

## Berry Petroleum - Denver, CO

Sample Delivery Group: L906807  
Samples Received: 05/04/2017  
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.



## J13 697 L906807-01 Solid

Collected by

Collected date/time  
05/02/17 10:00Received date/time  
05/04/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 350.1	WG976577	1	05/10/17 11:41	05/11/17 01:05	ASK
Wet Chemistry by Method 9056A	WG976630	1	05/06/17 10:34	05/06/17 19:28	KCF
Wet Chemistry by Method USDA LOI	WG978026	1	05/10/17 12:48	05/11/17 17:29	MMF
Metals (ICP) by Method 6010B	WG976583	1	05/04/17 15:15	05/05/17 20:54	ST

<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

## O6 696 L906807-02 Solid

Collected by

Collected date/time  
05/02/17 11:20Received date/time  
05/04/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 350.1	WG976577	1	05/10/17 11:41	05/11/17 01:08	ASK
Wet Chemistry by Method 9056A	WG976630	1	05/06/17 10:34	05/06/17 20:53	KCF
Wet Chemistry by Method USDA LOI	WG978026	1	05/10/17 12:48	05/11/17 17:27	MMF
Metals (ICP) by Method 6010B	WG976583	1	05/04/17 15:15	05/05/17 20:57	ST

## I31 596 L906807-03 Solid

Collected by

Collected date/time  
05/02/17 13:45Received date/time  
05/04/17 08:45

Method	Batch	Dilution	Preparation date/time	Analysis date/time	Analyst
Wet Chemistry by Method 350.1	WG976577	1	05/10/17 11:41	05/11/17 01:09	ASK
Wet Chemistry by Method 9056A	WG976630	5	05/06/17 10:34	05/06/17 21:57	KCF
Wet Chemistry by Method USDA LOI	WG978026	1	05/10/17 12:48	05/11/17 17:28	MMF
Metals (ICP) by Method 6010B	WG976583	1	05/04/17 15:15	05/05/17 21:00	ST



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	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND	J3 J6	5.00	1	05/11/2017 01:05	<a href="#">WG976577</a>

1 Cp

2 Tc

## Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Nitrate as (N)	27.0		1.00	1	05/06/2017 19:28	<a href="#">WG976630</a>
Phosphate, Ortho	20.7		1.00	1	05/06/2017 19:28	<a href="#">WG976630</a>

3 Ss

4 Cn

5 Sr

## Wet Chemistry by Method USDA LOI

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	25900		10.0	1	05/11/2017 17:29	<a href="#">WG978026</a>

6 Qc

7 Gl

## Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Potassium	2400		100	1	05/05/2017 20:54	<a href="#">WG976583</a>

8 Al

9 Sc



Wet Chemistry by Method 350.1

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Ammonia Nitrogen	ND		5.00	1	05/11/2017 01:08	<a href="#">WG976577</a>

<sup>1</sup> Cp

<sup>2</sup> Tc

Wet Chemistry by Method 9056A

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Nitrate as (N)	52.7		1.00	1	05/06/2017 20:53	<a href="#">WG976630</a>
Phosphate,Ortho	64.4		1.00	1	05/06/2017 20:53	<a href="#">WG976630</a>

<sup>3</sup> Ss

<sup>4</sup> Cn

Wet Chemistry by Method USDA LOI

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
TOC (Total Organic Carbon)	34200		10.0	1	05/11/2017 17:27	<a href="#">WG978026</a>

<sup>5</sup> Sr

<sup>6</sup> Qc

Metals (ICP) by Method 6010B

Analyte	Result	Qualifier	RDL	Dilution	Analysis	Batch
	mg/kg		mg/kg		date / time	
Potassium	2070		100	1	05/05/2017 20:57	<a href="#">WG976583</a>

<sup>7</sup> Gl

<sup>8</sup> Al

<sup>9</sup> Sc



## Wet Chemistry by Method 350.1

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Ammonia Nitrogen	ND	P1	5.00	1	05/11/2017 01:09	<a href="#">WG976577</a>

