

30-039-31020



75 Suttle Street
Durango, CO 81303
970.247.4220 Phone
970.247.4227 Fax
www.greenanalytical.com

16 June 2016

Katie Wohlst
Red Willow Production
PO Box 369
Ignacio, CO 81137
RE: API

OIL CONS. DIV DIST. 3

JUL 21 2016

Enclosed are the results of analyses for samples received by the laboratory on 06/01/16 15:20.
If you need any further assistance, please feel free to contact me.

Sincerely,

A handwritten signature in cursive script that reads 'Debbie Zufelt'.

Debbie Zufelt
Reports 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.

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.



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www.GreenAnalytical.com

Red Willow Production
PO Box 369
Ignacio CO, 81137

Project: API
Project Name / Number: EHS Comp
Project Manager: Katie Wohlust

Reported:
06/16/16 15:57

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
NC 23D #2H	1606022-01	Water	06/01/16 09:50	06/01/16 15:20

Green Analytical Laboratories

Debbie Zufelt, Reports Manager

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Project: API
Project Name / Number: EHS Comp
Project Manager: Katie Wohlust

Reported:
06/16/16 15:57

NC 23D #2H

1606022-01 (Water)

Analyte	Result	RL	MDL	Units	Dilution	Analyzed	Method	Notes	Analyst
General Chemistry									
Alkalinity, Bicarbonate*	<10.0	10.0		mg/L	100	06/09/16	2320 B		KDG
Alkalinity, Carbonate*	4000	10.0		mg/L	100	06/09/16	2320 B		KDG
Alkalinity, Hydroxide*	1000	10.0		mg/L	100	06/09/16	2320 B		KDG
Alkalinity, Total*	5000	10.0		mg/L	100	06/09/16	2320 B		KDG
Chloride	4530	1000	51.9	mg/L	1000	06/13/16	EPA300.0		JDA
Conductivity*	28200	10.0		uS/cm	1	06/02/16	2510 B		KDG
pH*	13.0			pH Units	1	06/02/16	EPA150.1		KDG
Resistivity	35.4			ohm/cm	1	06/10/16	2510 B		KDG
Total Dissolved Solids	14300	10.0		mg/L	1	06/10/16	EPA160.1		KDG
Specific Gravity	1.010			N/A	1	06/07/16	Hydrometer		KDG
Sulfate	<1000	1000	61.5	mg/L	1000	06/13/16	EPA300.0		JDA
Total Recoverable Metals by ICP (E200.7)									
Iron*	1.52	0.500	0.035	mg/L	10	06/10/16	EPA200.7		JLM
Dissolved Metals by ICP									
Hardness	1030	9.23	2.80	mg/L	20	06/09/16	2340 B		JLM
Barium*	3.81	0.200	0.053	mg/L	20	06/09/16	EPA200.7		JLM
Calcium*	412	0.400	0.055	mg/L	20	06/09/16	EPA200.7		JLM
Iron*	<1.00	1.00	0.070	mg/L	20	06/09/16	EPA200.7		JLM
Magnesium*	<2.00	2.00	0.648	mg/L	20	06/09/16	EPA200.7		JLM
Manganese*	0.399	0.100	0.015	mg/L	20	06/09/16	EPA200.7		JLM
Potassium*	1390	20.0	6.70	mg/L	20	06/09/16	EPA200.7		JLM
Sodium*	3080	20.0	6.11	mg/L	20	06/09/16	EPA200.7		JLM
Strontium*	25.8	2.00	0.007	mg/L	20	06/09/16	EPA200.7		JLM
Cation/Anion Balance	-17.39								

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Debbie Zufelt, Reports Manager

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Red Willow Production
PO Box 369
Ignacio CO, 81137

