September 14, 2016 Service Request No:T1601416

Ms. Ancy Sebastian
ALS Environmental - Canada
1435 Norjohn Court #1
Burlington, ON L7L 0E6

Laboratory Results for:

Dear Ms.Sebastian,

Enclosed are the results of the sample(s) submitted to our laboratory August 02, 2016
For your reference, these analyses have been assigned our service request number **T1601416.**

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and ALS Environmental is not responsible for use of less than the complete report. Results
apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 7102. You may also contact me via email at Wendy.Hyatt@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Wendy Hyatt
Client Services
Manager

ADDRESS 3860 S. Palo Verde Road, Suite 302, Tucson, AZ 85714
PHONE +1 520 573 1061 | FAX +1 520 573 1063
ALS Group USA, Corp.
dba ALS Environmental

Client: ALS Environmental - Canada **Service Request:**T1601416
Project:

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
T1601416-001	PY-1007 AUXILIARY FUEL	7/27/2016	1940
T1601416-002	PY-1009 AUXILIARY FUEL	7/27/2016	1940
T1601416-003	PY-1010 SCRUBBER PURGE WATER	7/27/2016	1930
T1601416-004	PY-1015 ASH SPIKING SOLUTION	7/27/2016	2005
T1601416-005	PY-1016 ASH SPIKING SOLUTION	7/27/2016	2005
T1601416-006	PY-2007C QUENCH ASH	7/28/2016	1800
T1601416-007	PY-2008C QUENCH ASH	7/28/2016	1800
T1601416-008	PY-2011 AUXILIARY FUEL	7/28/2016	1715
T1601416-009	PY-2012 AUXILIARY FUEL	7/28/2016	1715
T1601416-010	PY-2015 AUXILIARY FUEL	7/28/2016	1715
T1601416-011	PY-2016 AUXILIARY FUEL	7/28/2016	1715
T1601416-012	PY-2017 SCRUBBER PURGE WATER	7/28/2016	1705
T1601416-013	PY-2018 SCRUBBER PURGE WATER	7/28/2016	1705
T1601416-014	PY-2023 ASH SPIKING SOLUTION	7/28/2016	1800
T1601416-015	PY-2024 ASH SPIKING SOLUTION	7/28/2016	1800
T1601416-016	PY-2025 ASH SPIKING SOLUTION	7/28/2016	1800
T1601416-017	PY-2026 ASH SPIKING SOLUTION	7/28/2016	1800
T1601416-018	PY-3004B KILN ASH	7/29/2016	1545
T1601416-019	PY-3007 AUXILIARY FUEL	7/29/2016	1535
T1601416-020	PY-3009 AUXILIARY FUEL	7/29/2016	1535
T1601416-021	PY-3010 SCRUBBER PURGE WATER	7/29/2016	1525
T1601416-022	PY-3014 ASH SPIKING SOLUTION	7/29/2016	1545
T1601416-023	PY-3015 ASH SPIKING SOLUTION	7/29/2016	1545

ALS Environmental

Chain of Custody / Analytical Request Form

1435 Norjohn Court Unit 1, Burlington Ontario, Canada L7L 0E6

Tel +1-905-331-3111 Fax +1-905-331-4567 www.alsglobal.com burlington@alsenviro.com

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ALS Environmental - Canada

Report To		Report Format / Distribution		Service Requested
Company:	ALS Environmental Burlington ON	☐ Standard ☐ Other:		☐ Regular Service
Contact:	Ancy Sebastian/Lynne Wrona	☐ PDF ☐ Excel ☐ Digital ☐ Fax		☐ Rush Service (3 days with prior consultation) - surcharge applies
Address:	1435 Norjohn Court Unit 1	Email 1:	Ancy. Sebastian@alsglobal.com	☐ Other - Please contact ALS
Phone:	(905) 331-3111 Fax:	Email 2:	Lynne.Wrona@alsglobal.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	Client / Project Information		Analysis Request
Company:		Job #:		
Contact:		Location:		
Address:		PO:		
Phone:	Fax:	Sampled by:		
Lab Work Order #		ALS Contact:	Ancy Sebastian/Lynne Wrona	

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	%Ash 30/24.75	Density 30	Moisture Content 7.50	Heat Content(BTU) 48.75							Hazardous? Provide Details	Highly Contaminated?	Number of Containers
	L1808469-1 PY-1007 AUXILIARY FUEL	27-Jul-16	19:40	Other	X												
	L1808469-2 PY-1009 AUXILIARY FUEL	27-Jul-16	19:40	Other	X												
	L1808469-3 PY-1010 SCRUBBER PURGE WATER	27-Jul-16	19:30	Other	X												
	L1808469-4 PY-1015 ASH SPIKING SOLUTION	27-Jul-16	20:05	Other		X											
	L1808469-5 PY-1016 ASH SPIKING SOLUTION	27-Jul-16	20:05	Other	X												
	L1808469-6 PY-2007C QUENCH ASH	28-Jul-16	18:00	Other S		X	X										
	L1808469-7 PY-2008C QUENCH ASH	28-Jul-16	18:00	Other S		X	X										
	L1808469-8 PY-2011 AUXILIARY FUEL	28-Jul-16	17:15	Other		X		X									
	L1808469-9 PY-2012 AUXILIARY FUEL	28-Jul-16	17:15	Other		X		X									
	L1808469-10 PY-2015 AUXILIARY FUEL	28-Jul-16	17:15	Other	X												
	L1808469-11 PY-2016 AUXILIARY FUEL	28-Jul-16	17:15	Other	X												
	L1808469-12 PY-2017 SCRUBBER PURGE WATER	28-Jul-16	17:05	Other	X												
	L1808469-13 PY-2018 SCRUBBER PURGE WATER	28-Jul-16	17:05	Other	X												
	L1808469-14 PY-2023 ASH SPIKING SOLUTION	28-Jul-16	18:00	Other		X											
	L1808469-15 PY-2024 ASH SPIKING SOLUTION	28-Jul-16	18:00	Other		X											
	L1808469-16 PY-2025 ASH SPIKING SOLUTION	28-Jul-16	18:00	Other	X												
	L1808469-17 PY-2026 ASH SPIKING SOLUTION	28-Jul-16	18:00	Other	X												
	L1808469-18 PY-3004B KILN ASH	29-Jul-16	15:45	Other S		X	X										
	L1808469-19 PY-3007 AUXILIARY FUEL	29-Jul-16	15:35	Other		X		X									
	L1808469-20 PY-3009 AUXILIARY FUEL	29-Jul-16	15:35	Other	X												

Special Instructions / Regulations / Hazardous Details

*****PLEASE NOTE SAMPLE NOTES/EXPECTATIONS ON ACOMPANYING CLIENT COC*****

By the use of this form the user acknowledges and agrees with the Terms and Conditions as provided by ALS

Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			M. N	8/2/16	09:39	°C				

ALS Environmental

Chain of Custody / Analytical Request Form

1435 Norjohn Court Unit 1, Burlington Ontario, Canada L7L 0E6

Tel +1-905-331-3111 Fax +1-905-331-4567 www.alsglobal.com burlington@alsenviro.com