1 Cp

2 Tc

## Wet Chemistry by Method 9056A

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Nitrate as (N)	97.5		5.00	5	05/06/2017 21:57	<a href="#">WG976630</a>
Phosphate, Ortho	180		5.00	5	05/06/2017 21:57	<a href="#">WG976630</a>

3 Ss

4 Cn

5 Sr

## Wet Chemistry by Method USDA LOI

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
TOC (Total Organic Carbon)	33300		10.0	1	05/11/2017 17:28	<a href="#">WG978026</a>

6 Qc

7 Gl

## Metals (ICP) by Method 6010B

Analyte	Result mg/kg	Qualifier	RDL mg/kg	Dilution	Analysis date / time	Batch
Potassium	2260		100	1	05/05/2017 21:00	<a href="#">WG976583</a>

8 Al

9 Sc



Method Blank (MB)

(MB) R3217180-1 05/11/17 01:01

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

L906807-03 Original Sample (OS) • Duplicate (DUP)

(OS) L906807-03 05/11/17 01:09 • (DUP) R3217180-6 05/11/17 01:11

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Ammonia Nitrogen	ND	9.85	1	68	P1	20

L906870-03 Original Sample (OS) • Duplicate (DUP)

(OS) L906870-03 05/11/17 01:22 • (DUP) R3217180-7 05/11/17 01:23

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Ammonia Nitrogen	ND	2.55	1	34	J P1	20

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

(LCS) R3217180-2 05/11/17 01:02 • (LCSD) R3217180-3 05/11/17 01:03

	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	520	496	104	99	90-110			5	20

L906807-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L906807-01 05/11/17 01:05 • (MS) R3217180-4 05/11/17 01:06 • (MSD) R3217180-5 05/11/17 01:07

	Spike Amount	Original Result	MS Result	MSD Result	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	500	ND	245	343	49	69	1	80-120	J6	J3 J6	34	20

L906870-05 Original Sample (OS) • Matrix Spike (MS)

(OS) L906870-05 05/11/17 01:27 • (MS) R3217180-8 05/11/17 01:28

	Spike Amount	Original Result	MS Result	MS Rec.	Dilution	Rec. Limits	MS Qualifier
Analyte	mg/kg	mg/kg	mg/kg	%		%	
Ammonia Nitrogen	500	ND	406	81	1	80-120	

<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





Method Blank (MB)

(MB) R3216179-1 05/06/17 12:25

	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

L906122-01 Original Sample (OS) • Duplicate (DUP)

(OS) L906122-01 05/06/17 15:14 • (DUP) R3216179-4 05/06/17 15:35

	Original Result (dry)	DUP Result (dry)	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Nitrate	257	247	1	4		15
Phosphate,Ortho	466	483	1	3		15

L906212-03 Original Sample (OS) • Duplicate (DUP)

(OS) L906212-03 05/07/17 00:46 • (DUP) R3216179-7 05/07/17 01:08

	Original Result (dry)	DUP Result (dry)	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
Nitrate	0.864	0.934	1	8	J	15
Phosphate,Ortho	1.66	1.04	1	46	P1	15

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

(LCS) R3216179-2 05/06/17 12:46 • (LCSD) R3216179-3 05/06/17 13:07

	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	18.1	18.1	91	91	80-120			0	15
Phosphate,Ortho	20.0	18.7	17.9	94	90	80-120			4	15

L906520-02 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L906520-02 05/06/17 17:00 • (MS) R3216179-5 05/06/17 17:21 • (MSD) R3216179-6 05/06/17 17:42

	Spike Amount	Original Result	MS Result	MSD Result	MS Rec.	MSD Rec.	Dilution	Rec. Limits	MS Qualifier	MSD Qualifier	RPD	RPD Limits
Analyte	mg/kg	mg/kg	mg/kg	mg/kg	%	%		%			%	%
Nitrate	50.0	ND	49.4	51.9	99	104	1	80-120			5	15
Phosphate,Ortho	50.0	ND	36.5	38.4	72	76	1	80-120	J6	J6	5	15





Method Blank (MB)

