

## Linn Energy - Denver, CO

Sample Delivery Group: L904175  
Samples Received: 04/21/2017  
Project Number:  
Description: 2017 Reclamation pre-treatment  
Site: GG  
Report To: Tom Hogelin  
1999 Broadway, Suite 3700  
Denver, CO 80202

Entire Report Reviewed By:



Mark W. Beasley  
Technical Service Representative

Results relate only to the items tested or calibrated and are reported as rounded values. This test report shall not be reproduced, except in full, without written approval of the laboratory. Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.



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# SAMPLE SUMMARY

ONE LAB. NATIONWIDE.



F06 696 L904175-01 Solid

Collected by

Collected date/time  
04/20/17 00:00

Received date/time  
04/21/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 350.1	WG972767	1	04/24/17 14:52	04/24/17 23:37	ASK
Wet Chemistry by Method 9056A	WG973078	1	04/25/17 15:37	04/26/17 03:13	KCF
Wet Chemistry by Method USDA LOI	WG974183	1	04/27/17 09:59	04/28/17 16:53	MMF
Metals (ICP) by Method 6010B	WG972764	1	04/22/17 08:14	04/25/17 17:49	ST

<sup>1</sup>Cp

<sup>2</sup>Tc

<sup>3</sup>Ss

<sup>4</sup>Cn

F01 697 L904175-02 Solid

Collected by

Collected date/time  
04/20/17 00:00

Received date/time  
04/21/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 350.1	WG972767	1	04/24/17 14:52	04/24/17 23:39	ASK
Wet Chemistry by Method 9056A	WG973078	1	04/25/17 15:37	04/26/17 03:34	KCF
Wet Chemistry by Method USDA LOI	WG974183	1	04/27/17 09:59	04/28/17 16:53	MMF
Metals (ICP) by Method 6010B	WG972764	1	04/22/17 08:14	04/25/17 17:52	ST

<sup>5</sup>Sr

<sup>6</sup>Qc

<sup>7</sup>Gl

<sup>8</sup>Al

<sup>9</sup>Sc



All sample aliquots were received at the correct temperature, in the proper containers, with the appropriate preservatives, and within method specified holding times. All MDL (LOD) and RDL (LOQ) values reported for environmental samples have been corrected for the dilution factor used in the analysis. All Method and Batch Quality Control are within established criteria except where addressed in this case narrative, a non-conformance form or properly qualified within the sample results. By my digital signature below, I affirm to the best of my knowledge, all problems/anomalies observed by the laboratory as having the potential to affect the quality of the data have been identified by the laboratory, and no information or data have been knowingly withheld that would affect the quality of the data.

Mark W. Beasley  
Technical Service Representative

<sup>1</sup> Cp

<sup>2</sup> Tc

<sup>3</sup> Ss

<sup>4</sup> Cn

<sup>5</sup> Sr

<sup>6</sup> Qc

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc



## Wet Chemistry by Method 350.1

Analyte	Result mg/kg	<u>Qualifier</u>	RDL mg/kg	Dilution	Analysis date / time	<u>Batch</u>
Ammonia Nitrogen	ND		5.00	1	04/24/2017 23:37	<a href="#">WG972767</a>

1  
Cp2  
Tc

## Wet Chemistry by Method 9056A

Analyte	Result mg/kg	<u>Qualifier</u>	RDL mg/kg	Dilution	Analysis date / time	<u>Batch</u>
Nitrate as (N)	61.1		1.00	1	04/26/2017 03:13	<a href="#">WG973078</a>
Phosphate, Ortho	18.2		1.00	1	04/26/2017 03:13	<a href="#">WG973078</a>

3  
Ss4  
Cn5  
Sr

## Wet Chemistry by Method USDA LOI

Analyte	Result mg/kg	<u>Qualifier</u>	RDL mg/kg	Dilution	Analysis date / time	<u>Batch</u>
TOC (Total Organic Carbon)	19800		10.0	1	04/28/2017 16:53	<a href="#">WG974183</a>