T1601416 5

ALS Environmental - Canada

Report To		Report Format / Distribution		Service Requested
Company:	ALS Environmental Burlington ON	☐ Standard ☐ Other:		☑ Regular Service
Contact:	Ancy Sebastian/Lynne Wrona	☐ PDF ☐ Excel ☐ Digital ☐ Fax		☐ Rush Service (3 days with prior consultation) - surcharge applies
Address:	1435 Norjohn Court Unit 1	Email 1:	Ancy. Sebastian@alsglobal.com	☐ Other - Please contact ALS
Phone:	(905) 331-3111 Fax:	Email 2:	Lynne.Wrona@alsglobal.com	
Invoice To	Same as Report ? ☑ Yes ☐ No	**Client / Project Information**		
Company:		Job #:	Picatinny Arsenal	
Contact:		Location:		
Address:		PO:		
Phone:	Fax:	Sampled by:		
Lab Work Order #		**ALS Contact:**	**Ancy Sebastian/Lynne Wrona**	

Analysis Request

Sample #	Sample Identification (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	%Ash	Density									Hazardous? Provide Details	Highly Contaminated?	Number of Containers
	L1808469-21 PY-3010 SCRUBBER PURGE WATER	29-Jul-16	15:25	Other	X												
	L1808469-22 PY-3014 ASH SPIKING SOLUTION	29-Jul-16	15:45	Other		X											
	L1808469-23 PY-3015 ASH SPIKING SOLUTION	29-Jul-16	15:45	Other	X												

Special Instructions / Regulations / Hazardous Details

*****PLEASE NOTE SAMPLE NOTES/EXPECTATIONS ON ACOMPANYING CLIENT COC*****

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Released by:	Date (dd-mmm-yy)	Time (hh-mm)	Received by:	Date:	Time:	Temperature:	Verified by:	Date:	Time:	Observations: Yes / No ? If Yes add SIF
			M. [illegible]	8/2/16	09:39	°C				

3860 S. Palo Verde Road, Suite 302
Tucson, AZ 85714
T: +1 520 573 1061
F: +1 520 573 1063
www.alsglobal.com

Sample Receipt Form

T1601416 5
ALS Environmental - Canada

Client/Project: ALS-NY Work Order Number:

Received by: Mellissa Himebauch Date & Time: 8/2/16 9:39 Matrix: Aqueous

Samples were received via?: FedEx Samples were received in: Cooler

Were custody seals on containers? (●) Yes ( ) No ( ) NA If yes, how many and where? 1 on outside

If present were custody seals intact? (●) Yes ( ) No If present, were they signed and dated? ( ) Yes (●) No

Cooler Temp C	Temp Blank C	Tracking Number
5.6	n/a	682680152695

Packing material used? Bubble Wrap | Wet Ice | Bags |

Did all the bottles arrive in good condition (unbroken)? (●) Yes ( ) No ( ) NA If No, record comments below

Did all sample labels and tags agree with COC? (●) Yes ( ) No ( ) NA If No, record discrepancies below

Were all the appropriate containers and volumes received for the tests indicated? (●) Yes ( ) No ( ) NA

Are samples received deemed acceptable? (●) Yes ( ) No

Comments:
31 amber glass bottles received. All bottles labeled as Slurry Waste Feed to return to sender.

Notes, discrepancies, & resolutions:
Slurry waste is an explosive propellant when dry.

As a part of ISO 17025 protocols, ALS must notify clients that the quoted analytical methods performed by ALS may have minor modifications from the methods as published. These modifications are written into our Standard Operating Procedures and do not impact the quality of the data. Receipt of this document will be considered an acceptance of the procedures used by the laboratory for analysis unless notified by the client.
Modifications may include, but are not limited to:

- The analysis of a sample matrix that differs from that stated in the published method (example - ASTM D5865 Standard Test Method for Gross Calorific Value of Coal and Coke is used for other matrices such as biomass, Tire Derived Fuel, etc.).
- Analyzing a sample mass that differs from those in the published method (example - to accommodate samples with high concentrations of analyte, samples of limited volume, or to comply with the instrument manufacturer's operating guidelines).
- Instruments used for the analysis may differ from those listed in the published method (example - using ICP-OES when the method references flame Atomic Absorption Spectroscopy)

Client: ALS Environmental - Canada
5420 Mainway Drive, Unit #5
Burlington, ON L7L 6A4

Attn: Ancy Sebastian
Project: L1808469 Date Received: 8/ 2/16

Case Narrative

Sample Receipt

Thirty one amber glass bottles were received on 8/2/16 at 0939 at a temperature of 5.6˚C.
Several hazardous samples arrived (labeled Slurry Waste Feed) the same day, but they were re-directed to Stericycle.
Analysis was performed on 23 remaining samples (liquids and solids). Not all samples were tested for all analyses.
See the attached COC documents for discrepancies, if any, between the COC forms and sample containers.

The sample(s) was/were logged into the StarLIMS for the following analyses.

Solid Samples	
Air Dry Loss and Sample Preparation to < 60 mesh	See protocol below
Moisture (105C)	D2216
Bulk Density	E873
Liquid Samples	
Ash	D482
Heating Value (BTU)	D240
Density	D1475

Note: D and E prefixes on method indicate ASTM methods

Client: ALS Environmental - Canada
5420 Mainway Drive, Unit #5
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Attn: Ancy Sebastian
Project: L1808469 Date Received: 8/ 2/16

Case Narrative

Sample Preparation and Bulk Density

- Air dry the entire sample. Record air dry moisture loss.
- Grind sample to < 60 mesh using tungsten carbide ring and puck mill.
- Perform Bulk Density on dried sample.

Observations of Sample Preparation and Analyses

The samples were analyzed using the above methods. All analytical QC data is within acceptance criteria. There was insufficient sample to perform Bulk Density on samples -006, -007, and the duplicate for -018.

Client: ALS Environmental - Canada
5420 Mainway Drive, Unit #5
Burlington, ON L7L 6A4