Project: API
Project Name / Number: EHS Comp
Project Manager: Katie Wohlust

Reported:
06/16/16 15:57

General Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B606035 - General Prep - Wet Chem										
Duplicate (B606035-DUP2)		Source: 1606036-04		Prepared & Analyzed: 06/02/16						
pH	6.52		pH Units		6.52			0.00	20	
Reference (B606035-SRM1)		Prepared & Analyzed: 06/02/16								
pH	9.00		pH Units	9.13		98.6	7.807-102.15			
Batch B606054 - General Prep - Wet Chem										
Duplicate (B606054-DUP2)		Source: 1606036-04		Prepared & Analyzed: 06/02/16						
Conductivity	3510	10.0	uS/cm		3520			0.284	20	
Reference (B606054-SRM1)		Prepared & Analyzed: 06/02/16								
Conductivity	540		uS/cm	543		99.4	90-110			
Batch B606083 - General Prep - Wet Chem										
Blank (B606083-BLK1)		Prepared & Analyzed: 06/09/16								
Alkalinity, Total	ND	10.0	mg/L							
LCS (B606083-BS1)		Prepared & Analyzed: 06/09/16								
Alkalinity, Total	106	10.0	mg/L	100		106	85-115			
LCS Dup (B606083-BSD1)		Prepared & Analyzed: 06/09/16								
Alkalinity, Total	106	10.0	mg/L	100		106	85-115	0.00	20	
Batch B606089 - General Prep - Wet Chem										
Duplicate (B606089-DUP1)		Source: 1606036-01		Prepared & Analyzed: 06/07/16						
Specific Gravity	1.010		N/A		1.001			0.895	20	
Batch B606091 - General Prep - Wet Chem										
Blank (B606091-BLK1)		Prepared: 06/07/16 Analyzed: 06/10/16								
Total Dissolved Solids	ND	10.0	mg/L							
Duplicate (B606091-DUP1)		Source: 1605303-01		Prepared: 06/07/16 Analyzed: 06/10/16						
Total Dissolved Solids	230	10.0	mg/L		240			4.26	20	
Reference (B606091-SRM1)		Prepared: 06/07/16 Analyzed: 06/10/16								
Total Dissolved Solids	400	10.0	mg/L	400		100	85-115			
Batch B606117 - General Prep - Wet Chem										
LCS (B606117-BS1)		Prepared & Analyzed: 06/13/16								
Chloride	25.6	1.00	mg/L	25.0		102	90-110			
Sulfate	24.2	1.00	mg/L	25.0		97.0	90-110			

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Debbie Zufelt

Debbie Zufelt, Reports Manager

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PO Box 369
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Project: API
Project Name / Number: EHS Comp
Project Manager: Katie Wohlust

Reported:
06/16/16 15:57

**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 B606117 - General Prep - Wet Chem (Continued)

LCS Dup (B606117-BSD1)

Prepared & Analyzed: 06/13/16

Chloride	25.5	1.00	mg/L	25.0		102	90-110	0.368	20	
Sulfate	24.2	1.00	mg/L	25.0		96.7	90-110	0.248	20	

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 B606088 - EPA 200.2 Total Rec.

Blank (B606088-BLK1)

Prepared & Analyzed: 06/10/16

Iron	ND	0.050	mg/L							
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LCS (B606088-BS1)

Prepared & Analyzed: 06/10/16

Iron	3.79	0.050	mg/L	4.00		94.9	85-115			
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LCS Dup (B606088-BSD1)

Prepared & Analyzed: 06/10/16

Iron	3.81	0.050	mg/L	4.00		95.3	85-115	0.491	20	
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PO Box 369
Ignacio CO, 81137

Project: API
Project Name / Number: EHS Comp
Project Manager: Katie Wohlust

Reported:
06/16/16 15:57

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 B606076 - Dissolved Metals, E200.7/E200.8

Blank (B606076-BLK1)

Prepared & Analyzed: 06/09/16

Barium	ND	0.010	mg/L							
Calcium	0.052	0.020	mg/L							B1
Iron	ND	0.050	mg/L							
Magnesium	ND	0.100	mg/L							
Manganese	0.020	0.005	mg/L							B1
Potassium	ND	1.00	mg/L							
Sodium	ND	1.00	mg/L							
Strontium	ND	0.100	mg/L							

LCS (B606076-BS1)

Prepared & Analyzed: 06/09/16

Barium	2.58	0.010	mg/L	2.50	103	85-115				
Calcium	5.24	0.020	mg/L	5.00	105	85-115				
Iron	5.18	0.050	mg/L	5.00	104	85-115				
Magnesium	25.3	0.100	mg/L	25.0	101	85-115				
Manganese	2.59	0.005	mg/L	2.50	104	85-115				
Potassium	10.1	1.00	mg/L	10.0	101	85-115				
Sodium	8.55	1.00	mg/L	8.10	106	85-115				
Strontium	5.08	0.100	mg/L	5.00	102	85-115				