(MB) R3217425-1 05/11/17 17:29

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

L906807-03 Original Sample (OS) • Duplicate (DUP)

(OS) L906807-03 05/11/17 17:28 • (DUP) R3217425-4 05/11/17 17:29

	Original Result	DUP Result	Dilution	DUP RPD	DUP Qualifier	DUP RPD Limits
Analyte	mg/kg	mg/kg		%		%
TOC (Total Organic Carbon)	33300	35600	1	6.63		20

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

(LCS) R3217425-2 05/11/17 17:27 • (LCSD) R3217425-3 05/11/17 17:27

	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	7670	7700	137	138	50.0-150			0.327	20

1Cp

2Tc

3Ss

4Cn

5Sr

6Qc

7Gl

8Al

9Sc



Method Blank (MB)

(MB) R3216107-1 05/05/17 19:42

Analyte	MB Result mg/kg	MB Qualifier	MB MDL mg/kg	MB RDL mg/kg
Potassium	14.3	↓	10.2	100

<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

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

(LCS) R3216107-2 05/05/17 19:45 • (LCSD) R3216107-3 05/05/17 19:48

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	1030	980	103	98	80-120			5	20

L906637-01 Original Sample (OS) • Matrix Spike (MS) • Matrix Spike Duplicate (MSD)

(OS) L906637-01 05/05/17 19:50 • (MS) R3216107-6 05/05/17 19:59 • (MSD) R3216107-7 05/05/17 20:07

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	1320	1840	3240	3060	106	93	1	75-125			6	20



## 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.
J3	The associated batch QC was outside the established quality control range for precision.
J6	The sample matrix interfered with the ability to make any accurate determination; spike value is low.
P1	RPD value not applicable for sample concentrations less than 5 times the reporting limit.

<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



ESC Lab Sciences is the only environmental laboratory accredited/certified to support your work nationwide from one location. One phone call, one point of contact, one laboratory. No other lab is as accessible or prepared to handle your needs throughout the country. Our capacity and capability from our single location laboratory is comparable to the collective totals of the network laboratories in our industry. The most significant benefit to our "one location" design is the design of our laboratory campus. The model is conducive to accelerated productivity, decreasing turn-around time, and preventing cross contamination, thus protecting sample integrity. Our focus on premium quality and prompt service allows us to be **YOUR LAB OF CHOICE**.

\* Not all certifications held by the laboratory are applicable to the results reported in the attached report.

## State Accreditations

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
Connecticut	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		