Attn: Ancy Sebastian
Project: L1808469 Date Received: 8/ 2/16

Certificate of Analysis

Sample ID:	Sample Date and Time:	Lab #:	Moisture D2216 wt%	Ash D482 As Received wt%	Heating Value D240 As Received BTU/lb	Bulk Density E873 Moist. Free g/cm^3	Density D1475 g/cm^3
PY-1007 AUXILIARY FUEL	7/27/16 1940	T1601416-001	n/a	<0.01	n/a	n/a	n/a
		Duplicate	n/a	<0.01	n/a	n/a	n/a
PY-1009 AUXILIARY FUEL	7/27/16 1940	T1601416-002	n/a	0.03	n/a	n/a	n/a
		Duplicate	n/a	<0.01	n/a	n/a	n/a
PY-1010 SCRUBBER PURGE WATER	7/27/16 1930	T1601416-003	n/a	0.18	n/a	n/a	n/a
		Duplicate	n/a	0.19	n/a	n/a	n/a
PY-1015 ASH SPIKING SOLUTION	7/27/16 2005	T1601416-004	n/a	n/a	n/a	n/a	1.1418
		Duplicate	n/a	n/a	n/a	n/a	1.1416
PY-1016 ASH SPIKING SOLUTION	7/27/16 2005	T1601416-005	n/a	15.00	n/a	n/a	n/a
		Duplicate	n/a	16.04	n/a	n/a	n/a
PY-2007C QUENCH ASH	7/28/16 1800	T1601416-006	98.52	n/a	n/a	*	n/a
		Duplicate	98.52	n/a	n/a	*	n/a
PY-2008C QUENCH ASH	7/28/16 1800	T1601416-007	98.55	n/a	n/a	*	n/a
		Duplicate	98.55	n/a	n/a	*	n/a
PY-2011 AUXILIARY FUEL	7/28/16 1715	T1601416-008	n/a	n/a	19,765	n/a	0.8378
		Duplicate	n/a	n/a	19,640	n/a	0.8378
PY-2012 AUXILIARY FUEL	7/28/16 1715	T1601416-009	n/a	n/a	19,742	n/a	0.8381
		Duplicate	n/a	n/a	19,634	n/a	0.8374
PY-2015 AUXILIARY FUEL	7/28/16 1715	T1601416-010	n/a	<0.01	n/a	n/a	n/a
		Duplicate	n/a	<0.01	n/a	n/a	n/a
PY-2016 AUXILIARY FUEL	7/28/16 1715	T1601416-011	n/a	<0.01	n/a	n/a	n/a
		Duplicate	n/a	<0.01	n/a	n/a	n/a
PY-2017 SCRUBBER PURGE WATER	7/28/16 1705	T1601416-012	n/a	0.11	n/a	n/a	n/a
		Duplicate	n/a	0.07	n/a	n/a	n/a
PY-2018 SCRUBBER PURGE WATER	7/28/16 1705	T1601416-013	n/a	0.10	n/a	n/a	n/a
		Duplicate	n/a	0.07	n/a	n/a	n/a
PY-2023 ASH SPIKING SOLUTION	7/28/16 1800	T1601416-014	n/a	n/a	n/a	n/a	1.1421
		Duplicate	n/a	n/a	n/a	n/a	1.1418

Client: ALS Environmental - Canada
5420 Mainway Drive, Unit #5
Burlington, ON L7L 6A4

Attn: Ancy Sebastian
Project: L1808469

Date Received: 8/ 2/16

Certificate of Analysis

Sample ID:	Sample Date and Time:	Lab #:	Moisture D2216 wt%	Ash D482 As Received wt%	Heating Value D240 As Received BTU/lb	Bulk Density E873 Moist. Free g/cm^3	Density D1475 g/cm^3
PY-2024 ASH SPIKING SOLUTION	7/28/16 1800	T1601416-015	n/a	n/a	n/a	n/a	1.1432
		Duplicate	n/a	n/a	n/a	n/a	1.1426
PY-2025 ASH SPIKING SOLUTION	7/28/16 1800	T1601416-016	n/a	16.55	n/a	n/a	n/a
		Duplicate	n/a	16.72	n/a	n/a	n/a
PY-2026 ASH SPIKING SOLUTION	7/28/16 1800	T1601416-017	n/a	15.75	n/a	n/a	n/a
		Duplicate	n/a	16.78	n/a	n/a	n/a
PY-3004B KILN ASH	7/29/16 1545	T1601416-018	1.01	n/a	n/a	1.0052	n/a
		Duplicate	0.98	n/a	n/a	*	n/a
PY-3007 AUXILIARY FUEL	7/29/16 1535	T1601416-019	n/a	n/a	19,740	n/a	0.8381
		Duplicate	n/a	n/a	19,653	n/a	0.8377
PY-3009 AUXILIARY FUEL	7/29/16 1535	T1601416-020	n/a	<0.01	n/a	n/a	n/a
		Duplicate	n/a	<0.01	n/a	n/a	n/a
PY-3010 SCRUBBER PURGE WATER	7/29/16 1525	T1601416-021	n/a	0.06	n/a	n/a	n/a
		Duplicate	n/a	0.05	n/a	n/a	n/a
PY-3014 ASH SPIKING SOLUTION	7/29/16 1545	T1601416-022	n/a	n/a	n/a	n/a	1.1427
		Duplicate	n/a	n/a	n/a	n/a	1.1424
PY-3015 ASH SPIKING SOLUTION	7/29/16 1545	T1601416-023	n/a	17.04	n/a	n/a	n/a
		Duplicate	n/a	17.01	n/a	n/a	n/a

Notes:
*Not enough sample to perform analysis.

Client: ALS Environmental - Canada
5420 Mainway Drive, Unit #5
Burlington, ON L7L 6A4

Attn: Ancy Sebastian
Project: L1808469 Date Received: 8/ 2/16

Quality Control

			Moisture	Ash	Heating Value		Density
			D2216	D482	D240		D1475
			wt%	As Received wt%	As Received BTU/lb		g/cm^3
Prep Blank			<0.01	100.10	n/a		n/a
LCS			Sand/Nano	AR 1722	Benzoic		Nanopure
			2941	5113	4823		
		Observed Value	10.25	22.32	11,402		0.9973
		True Value	10.25	22.42	11,374		0.9973
		%R	100	100	100		100
Duplicate			T1601416-006	T1601416-001	T1601416-008		T1601416-004
		Observed Value	98.52	<0.01	19,765		1.1418
		Duplicate Value	98.52	<0.01	19,640		1.1416
		%RPD	0.0	-	0.6		0.0

Client: ALS Environmental - Canada
5420 Mainway Drive, Unit #5
Burlington, ON L7L 6A4

Attn: Ancy Sebastian
Project: L1808469 Date Received: 8/ 2/16

Raw Data

ALS Environmental - Tucson, AZ

Air Dry Loss

Gravimetric, 35C

Reporting Limit: 0.01

Detection Limit: 0.01

Analyst:	KS
Analysis Date:	08/16/16
Analyst Review:	KS 8/18/2016
Supervisor Review:	8/24/16

Temperature °C	Start Time	End Time
40	8/16/2016 1343	8/17/2016 0741

SX Type	Sample Number	Cruc. Wt. g	Cruc. & Wet Sx Wt. g	Cruc. & Dried Sx Wt. g	ADL Moisture	Remarks
	T1601416-006	124.00	196.24	125.12	98.45	
	T1601416-007	93.01	182.84	94.38	98.47	
	T1601416-018	87.24	195.26	194.67	0.55	

Remarks

ALS Environmental - Tucson, AZ

Air Dry Loss

Gravimetric, 35C

Reporting Limit: 0.01 **Detection Limit:** 0.01

Analyst: 195
Analysis Date: 8/16/2016
Analyst Review: 195 8/18/2016
Supervisor Review:

