	A	PB	PB	PB	PB	PB	PB

SRB
Black
(Sulfate Reducing Bacteria)

	07/16	07/17	07/18	07/19	07/20	07/21	7/22	7/23	7/24	7/25
Time Lag (days)	1	2	3	4	5	6	7	8	9	10
Approx. Population	2,200,000	500,000	115,000	27,000	6,000	1400	325	75	20	< 5
Reaction Code	A	A	A	A	BB	BB	BB	BB	BB	BB

Aggressivity:	High	Medium	Low
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Reaction Code Summary: APB
Purple

ABSENT = A

IRB

- FO - Foam
- BR - Brown Ring
- BG - Brown Gel
- BC - Brown Clouds
- GC - Green Cloudy
- RC - Red Cloudy
- CL - Cloudy
- BL - Black

SLYM

- DS - Dense Slime
- SR - Slime Ring
- CL - Cloudy
- CP - Cloudy Layered Plates
- PB - Pale Blue Glowing
- BL - Blackened Liquid
- TH - Thread Like Strands

SRB

- BB - Black Base
- BT - Black Ball/Top
- BT/BB - Black Top & Base
- Cloudy
- *n/a - Not Aggressive

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