LCS Dup (B606076-BS1)

Prepared & Analyzed: 06/09/16

Barium	2.33	0.010	mg/L	2.50	93.4	85-115	9.93	20		
Calcium	4.68	0.020	mg/L	5.00	93.5	85-115	11.5	20		
Iron	4.64	0.050	mg/L	5.00	92.8	85-115	11.0	20		
Magnesium	22.7	0.100	mg/L	25.0	90.7	85-115	10.8	20		
Manganese	2.28	0.005	mg/L	2.50	91.2	85-115	12.9	20		
Potassium	8.99	1.00	mg/L	10.0	89.9	85-115	11.7	20		
Sodium	7.59	1.00	mg/L	8.10	93.7	85-115	11.9	20		
Strontium	4.53	0.100	mg/L	5.00	90.6	85-115	11.4	20		

Green Analytical Laboratories

Debbie Zufelt

Debbie Zufelt, Reports Manager

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Red Willow Production
PO Box 369
Ignacio CO, 81137

Project: API
Project Name / Number: EHS Comp
Project Manager: Katie Wohlust

Reported:
06/16/16 15:57

Notes and Definitions

B1	Target analyte detected in method blank at or above method reporting limit. Sample concentration found to be 10 times above the concentration found in the method blank or less than the reporting limit.
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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Debbie Zufelt, Reports Manager

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CHAIN OF CUSTODY RECORD

Page ____ of ____

Page 8 of 8

Client: Red Willow
 Contact: Katie Wohlst
 Address: PO BOX 369
Ignacio CO 81137
 Phone Number: 970-563-5288
 Email: kawohlst@rwpc.us

NOTES:

- 1) Ensure proper container packaging.
- 2) Ship samples promptly following collection.
- 3) Designate Sample Reject Disposition.

PO#

Project Name: EHS Comp

Table 1. - Matrix Type

1 = Surface Water, 2 = Ground Water
 3 = Soil/Sediment, 4 = Prod.W., 5 = Oil
 6 = Waste, 7 = Other (Specify) braden head

FOR GAL USE ONLY

GAL JOB #

1606-022

Samplers Signature: Katie Wohlst

Lab Name: Green Analytical Laboratories		(970) 247-4220 FAX (970) 247-4227		Analyses Required										Comments
Address: 75 Suttle Street, Durango, CO 81303		www.greenanalytical.com												
Sample ID	Collection		Miscellaneous			Preservative(s)					API Gen. Chem.			
	Date	Time	Collected by: (Init.)	Matrix Type From Table 1	No. of Containers	Sample Filtered ? Y/N	Unpreserved (Ice Only)	HNO3	HCL	H2SO4		NAOH	Other (Specify)	
1. NC 23D #2H	6/1/16	9:50	KW	7	2	N	X						X	13.6°C on ice Fluid from braden head composite sample
2.														
3.														
4.														
5.														
6.														
7.														
8.														
9.														
10.														
Relinquished by: <u>[Signature]</u>			Date: <u>6/1/16</u>	Time: <u>3:20 PM</u>		Received by: <u>Michael Valente</u>			Date:	Time:				
Relinquished by:			Date:	Time:		Received by:			Date:	Time:				
Relinquished by:			Date:	Time:		Received by:			Date:	Time:				

* Sample Reject: [] Return [] Dispose [] Store (30 Days)



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14 July 2016

Katie Wohlust
Red Willow Production
PO Box 369
Ignacio, CO 81137
RE: API

Enclosed are the results of analyses for samples received by the laboratory on 06/27/16 11:44.
If you need any further assistance, please feel free to contact me.

Sincerely,

A handwritten signature in cursive script that reads 'Debbie Zufelt'.

Debbie Zufelt
Reports Manager

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Red Willow Production
PO Box 369
Ignacio CO, 81137

Project: API
Project Name / Number: EHS Comp
Project Manager: Katie Wohlust

Reported:
07/14/16 12:49

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
NC 23D #2H	1606275-01	Water	06/27/16 10:15	06/27/16 11:44

Green Analytical Laboratories

Debbie Zufelt, Reports Manager

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Red Willow Production
PO Box 369
Ignacio CO, 81137

Project: API
Project Name / Number: EHS Comp
Project Manager: Katie Wohlust

Reported:
07/14/16 12:49

NC 23D #2H

1606275-01 (Water)