Temperature °C	Start Time	End Time
40	8/16/2016 1343	8/17/2016 0741

SX Type	Sample Number	Cruc. Wt. g	Cruc. & Wet Sx Wt. g	Cruc. & Dried Sx Wt. g	ADL Moisture	Remarks
	T160 1416 -006	124.00	196.24	125.17		
	007	93.01	182.84	94.38		
	018	87.24	195.26	194.67		

Remarks

R#511740

ALS Envrionmental - Tucson, AZ

Total Solids or Moisture_overnight

Sand mass, g	Water mass, g	Wt%, TV	Wt%, observed	%R
1.0151	0.1028	9.20	9.16	99.6
1.0574	0.1155	9.85	9.86	100.1

Oven used	Temperature °C	Start Time	End Time 1
Oven# 2	101.9	8/25/2016 11:10	8/26/2016 8:55

Analyst	CM
Analysis Date	08/25/16
Analyst Review	CM 8/26/16
Secondary Review	8/26/16

SX Type	Sample Number	ADL Moist %	Cup No.	Cruc. Wt. g	Cruc. & Wet Sx Wt. g	Cruc. & Dried Sx Wt. g	Moist%	Total Moist %	Total Solids %	Moist RPD	Total Moist RPD	Remarks
SX	Sand Blank (2941)		PB	0.4101	1.4112	1.4110	0.02	0.02	99.98	✓		
SX	Sand (2941) & nanopure		STD	0.4148	1.5327	1.4303	9.16	9.16	90.84			
DUP	Sand (2941) & nanopure		STD D	0.4105	1.5834	1.4678	9.86	9.86	90.14	7.3	7.3	
SX	T1601399-001		1	0.4173	1.4194	1.4082	1.12	1.12	98.88			
DUP	T1601399-001		1 D	0.4086	1.4119	1.4001	1.18	1.18	98.82	5.1	5.1	
SX	T1601442-001		2	1.1869	2.2175	2.0371	17.50	17.50	82.50			
SX	T1601442-002		3	1.1922	2.2005	2.0385	16.07	16.07	83.93			
SX	T1601442-003		4	1.1861	2.2372	1.7821	43.30	43.30	56.70			
SX	T1601433-001		5	1.1925	2.1984	2.1615	3.67	3.67	96.33			
SX	T1601436-001		6	1.1892	2.2005	2.1557	4.43	4.43	95.57			
SX	T1601424-001		7	1.1835	2.2219	2.1701	4.99	4.99	95.01			
SX	T1601424-002		8	1.1786	2.1923	2.1615	3.04	3.04	96.96			
SX	T1601424-003		9	0.4115	1.4661	1.4588	0.69	0.69	99.31			
SX	T1601428-001		10	1.1910	2.2099	2.1742	3.50	3.50	96.50			
SX	T1601428-002		11	1.1703	2.1971	2.1698	2.66	2.66	97.34			
DUP	T1601428-002		11 D	1.1806	2.1922	2.1671	2.48	2.48	97.52	6.9	6.9	✓
SX	T1601428-003		12	1.1899	2.1953	2.1699	2.53	2.53	97.47			
SX	T1601428-004		13	1.1961	2.2195	2.2028	1.63	1.63	98.37			
SX	T1601428-005		14	1.1764	2.2118	2.1964	1.49	1.49	98.51			
SX	T1601428-006		15	1.1821	2.1996	2.1824	1.69	1.69	98.31			
SX	T1601428-007		16	1.1919	2.1986	2.1893	0.92	0.92	99.08			
SX	T1601429-001		17	1.1898	2.2163	2.1548	5.99	5.99	94.01			
SX	T1601440-001		18	0.4127	1.4470	1.3442	9.94	9.94	90.06			
SX	T1601445-001		19	0.4151	1.4682	1.3129	14.75	14.75	85.25			
SX	J1605875-001		20	0.4109	1.4323	1.4029	2.88	2.88	97.12			

Note: the SX type needs to be "dup" to allow for the spreadsheet to calculate the RPD. The Total Solids % is adjusted to include the ADL Moisture.

R#571740

ALS Envrionmental - Tucson, AZ

Total Solids or Moisture_overnight

Sand mass, g	Water mass, g	Wt%, TV	Wt%, observed	%R
1.0984	0.1254	10.25	10.25	100.0
1.0342	0.1433	12.17	12.15	99.8

Oven used	Temperature °C	Start Time	End Time 1
Oven# 2	103.3	8/25/2016 15:00 AM	8/26/2016 8:55

Analyst	CM
Analysis Date	08/25/16
Analyst Review	CM 8/26/16
Secondary Review	

SX Type	Sample Number	ADL Moist %	Cup No.	Cruc. Wt. g	Cruc. & Wet Sx Wt. g	Cruc. & Dried Sx Wt, g	Moist%	Total Moist %	Total Solids %	Moist RPD	Total Moist RPD	Remarks
SX	Sand Blank (2941)		PB 2	0.4126	1.4189	1.4191	-0.02	-0.02	100.02			
SX	Sand (2941) & nanopure		STD 2	0.4112	1.6350	1.5095	10.25	10.25	89.75			8.97% WB 8/26/16
DUP	Sand (2941) & nanopure		STD 2	0.4135	1.5910	1.4479	12.15	12.15	87.85	16.9	16.9	
SX	T1601416-006		21	0.4137	1.0048	0.9761	4.86	4.86	95.14			
DUP	T1601416-006		21 D	0.4075	0.7882	0.7712	4.47	4.47	95.53	8.4	8.4	limited sample
SX	T1601416-007		22	0.4137	0.8971	0.8734	4.90	4.90	95.10			
DUP	T1601416-007		23	0.4174	1.0851	1.0515	5.03	5.03	94.97	2.6	2.6	limited sample
SX	T1601416-018		24	0.4159	1.4487	1.4439	0.46	0.46	99.54			
DUP	T1601416-018		25	0.4060	1.4269	1.4224	0.44	0.44	99.56	5.3	5.3	

Note: the SX type needs to be "dup" to allow for the spreadsheet to calculate the RPD. The Total Solids % is adjusted to include the ADL Moisture.

Analytical Run Worksheet

Run #: 511740
Instrument: T-TGA-01
Run Status: Draft

CAS Lab: TUCSON
Team: Elemental
Assigned To : CMULL
Run Date: 08/25/2016 10:20 AM