6  
Qc7  
Gl

## Metals (ICP) by Method 6010B

Analyte	Result mg/kg	<u>Qualifier</u>	RDL mg/kg	Dilution	Analysis date / time	<u>Batch</u>
Potassium	1840		100	1	04/25/2017 17:49	<a href="#">WG972764</a>

8  
Al9  
Sc



## Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Ammonia Nitrogen	ND	J6	5.00	1	04/24/2017 23:39	<a href="#">WG972767</a>

1 Cp

2 Tc

3 Ss

4 Cn

5 Sr

## Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Nitrate as (N)	14.8		1.00	1	04/26/2017 03:34	<a href="#">WG973078</a>
Phosphate, Ortho	5.37		1.00	1	04/26/2017 03:34	<a href="#">WG973078</a>

6 Qc

7 Gl

## Wet Chemistry by Method USDA LOI

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
TOC (Total Organic Carbon)	22100		10.0	1	04/28/2017 16:53	<a href="#">WG974183</a>

8 Al

9 Sc

## Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Potassium	1930		100	1	04/25/2017 17:52	<a href="#">WG972764</a>



Method Blank (MB)

(MB) R3213093-1 04/24/17 23:10

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Ammonia Nitrogen	U		1.57	5.00

L904108-01 Original Sample (OS) • Duplicate (DUP)

(OS) L904108-01 04/24/17 23:19 • (DUP) R3213093-4 04/24/17 23:22

	Original Result (dry)	DUP Result (dry)	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Ammonia Nitrogen	3.80	4.63	1	20	J	20

L904175-01 Original Sample (OS) • Duplicate (DUP)

(OS) L904175-01 04/24/17 23:37 • (DUP) R3213093-7 04/24/17 23:38

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Ammonia Nitrogen	ND	0.000	1	0		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3213093-2 04/24/17 23:11 • (LCSD) R3213093-3 04/24/17 23:12

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Ammonia Nitrogen	500	525	492	105	98	90-110			6	20

L904112-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L904112-01 04/24/17 23:26 • (MS) R3213093-5 04/24/17 23:27 • (MSD) R3213093-6 04/24/17 23:28

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Ammonia Nitrogen	683	6.29	544	485	79	70	1	80-120	J6	J6	11	20

L904175-02 Original Sample (OS) • Matrix Spike (MS)

(OS) L904175-02 04/24/17 23:39 • (MS) R3213093-8 04/24/17 23:40

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/kg	mg/kg	mg/kg	%		%	
Ammonia Nitrogen	500	ND	375	75	1	80-120	J6

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

Method Blank (MB)

(MB) R3213450-1 04/25/17 18:18

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
Nitrate	U		0.0116	1.00
Phosphate,Ortho	U		0.0769	1.00

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc

L904099-01 Original Sample (OS) • Duplicate (DUP)

(OS) L904099-01 04/25/17 20:04 • (DUP) R3213450-4 04/25/17 20:25

	Original Result (dry)	DUP Result (dry)	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Nitrate	U	0.378	1	0	J	15
Phosphate,Ortho	U	1.65	1	7		15

L904175-02 Original Sample (OS) • Duplicate (DUP)

(OS) L904175-02 04/26/17 03:34 • (DUP) R3213450-7 04/26/17 03:56

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Nitrate	14.8	13.8	1	7		15
Phosphate,Ortho	5.37	5.21	1	3		15

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3213450-2 04/25/17 18:39 • (LCSD) R3213450-3 04/25/17 19:00

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
Nitrate	20.0	20.8	20.9	104	104	80-120			0	15
Phosphate,Ortho	20.0	18.1	18.5	91	92	80-120			2	15

L904112-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L904112-02 04/25/17 23:57 • (MS) R3213450-5 04/26/17 00:18 • (MSD) R3213450-6 04/26/17 00:39

	Spike Amount (dry)	Original Result (dry)	MS Result (dry)	MSD Result (dry)	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Nitrate	64.4	U	65.9	66.7	100	101	1	80-120			1	15
Phosphate,Ortho	64.4	U	44.3	42.7	67	65	1	80-120	J6	J6	4	15





Method Blank (MB)