Analyte	Result	RL	MDL	Units	Dilution	Analyzed	Method	Notes	Analyst
General Chemistry									
Alkalinity, Bicarbonate*	2060	10.0		mg/L	10	06/28/16	2320 B		KDG
Alkalinity, Carbonate*	<10.0	10.0		mg/L	10	06/28/16	2320 B		KDG
Alkalinity, Hydroxide*	<10.0	10.0		mg/L	10	06/28/16	2320 B		KDG
Alkalinity, Total*	2060	10.0		mg/L	10	06/28/16	2320 B		KDG
Chloride	4560	100	5.19	mg/L	100	07/01/16	EPA300.0		JDA
Conductivity*	13300	10.0		uS/cm	1	06/29/16	2510 B		KDG
pH*	7.74			pH Units	1	06/29/16	EPA150.1	H4	KDG
Resistivity	75.2			ohm/cm	1	06/29/16	2510 B		KDG
Total Dissolved Solids	8900	10.0		mg/L	1	06/29/16	EPA160.1		KDG
Specific Gravity	1.007			N/A	1	06/28/16	Hydrometer		KDG
Sulfate	<100	100	6.15	mg/L	100	07/01/16	EPA300.0		JDA
Total Recoverable Metals by ICP (E200.7)									
Iron*	4.76	2.00	0.070	mg/L	20	07/07/16	EPA200.7		LLG
Dissolved Metals by ICP									
Hardness	242	9.23	2.80	mg/L	20	07/06/16	2340 B		LLG
Barium*	13.8	0.200	0.053	mg/L	20	07/06/16	EPA200.7		LLG
Calcium*	49.5	0.400	0.055	mg/L	20	07/06/16	EPA200.7		LLG
Iron*	<1.00	1.00	0.070	mg/L	20	07/06/16	EPA200.7		LLG
Magnesium*	28.7	2.00	0.648	mg/L	20	07/06/16	EPA200.7		LLG
Manganese*	0.317	0.100	0.015	mg/L	20	07/06/16	EPA200.7		LLG
Potassium*	<20.0	20.0	6.70	mg/L	20	07/06/16	EPA200.7		LLG
Sodium*	3490	20.0	6.11	mg/L	20	07/06/16	EPA200.7		LLG
Strontium*	25.2	2.00	0.007	mg/L	20	07/06/16	EPA200.7		LLG
Cation/Anion Balance	-1.68								

Green Analytical Laboratories

Debbie Zufelt

Debbie Zufelt, Reports Manager

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Project: API
Project Name / Number: EHS Comp
Project Manager: Katie Wohlust

Reported:
07/14/16 12:49

General Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B606244 - General Prep - Wet Chem

Blank (B606244-BLK1) Prepared & Analyzed: 06/28/16

Alkalinity, Total	ND	10.0	mg/L
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LCS (B606244-BS1) Prepared & Analyzed: 06/28/16

Alkalinity, Total	105	10.0	mg/L	100	105	85-115
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LCS Dup (B606244-BSD1) Prepared & Analyzed: 06/28/16

Alkalinity, Total	105	10.0	mg/L	100	105	85-115	0.00	20
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Batch B606248 - General Prep - Wet Chem

Duplicate (B606248-DUP1) Source: 1606263-01 Prepared & Analyzed: 06/28/16

Specific Gravity	1.000		N/A	1.000		0.00	20
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Batch B606261 - General Prep - Wet Chem

Blank (B606261-BLK1) Prepared & Analyzed: 07/01/16

Chloride	ND	1.00	mg/L
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Sulfate	ND	1.00	mg/L
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LCS (B606261-BS1) Prepared & Analyzed: 07/01/16

Chloride	24.2	1.00	mg/L	25.0	96.6	90-110
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Sulfate	24.1	1.00	mg/L	25.0	96.3	90-110
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LCS Dup (B606261-BSD1) Prepared & Analyzed: 07/01/16

Chloride	24.3	1.00	mg/L	25.0	97.0	90-110	0.413	20
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Sulfate	24.3	1.00	mg/L	25.0	97.2	90-110	0.930	20
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Batch B606264 - General Prep - Wet Chem

Blank (B606264-BLK1) Prepared & Analyzed: 06/29/16

Total Dissolved Solids	ND	10.0	mg/L
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Duplicate (B606264-DUP1) Source: 1606263-02 Prepared & Analyzed: 06/29/16