Seq#	Lab Sample ID	Bottle	QC Type	Container Barcode	Client Sample ID	Method / Test / Prep Method	Df	Parent
1	T1601399-001	.02			2153748 004	ASTM D3173-11 / Moisture /	1	
2	T1601442-001	.01			Bark	ASTM D3173-11 / Moisture /	1	
3	T1601442-002	.01			Cross-ties	ASTM D3173-11 / Moisture /	1	
4	T1601442-003	.02			Sludge	ASTM D3173-11 / Moisture /	1	
5	T1601433-001	.02			BARK-07-16	ASTM D3173-11 / Moisture /	1	
6	T1601436-001	.02			Bark Moisture 08-17-16	ASTM D3173-11 / Moisture /	1	
7	T1601424-001	.01			Bark RFP0816-22	ASTM D3173-11 / Moisture /	1	
8	T1601424-002	.01			Sludge RFP0816-23	ASTM D3173-11 / Moisture /	1	
9	T1601424-003	.03			TDF-Tire RFP0816-24	ASTM D3173-11 / Moisture /	1	
10	T1601428-001	.02			MIX WOOD Sample 8/8	ASTM D3173-11 / Moisture /	1	
11	T1601428-002	.01			MIX WOOD Sample 8/9	ASTM D3173-11 / Moisture /	1	
12	T1601428-003	.01			MIX WOOD Sample 8/10	ASTM D3173-11 / Moisture /	1	
13	T1601428-004	.01			MIX WOOD Sample 8/11	ASTM D3173-11 / Moisture /	1	
14	T1601428-005	.01			MIX WOOD Sample 8/12	ASTM D3173-11 / Moisture /	1	
15	T1601428-006	.01			MIX WOOD Sample 8/13	ASTM D3173-11 / Moisture /	1	
16	T1601428-007	.01			MIX WOOD Sample 8/14	ASTM D3173-11 / Moisture /	1	
17	T1601429-001	.02			JAY081616AF	ASTM D3173-11 / Moisture /	1	
18	T1601440-001	.01			L1812623-1	ASTM D3173-11 / Moisture /	1	
19	T1601445-001	.02			JAY081816AFND	ASTM D3173-11 / Moisture /	1	
20	J1605875-001	.01			Bark	ASTM D3173-03 / Moisture /	1	
21	T1601416-006	.01			PY-2007C QUENCH ASH	ASTM D2216 / Water Cont /	1	
22	T1601416-007	.01			PY-2008C QUENCH ASH	ASTM D2216 / Water Cont /	1	
23	T1601416-018	.01			PY-3004B KILN ASH	ASTM D2216 / Water Cont /	1	

R#511620

ALS Envrionmental - Tucson, AZ

Total Solids, Moisture, or Ash (solids)

Analyst	CM
Analysis Date	08/24/16
Analyst Review	CM 8/25/16
Secondary Review	IM 8/26/16

Sand mass, g	Water mass, g	Wt%, TV	Wt%, observed	%R

Oven/Furnace used	Temperature °C	Start Time	End Time 1	End Time 2	End Time 3	End Time 4
Furnace# 2	764	14:20	16:36	Start time 8/25, 10:00	11:15	

SX Type	Sample Number	Moist %	Cup No.	Cruc. Wt. g	Cruc. & Wet Sx Wt. g	Cruc. & Dried Sx Wt. 1, g	Cruc. & Dried Sx Wt. 2, g	Cruc. & Dried Sx Wt. 3, g	Cruc. & Dried Sx Wt. 4, g	1st Ash%	2nd Ash%	3rd Ash%	4th Ash%	Ash %, dry wt	Organic Matter, as tested	Ash RPD	Total Moist RPD	Remarks
SX	Sand blank		BE	62.5602	63.6724	63.6735	63.6721			100.10	99.97			99.97	0.03			
SX	AR 1722 (5113)		BLUE	71.2452	72.2551	71.4712	71.4706			22.38	22.32			22.32	77.68			%R 99.6 , T.V.=22.42
DUP	AR 1722 (5113)		CH	73.5814	74.5896	73.8081	73.8072			22.49	22.40			22.40	77.60	0.3		%R 99.9 , T.V.=22.42
SX	T1601449-001		V	68.5395	69.5446	68.5529	68.5526			1.33	1.30			1.30	98.70			
SX	T1601416-001		B	10.0877	11.1076	10.0876	10.0876			-0.01	-0.01			-0.01	100.01			
DUP	T1601416-001		CD	13.5108	14.5163	13.5108	13.5108			0.00	0.00							
SX	T1601416-002		4	13.3712	14.4055	13.3712	13.3715			0.00	0.03			0.03	99.97			
DUP	T1601416-002		D	13.4327	14.4713	13.4326	13.4327			-0.01	0.00			-0.01	100.01	-200.0		
SX	T1601416-003		2	12.4371	13.5592	12.4391	12.4391			0.18	0.18			0.18	99.82			Step 1 Pre-Ash Crucibles
DUP	T1601416-003		6	12.0003	13.0366	12.0021	12.0023			0.17	0.19			0.19	99.81	8.0		Step 2 Collect masses and ash
SX	T1601416-005		O	13.6912	14.8011	13.8606	13.8577			15.26	15.00			15.00	85.00			at 750C for 2hrs.
DUP	T1601416-005		10	30.5371	31.6105	30.7137	30.7093			16.45	16.04			16.04	83.96	6.7		Step 3 Cool & re-mass
SX	T1601416-010		5	28.9804	29.9876	28.9804	28.9801			0.00	-0.03			-0.03	100.03			Step 4 Ash at 750 for 1 hr
DUP	T1601416-010		14	26.8334	27.9153	26.8316	26.8308			-0.17	-0.24			-0.24	100.24	-155.9		Step 5 Cool & re-mass
SX	T1601416-011		9	27.3389	28.3371	27.3368	27.3362			-0.21	-0.27			-0.27	100.27			
DUP	T1601416-011		#4	26.1094	27.1495	26.1068	26.1064			-0.25	-0.29			-0.29	100.29	-6.4		
SX	T1601416-012		B	37.6437	38.7331	37.6446	37.6449			0.08	0.11			0.11	99.89			
DUP	T1601416-012		R	45.0599	46.1583	45.0605	45.0607			0.05	0.07			0.07	99.93	40.8		
SX	T1601416-013		T	41.5571	42.5845	41.5579	41.5581			0.08	0.10			0.10	99.90			
DUP	T1601416-013		L	39.6806	40.6999	39.6813	39.6813			0.07	0.07			0.07	99.93	34.5		
SX	T1601416-016		GD	39.0587	40.1384	39.2391	39.2374			16.71	16.55			16.55	83.45			
DUP	T1601416-016		RQ	39.7595	40.8432	39.9418	39.9407			16.82	16.72			16.72	83.28	1.0		
SX	T1601416-017		ZR	37.7222	38.8178	37.8954	37.8948			15.81	15.75			15.75	84.25			
DUP	T1601416-017		Q	38.2940	39.3445	38.4709	38.4703			16.84	16.78			16.78	83.22	6.3		

Note: the SX type needs to be "dup" to allow for the spreadsheet to calculate the RPD. The Total Solids % is adjusted to include the ADL Moisture. A temperature > 150 C will change the columns to be for ash not moisture/TS. For ash determinations, the moisture column is used to get a dry wt % for the ash.