(MB) R3214435-1 04/28/17 16:52

	MB Result	MB Qualifier	MB MDL	MB RDL
Analyte	mg/kg		mg/kg	mg/kg
TOC (Total Organic Carbon)	U		3.33	10.0

L904175-01 Original Sample (OS) • Duplicate (DUP)

(OS) L904175-01 04/28/17 16:53 • (DUP) R3214435-4 04/28/17 16:53

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
TOC (Total Organic Carbon)	19800	18600	1	6.41		20

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3214435-2 04/28/17 16:54 • (LCSD) R3214435-3 04/28/17 16:54

	Spike Amount	LCS Result	LCSD Result	LCS Rec.	LCSD Rec.	Rec. Limits	LCS Qualifier	LCSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	%	%	%			%	%
TOC (Total Organic Carbon)	5590	8360	8350	150	149	50.0-150			0.202	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3213410-1 04/25/17 16:25

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Potassium	26	↓	10.2	100

Laboratory Control Sample (LCS) • Laboratory Control Sample Duplicate (LCSD)

(LCS) R3213410-2 04/25/17 16:28 • (LCSD) R3213410-3 04/25/17 16:30

Analyte	Spike Amount mg/kg	LCS Result mg/kg	LCSD Result mg/kg	LCS Rec. %	LCSD Rec. %	Rec. Limits %	LCS Qualifier	LCSD Qualifier	RPD %	RPD Limits %
Potassium	1000	1060	1040	106	104	80-120			2	20

L904141-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L904141-01 04/25/17 16:33 • (MS) R3213410-6 04/25/17 16:42 • (MSD) R3213410-7 04/25/17 16:45

Analyte	Spike Amount (dry) mg/kg	Original Result (dry) mg/kg	MS Result (dry) mg/kg	MSD Result (dry) mg/kg	MS Rec. %	MSD Rec. %	Dilution	Rec. Limits %	MS Qualifier	MSD Qualifier	RPD %	RPD Limits %
Potassium	1270	2870	4240	4000	108	88	1	75-125			6	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



## Abbreviations and Definitions

SDG	Sample Delivery Group.
MDL	Method Detection Limit.
RDL	Reported Detection Limit.
ND	Not detected at the Reporting Limit (or MDL where applicable).
U	Not detected at the Reporting Limit (or MDL where applicable).
RPD	Relative Percent Difference.
(dry)	Results are reported based on the dry weight of the sample. [this will only be present on a dry report basis for soils].
Original Sample	The non-spiked sample in the prep batch used to determine the Relative Percent Difference (RPD) from a quality control sample. The Original Sample may not be included within the reported SDG.
Rec.	Recovery.

Qualifier	Description
J	The identification of the analyte is acceptable; the reported value is an estimate.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.

<sup>1</sup> Cp<sup>2</sup> Tc<sup>3</sup> Ss<sup>4</sup> Cn<sup>5</sup> Sr<sup>6</sup> Qc<sup>7</sup> Gl<sup>8</sup> Al<sup>9</sup> Sc