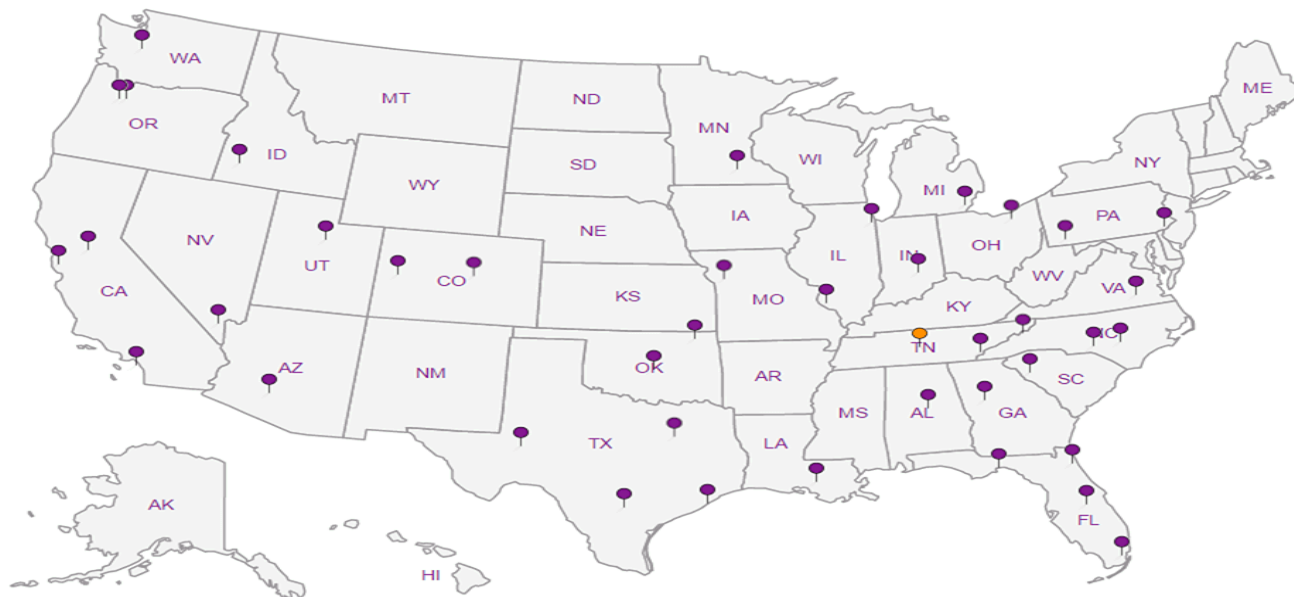
## Third Party & Federal Accreditations

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	TN00003		

<sup>1</sup> Drinking Water <sup>2</sup> Underground Storage Tanks <sup>3</sup> Aquatic Toxicity <sup>4</sup> Chemical/Microbiological <sup>5</sup> Mold <sup>n/a</sup> Accreditation not applicable

## Our Locations

ESC Lab Sciences has sixty-four client support centers that provide sample pickup and/or the delivery of sampling supplies. If you would like assistance from one of our support offices, please contact our main office. **ESC Lab Sciences performs all testing at our central laboratory.**



[illegible]

## ESC LAB SCIENCES Cooler Receipt Form

Client: <u>BERPETDCO</u>	SDG#	<u>6906907</u>	
Cooler Received/Opened On: <u>5/4/17</u>	Temperature:	<u>2-1</u>	
Received By: <u>Timisha Scott</u>			
Signature: <u>[Signature]</u> <u>CS</u>			
<b>Receipt Check List</b>			
	NP	Yes	No
COC Seal Present / Intact?	/		
COC Signed / Accurate?		/	
Bottles arrive intact?		/	
Correct bottles used?		/	
Sufficient volume sent?		/	
If Applicable			
VOA Zero headspace?			
Preservation Correct / Checked?			

**Troy Dunlap**

**ESC Lab Sciences**  
**Non-Conformance Form**

<b>Login #: L906807</b>	<b>Client: BERPETDCO</b>	<b>Date: 5/4/17</b>	<b>Evaluated by: Troy Dunlap</b>
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**Non-Conformance (check applicable items)**

<b>Sample Integrity</b>	<b>Chain of Custody Clarification</b>	<b>If Broken Container:</b>
Parameter(s) past holding time	X Login Clarification Needed	
Improper temperature	Chain of custody is incomplete	Insufficient packing material around container
Improper container type	Please specify Metals requested.	Insufficient packing material inside cooler
Improper preservation	Please specify TCLP requested.	Improper handling by carrier (FedEx / UPS / Courier)
Insufficient sample volume.	Received additional samples not listed on coc.	Sample was frozen
Sample is biphasic.	Sample ids on containers do not match ids on coc	Container lid not intact
Vials received with headspace.	Trip Blank not received.	<b>If no Chain of Custody:</b>
Broken container	Client did not "X" analysis.	Received by:
Broken container:	Chain of Custody is missing	Date/Time:
Sufficient sample remains		Temp./Cont. Rec./pH:
		Carrier:
		Tracking#

**Login Comments: Only received one 4oz jar for 006 696 at 1120. COC says 2 containers. Received a 4oz jar for 006 699 not listed on the COC with same time as 006 696.**

<b>Client informed by:</b>	<b>Call</b>	<b>Email</b>	<b>Voice Mail</b>	<b>Date: 5/4/17</b>	<b>Time: 1055</b>
<b>TSR Initials: MB</b>	<b>Client Contact:</b>				

**Login Instructions:**

**Place 006-699 jar on hold**

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