R# 511620

ALS Envrionmental - Tucson, AZ

Total Solids, Moisture, or Ash (solids)

Sand mass, g	Water mass, g	Wt%, TV	Wt%, observed	%R

Analyst	CM
Analysis Date	08/24/16
Analyst Review	
Secondary Review	

Oven/Furnace used	Temperature °C	Start Time	End Time 1	End Time 2	End Time 3	End Time 4
Furnace# 2	764	14:20	16:36	Start time 8/25, 10:00	11:15	

SX Type	Sample Number	Moist %	Cup No.	Cruc. Wt. g	Cruc. & Wet Sx Wt. g	Cruc. & Dried Sx Wt. 1, g	Cruc. & Dried Sx Wt. 2, g	Cruc. & Dried Sx Wt. 3, g	Cruc. & Dried Sx Wt. 4, g	1st Ash%	2nd Ash%	3rd Ash%	4th Ash%	Ash %, dry wt	Organic Matter, as tested	Ash RPD	Total Moist RPD	Remarks
SX	Sand blank		N	39.0091	40.0203	40.0210	40.0208			100.07	100.05			100.05	-0.05			
SX	AR 1722 (5113)		DX	43.0931	44.1038	43.3193	43.3189			22.38	22.34			22.34	77.66			%R 99.6, T.V.=22.42
DUP	AR 1722 (5113)		11	38.7865	39.8266	39.0197	39.0198			22.42	22.43			22.43	77.57	0.4		%R 100.0 , T.V.=22.42
SX	T1601416-020		C	42.5812	43.5961	42.5811	42.5811			-0.01	-0.01			-0.01	100.01			
DUP	T1601416-020		E	38.4356	39.4435	38.4354	38.4353			-0.02	-0.03			-0.03	100.03	-100.5		
SX	T1601416-021		1	37.0888	38.1153	37.0893	37.0894			0.05	0.06			0.06	99.94			
DUP	T1601416-021		Z	37.5621	38.5889	37.5626	37.5626			0.05	0.05			0.05	99.95	18.2		
SX	T1601416-023		7	38.5618	39.6385	38.7457	38.7453			17.08	17.04			17.04	82.96			
DUP	T1601416-023		A	37.4959	38.5412	37.6745	37.6737			17.09	17.01			17.01	82.99	0.2		Step 1 Pre-Ash Crucibles
																		Step 2 Collect masses and ash
																		at 750C for 2hrs.
																		Step 3 Cool & re-mass
																		Step 4 Ash at 750 for 1 hr
																		Step 5 Cool & re-mass

Note: the SX type needs to be "dup" to allow for the spreadsheet to calculate the RPD. The Total Solids % is adjusted to include the ADL Moisture. A temperature > 150 C will change the columns to be for ash not moisture/TS. For ash determinations, the moisture column is used to get a dry wt % for the ash.

Analytical Run Worksheet

Run #: **511620**
Instrument: T-TGA-01
Run Status: Draft

CAS Lab: TUCSON
Team: Elemental
Assigned To : CMULL
Run Date: 08/24/2016 01:50 PM

Seq#	Lab Sample ID	Bottle	QC Type	Container Barcode	Client Sample ID	Method / Test / Prep Method	Df	Parent
1	T1601449-001	.01			L1816461-1	ASTM D482-03 / Ash /	1	
2	T1601416-001	.01			PY-1007 AUXILIARY FUEL	ASTM D482-03 / Ash /	1	
3	T1601416-002	.01			PY-1009 AUXILIARY FUEL	ASTM D482-03 / Ash /	1	
4	T1601416-003	.01			PY-1010 SCRUBBER PURGE WATER	ASTM D482-03 / Ash /	1	
5	T1601416-005	.01			PY-1016 ASH SPIKING SOLUTION	ASTM D482-03 / Ash /	1	
6	T1601416-010	.01			PY-2015 AUXILIARY FUEL	ASTM D482-03 / Ash /	1	
7	T1601416-011	.01			PY-2016 AUXILIARY FUEL	ASTM D482-03 / Ash /	1	
8	T1601416-012	.01			PY-2017 SCRUBBER PURGE WATER	ASTM D482-03 / Ash /	1	
9	T1601416-013	.01			PY-2018 SCRUBBER PURGE WATER	ASTM D482-03 / Ash /	1	
10	T1601416-016	.01			PY-2025 ASH SPIKING SOLUTION	ASTM D482-03 / Ash /	1	
11	T1601416-017	.01			PY-2026 ASH SPIKING SOLUTION	ASTM D482-03 / Ash /	1	
12	T1601416-020	.01			PY-3009 AUXILIARY FUEL	ASTM D482-03 / Ash /	1	
13	T1601416-021	.01			PY-3010 SCRUBBER PURGE WATER	ASTM D482-03 / Ash /	1	
14	T1601416-023	.01			PY-3015 ASH SPIKING SOLUTION	ASTM D482-03 / Ash /	1	

AC600

CM 8/19/16 w/S#15

Ready to Scan

Analysis Date	Name	Vessel	Mass	Spike Weight	Sulfur	Qvad	BTU ar	Description	Comments
8/18/2016 12:18:01 PM	Benzoic #4823	1	0.9846	0.00000	0.00000	11401.6	11402		%R 100.2
8/18/2016 12:24:22 PM	QAR 5212	3	1.0032	0.00000	3.75000	11939.6	11940		%R 98.2
8/18/2016 12:29:55 PM	Blank w/tape	1	0.0536	0.00000	0.00000	16489.7	16490		
8/18/2016 12:35:26 PM	AR 100 #3567 w/tape	3	0.4610	0.00000	0.960000	20445.4	20445		tape weight: 0.0528, %R 111.1
8/18/2016 12:40:58 PM	T1601416-008	1	0.4657	0.00000	0.00000	21761.6	21762		tape weight: 0.0564
8/18/2016 12:46:58 PM	T1601416-008 D	3	0.4722	0.00000	0.00000	21539.8	21540		tape weight: 0.0544, RPD 1.03%
8/18/2016 12:52:30 PM	T1601416-009	1	0.4822	0.00000	0.00000	21646.5	21647		tape weight: 0.0557
8/18/2016 12:58:06 PM	T1601416-009 D	3	0.4579	0.00000	0.00000	21725.6	21726		tape weight: 0.0581, RPD 0.36%
8/18/2016 1:04:34 PM	T1601416-019	1	0.4857	0.00000	0.00000	21672.2	21672		tape weight: 0.0569
8/18/2016 1:10:05 PM	T1601416-019 D	3	0.4875	0.00000	0.00000	21573.7	21574		tape weight: 0.0568, RPD 0.45%
8/18/2016 1:15:49 PM	T1601142-001	1	0.4389	0.00000	0.0900000	10105.2	10105		re-test
8/18/2016 1:21:52 PM	T1601143-001	3	0.4513	0.239300	0.700000	4233.85	4234		re-test
8/18/2016 1:29:59 PM	J1605584-001	1	0.3956	0.00000	0.00000	8151.53	8152		
8/18/2016 1:35:39 PM	J1605584-002	3	0.3677	0.00000	0.00000	15708.0	15708		
8/18/2016 1:41:14 PM	J1605584-003	1	0.4566	0.157000	0.00000	4556.62	4557		
8/18/2016 1:46:45 PM	J1605585-001	3	0.4789	0.00000	0.00000	12663.2	12663		
8/18/2016 1:54:45 PM	J1605585-001 D	1	0.4806	0.00000	0.00000	12723.6	12724		RPD 0.48%
8/18/2016 2:01:25 PM	J1605585-002	3	0.4055	0.00000	0.00000	8245.17	8245		
8/18/2016 2:06:55 PM	J1605587-001	1	0.4053	0.00000	0.0600000	7864.89	7865		
8/18/2016 2:12:35 PM	J1605587-002	3	0.3854	0.149200	0.980000	8750.75	8751		
8/18/2016 2:18:06 PM	T1601394-001	1	0.3878	0.00000	0.00000	8582.96	8583		
8/18/2016 2:23:36 PM	J1605705-001	3	0.4074	0.00000	0.00000	8850.71	8851		
8/18/2016 2:29:14 PM	J1605707-001	1	0.3874	0.00000	0.00000	7199.72	7200		
8/18/2016 2:34:45 PM	T1601412-001	3	0.4120	0.00000	0.200000	9364.93	9365		
8/18/2016 2:41:14 PM	T1601414-001	1	0.4498	0.00000	0.120000	10755.6	10756		
8/18/2016 2:46:59 PM	T1601378-001	3	0.3958	0.00000	0.0300000	7701.53	7702		
8/18/2016 2:52:32 PM	Benzoic (4823)	1	1.0005	0.00000	0.00000	11390.2	11390		%R 100.1