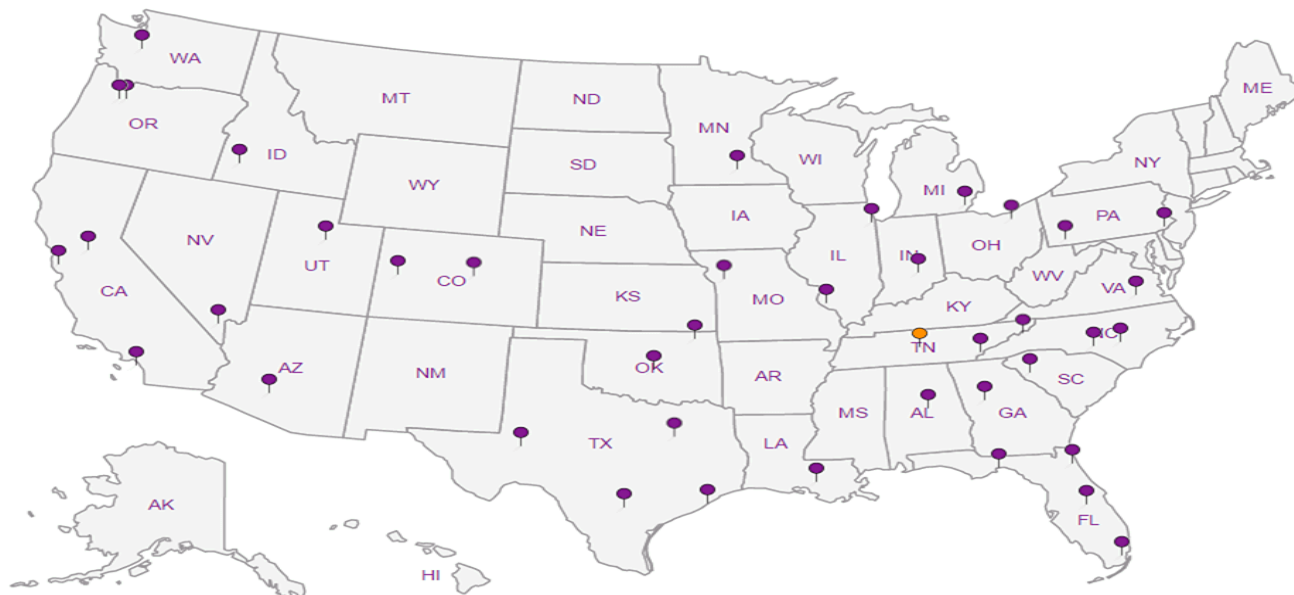


- 1 Cp
- 2 Tc
- 3 Ss
- 4 Cn
- 5 Sr
- 6 Qc
- 7 Gl
- 8 Al
- 9 Sc

Alabama	40660	Nevada	TN-03-2002-34
Alaska	UST-080	New Hampshire	2975
Arizona	AZ0612	New Jersey–NELAP	TN002
Arkansas	88-0469	New Mexico	TN00003
California	01157CA	New York	11742
Colorado	TN00003	North Carolina	Env375
Conneticut	PH-0197	North Carolina <sup>1</sup>	DW21704
Florida	E87487	North Carolina <sup>2</sup>	41
Georgia	NELAP	North Dakota	R-140
Georgia <sup>1</sup>	923	Ohio–VAP	CL0069
Idaho	TN00003	Oklahoma	9915
Illinois	200008	Oregon	TN200002
Indiana	C-TN-01	Pennsylvania	68-02979
Iowa	364	Rhode Island	221
Kansas	E-10277	South Carolina	84004
Kentucky <sup>1</sup>	90010	South Dakota	n/a
Kentucky <sup>2</sup>	16	Tennessee <sup>14</sup>	2006
Louisiana	AI30792	Texas	T 104704245-07-TX
Maine	TN0002	Texas <sup>5</sup>	LAB0152
Maryland	324	Utah	6157585858
Massachusetts	M-TN003	Vermont	VT2006
Michigan	9958	Virginia	109
Minnesota	047-999-395	Washington	C1915
Mississippi	TN00003	West Virginia	233
Missouri	340	Wisconsin	9980939910
Montana	CERT0086	Wyoming	A2LA
Nebraska	NE-OS-15-05		

A2LA – ISO 17025	1461.01	AIHA-LAP, LLC	100789
A2LA – ISO 17025 <sup>5</sup>	1461.02	DOD	1461.01
Canada	1461.01	USDA	S-67674
EPA-Crypto	IN00003		

## Our Locations





## ESC LAB SCIENCES Cooler Receipt Form

Client: <u>Burgett Berletto</u>	SDG#	904175	
Cooler Received/Opened On: 4/ 21 /17	Temperature:	1.2	
Received By: Nadiar Yakob			
Signature: <u>Nadiar Yakob</u>			
<b>Receipt Check List</b>	<b>NP</b>	<b>Yes</b>	<b>No</b>
COC Seal Present / Intact?	/		
COC Signed / Accurate?		/	
Bottles arrive intact?		/	
Correct bottles used?		/	
Sufficient volume sent?		/	
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?			