Total Dissolved Solids	105	10.0	mg/L	95.0		10.0	20
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Reference (B606264-SRM1) Prepared & Analyzed: 06/29/16

Total Dissolved Solids	385	10.0	mg/L	400	96.3	85-115
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Batch B607009 - General Prep - Wet Chem

Duplicate (B607009-DUP2) Source: 1606304-03 Prepared & Analyzed: 06/29/16

Conductivity	2410	10.0	uS/cm	2380		1.26	20
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Reference (B607009-SRM1) Prepared & Analyzed: 06/29/16

Green Analytical Laboratories

Debbie Zufelt

Debbie Zufelt, Reports Manager

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Red Willow Production
PO Box 369
Ignacio CO, 81137

Project: API
Project Name / Number: EHS Comp
Project Manager: Katie Wohlust

Reported:
07/14/16 12:49

**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 B607009 - General Prep - Wet Chem (Continued)

Reference (B607009-SRM1) (Continued)

Prepared & Analyzed: 06/29/16

Conductivity	471		uS/cm	486		96.9	90-110			
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Batch B607011 - General Prep - Wet Chem

Duplicate (B607011-DUP2)

Source: 1606301-01

Prepared & Analyzed: 06/29/16

pH	7.86		pH Units		7.89			0.381	20	
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Reference (B607011-SRM1)

Prepared & Analyzed: 06/29/16

pH	9.06		pH Units	9.08		99.8	7.807-102.15			
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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 B607040 - EPA 200.2 Total Rec.

Blank (B607040-BLK1)

Prepared & Analyzed: 07/07/16

Iron	0.051	0.050	mg/L							B3
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LCS (B607040-BS1)

Prepared & Analyzed: 07/07/16

Iron	4.25	0.050	mg/L	4.00		106	85-115			
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LCS Dup (B607040-BSD1)

Prepared & Analyzed: 07/07/16

Iron	4.25	0.050	mg/L	4.00		106	85-115	0.0190	20	
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Project: API
Project Name / Number: EHS Comp
Project Manager: Katie Wohlust

Reported:
07/14/16 12:49

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 B607023 - Dissolved Metals, E200.7/E200.8

Blank (B607023-BLK1)

Prepared & Analyzed: 07/06/16

Barium	ND	0.010	mg/L
Calcium	ND	0.020	mg/L
Iron	ND	0.050	mg/L
Magnesium	ND	0.100	mg/L
Manganese	ND	0.005	mg/L
Potassium	ND	1.00	mg/L
Sodium	ND	1.00	mg/L
Strontium	ND	0.100	mg/L

LCS (B607023-BS1)

Prepared & Analyzed: 07/06/16

Barium	2.54	0.010	mg/L	2.50	101	85-115
Calcium	5.22	0.020	mg/L	5.00	104	85-115
Iron	5.23	0.050	mg/L	5.00	105	85-115
Magnesium	26.1	0.100	mg/L	25.0	104	85-115
Manganese	2.60	0.005	mg/L	2.50	104	85-115
Potassium	10.1	1.00	mg/L	10.0	101	85-115
Sodium	8.22	1.00	mg/L	8.10	101	85-115
Strontium	5.10	0.100	mg/L	5.00	102	85-115

LCS Dup (B607023-BSD1)

Prepared & Analyzed: 07/06/16

Barium	2.60	0.010	mg/L	2.50	104	85-115	2.56	20
Calcium	5.37	0.020	mg/L	5.00	107	85-115	2.69	20
Iron	5.32	0.050	mg/L	5.00	106	85-115	1.71	20
Magnesium	26.8	0.100	mg/L	25.0	107	85-115	2.54	20
Manganese	2.61	0.005	mg/L	2.50	104	85-115	0.485	20
Potassium	10.3	1.00	mg/L	10.0	103	85-115	2.04	20
Sodium	8.35	1.00	mg/L	8.10	103	85-115	1.61	20
Strontium	5.22	0.100	mg/L	5.00	104	85-115	2.21	20

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Reported:
07/14/16 12:49

Notes and Definitions

H4 pH analysis performed more than 48 hours after sampling.

B3 Target analyte detected in method blank or continuing calibration blank. Reporting limit elevated to account for blank result.

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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* Sample Reject: ☐ Return ☐ Dispose ☐ Store (30 Days)