AC600

CM 8/18/16 R#510550

Analysis Date	Name	Vessel	Mass	Spike Weight	Sulfur	Qvad	BTU ar	Description	Comments
8/18/2016 12:18:01 PM	Benzoic #4823	1	0.9846	0.00000	0.00000	11401.6	11402		%R 100.2
8/18/2016 12:24:22 PM	QAR 5212	3	1.0032	0.00000	3.75000	11939.6	11940		%R 98.2
8/18/2016 12:29:55 PM	Blank w/tape	1	0.0536	0.00000	0.00000	16489.7	16490		
8/18/2016 12:35:26 PM	AR 100 #3567 w/tape	3	0.4610	0.00000	0.960000	20445.4	20445		tape weight: 0.0528, %R 111.1
8/18/2016 12:40:58 PM	T1601416-008	1	0.4657	0.00000	0.00000	21761.6	21762		tape weight: 0.0564
8/18/2016 12:46:58 PM	T1601416-008 D	3	0.4722	0.00000	0.00000	21539.8	21540		tape weight: 0.0544, RPD 1.03%
8/18/2016 12:52:30 PM	T1601416-009	1	0.4822	0.00000	0.00000	21646.5	21647		tape weight: 0.0557
8/18/2016 12:58:06 PM	T1601416-009 D	3	0.4579	0.00000	0.00000	21725.6	21726		tape weight: 0.0581, RPD 0.36%
8/18/2016 1:04:34 PM	T1601416-019	1	0.4857	0.00000	0.00000	21672.2	21672		tape weight: 0.0569
8/18/2016 1:10:05 PM	T1601416-019 D	3	0.4875	0.00000	0.00000	21573.7	21574		tape weight: 0.0568, RPD 0.45%
8/18/2016 1:15:49 PM	T1601142-001	1	0.4389	0.00000	0.0900000	10105.2	10105		re-test
8/18/2016 1:21:52 PM	T1601143-001	3	0.4513	0.239300	0.700000	4233.85	4234		re-test
8/18/2016 1:29:59 PM	J1605584-001	1	0.3956	0.00000	0.00000	8151.53	8152		
8/18/2016 1:35:39 PM	J1605584-002	3	0.3677	0.00000	0.00000	15708.0	15708		
8/18/2016 1:41:14 PM	J1605584-003	1	0.4566	0.157000	0.00000	4556.62	4557		
8/18/2016 1:46:45 PM	J1605585-001	3	0.4789	0.00000	0.00000	12663.2	12663		
8/18/2016 1:54:45 PM	J1605585-001 D	1	0.4806	0.00000	0.00000	12723.6	12724		RPD 0.48%
8/18/2016 2:01:25 PM	J1605585-002	3	0.4055	0.00000	0.00000	8245.17	8245		
8/18/2016 2:06:55 PM	J1605587-001	1	0.4053	0.00000	0.00000	7866.31	7866		NS
8/18/2016 2:12:35 PM	J1605587-001	3	0.3854	0.149200	0.00000	8774.01	8774		NS
8/18/2016 2:18:06 PM	T1601394-001	1	0.3878	0.00000	0.00000	8582.96	8583		
8/18/2016 2:23:36 PM	J1605705-001	3	0.4074	0.00000	0.00000	8850.71	8851		
8/18/2016 2:29:14 PM	J1605707-001	1	0.3874	0.00000	0.00000	7199.72	7200		
8/18/2016 2:34:45 PM	T1601412-001	3	0.4120	0.00000	0.00000	9369.68	9370		NS
8/18/2016 2:41:14 PM	T1601414-001	1	0.4498	0.00000	0.00000	10758.4	10758		NS
8/18/2016 2:46:59 PM	T1601378-001	3	0.3958	0.00000	0.00000	7702.24	7702		NS
8/18/2016 2:52:32 PM	Benzoic (4823)	1	1.0005	0.00000	0.00000	11390.2	11390		%R 100.1

Analytical Run Worksheet

Run #: 510550
Instrument: T-Calorimeter-01
Run Status: Draft

CAS Lab: TUCSON
Team: Elemental
Assigned To : CMULL
Run Date: 08/18/2016 02:30 PM

Seq#	Lab Sample ID	Bottle	QC Type	Container Barcode	Client Sample ID	Method / Test / Prep Method	Df	Parent
1	T1601416-008	.01			PY-2011 AUXILIARY FUEL	ASTM D240 / BTU /	1	
2	T1601416-009	.01			PY-2012 AUXILIARY FUEL	ASTM D240 / BTU /	1	
3	T1601416-019	.01			PY-3007 AUXILIARY FUEL	ASTM D240 / BTU /	1	
4	J1605584-001	.01			8/4/16 Bark Mixture	ASTM E711-87(2004) / BTU /	1	
5	J1605584-002	.01			8/4/16 TDF	ASTM E711-87(2004) / BTU /	1	
6	J1605584-003	.01			8/4/16 Sludge	ASTM E711-87(2004) / BTU /	1	
7	J1605585-001	.01			COAL 1	ASTM D5865-10ae1 / BTU /	1	
8	J1605585-002	.01			BARK 1	ASTM D5865-10ae1 / BTU /	1	
9	J1605587-001	.01			8/4/16 Bark Fuel	ASTM D5865-02 / BTU /	1	
10	J1605587-002	.01			8/4/16 Knot Fuel	ASTM D5865-02 / BTU /	1	
11	T1601394-001	.02			SV-PB13-Bark	ASTM D5865-10ae1 / BTU /	1	
12	J1605705-001	.01			Box Clippings	ASTM D5865-10 / BTU /	1	
13	J1605707-001	.01			Wood/Bark - Power Boiler 4th Fl	ASTM D5865-10 / BTU /	1	
14	T1601412-001	.02			Composite wk of 8/11/16	ASTM D5865-10ae1 / BTU /	1	
15	T1601414-001	.02			Composite wk of 8/10/16	ASTM D5865-10ae1 / BTU /	1	
16	T1601378-001	.01			DPW-MRF Semi-Annual August	ASTM D5865-10ae1 / BTU /	1	

Tape Correction														
Blank (Tape only) g	0.0536				BTU=Qps	9489.00	W=	3446.99						
NAME	OV BTU/lb	BTUs Total	BTUs Tape	Corrected BTU/lb	Mass	tape g	Delta T	e1 (tape)	e2 (fuse)	e3 (STD?)	e4 (sulfuric)	TV BTU Calc?	TV	%R
AR 100 CN 3567	20,445.00	20.7602	1.9178	18,556.34	0.4610	0.0528	2.8073	501	0.06256	0	0.00000	20	18397	100.9
Tape Blank	16,490.00	1.9468	1.9468	-	0.0536	0.0536	0.2168	509	0.06256	0	0.00000	4		
T1601416-008	21,762.00	22.3228	2.0485	19,764.93	0.4657	0.0564	0.2168							
T1601416-008 D	21,540.00	22.4035	1.9759	19,640.26	0.4722	0.0544	0.2168							
T1601416-009	21,647.00	22.9916	2.0231	19,742.20	0.4822	0.0557	0.2168							
T1601416-009 D	21,726.00	21.9126	2.1103	19,633.69	0.4579	0.0581	0.2168							
T1601416-019	21,672.00	23.1852	2.0667	19,740.19	0.4857	0.0569	0.2168							
T1601416-019 D	21,574.00	23.1659	2.0631	19,652.70	0.4875	0.0568	0.2168							

ALS - Environmental, - Tucson, AZ

Bulk Density for Waste Samples or Sediment / Soil Samples

Analyst:	KS
Analysis Date:	8/26/16 0:00
Analyst Review:	KS 8/26/2016
Supervisor Review:	(MW) 8/29/16

☐ ASTM E1109 - Determining the Bulk Density of Solid Waste Fractions

☐ ASTM D2937 - Density of Soil in Place by the Drive-Cylinder Method

SX Type	Sample ID	Cup No.	Residual or Total Moist wt%	Contain. Wt. g	Cont. & Sx Wt. g	Sample Volume diameter cm	Sample Volume height cm	Sample Volume cm3	Bulk Density g/cm3 As Received	Bulk Density g/cm3 Moist. Free	Duplicate RPD%	Remarks
	T1601416-018			86.9	122.4	2.5	7.2	35.3	1.0052	1.0052		

NOTE - Enter the Residual Moisture for samples that have been Air Dried. Enter Total Moisture for samples that have not been Air Dried.

ALS - Environmental, - Tucson, AZ

Bulk Density for Waste Samples or Sediment / Soil Samples

- [ ] ASTM E1109 - Determining the Bulk Density of Solid Waste Fractions
- [ ] ASTM D2937 - Density of Soil in Place by the Drive-Cylinder Method

Analyst:	KS
Analysis Date:	8/26/2016
Analyst Review:	KS 8/26/2016
Supervisor Review:	

SX Type	Sample ID	Cup No.	Residual or Total Moist wt%	Contain. Wt. g	Cont. & Sx Wt. g	Sample Volume diameter cm	Sample Volume height cm	Sample Volume cm3	Bulk Density g/cm3 As Received	Bulk Density g/cm3 Moist. Free	Duplicate RPD%	Remarks
	T160141G-018			86.89	122.40	2.5	7.2					

NOTE - Enter the Residual Moisture for samples that have been Air Dried. Enter Total Moisture for samples that have not been Air Dried.

ALS Environmental - Tucson

Density / Specific Gravity by Pycnometer

ASTM D891 / D1217

Temp. °C	24
H20 Density	0.9973

Work Group #:	511390
Analyst:	Humberto Seeger
Analysis Date:	8/24/16 0:00
Analyst Review:	HAS
Supervisor Review:	IM 8/26/16

SX Type	Sample Number	Cup No.	Pycn Wt. g	Pycn + Sx Wt. g	Sample Wt. g	Density g/cm3	Avg.	Specific Gravity	Avg.	API Gravity	Avg.	Avg. Pycn. Vol cm3	23.6764
sx	LCS Nanopure H2O		27.2701	50.8824	23.6123	0.9973		1.0000		10.0			
dup	LCSD Nanopure H2O		27.2684	50.8811	23.6127	0.9973	0.9973	1.0000	1.0000	10.0	10.0000		
SX	T1601416-004		27.2686	54.3014	27.0328	1.1418		1.1449		-7.9			
dup	T1601416-004D		27.2690	54.2972	27.0282	1.1416	1.1417	1.1447	1.1448	-7.9	-7.8926		
sx	T1601416-008		27.2691	47.1060	19.8369	0.8378		0.8401		36.9			
sx	T1601416-008D		27.2694	47.1046	19.8352	0.8378		0.8400		36.9			
sx	T1601416-009		27.2695	47.1139	19.8444	0.8381		0.8404		36.9			
sx	T1601416-009D		27.2684	47.0949	19.8265	0.8374		0.8397		37.0			
sx	T1601416-014		27.2674	54.3093	27.0419	1.1421		1.1452		-7.9			
sx	T1601416-014D		27.2670	54.2997	27.0327	1.1418		1.1448		-7.9			
sx	T1601416-015		27.2695	54.3367	27.0672	1.1432		1.1463		-8.1			
sx	T1601416-015D		27.2684	54.3202	27.0518	1.1426		1.1457		-8.0			
sx	T1601416-019		27.2678	47.1101	19.8423	0.8381		0.8403		36.9			
sx	T1601416-019D		27.2698	47.1042	19.8344	0.8377		0.8400		37.0			
sx	T1601416-022		27.2703	54.3249	27.0546	1.1427		1.1458		-8.0			
sx	T1601416-022D		27.2682	54.3156	27.0474	1.1424		1.1455		-8.0			
sx					0.0000	0.0000		0.0000		#DIV/0!			
sx					0.0000	0.0000		0.0000		#DIV/0!			
sx					0.0000	0.0000		0.0000		#DIV/0!			
sx					0.0000	0.0000		0.0000		#DIV/0!			
sx					0.0000	0.0000		0.0000		#DIV/0!			
sx					0.0000	0.0000		0.0000		#DIV/0!			

Analytical Run Worksheet

Run #: 511390
Instrument: T-Balance-04
Run Status: Draft

CAS Lab: TUCSON
Team: Elemental
Assigned To : HSEEGER
Run Date: 08/24/2016 04:15 PM

Seq#	Lab Sample ID	Bottle	QC Type	Container Barcode	Client Sample ID	Method / Test / Prep Method	Df	Parent
1	T1601416-004	.01			PY-1015 ASH SPIKING SOLUTION	ASTM D1475-98(08) / Density /	1	
2	T1601416-008	.01			PY-2011 AUXILIARY FUEL	ASTM D1475-98(08) / Density /	1	
3	T1601416-009	.01			PY-2012 AUXILIARY FUEL	ASTM D1475-98(08) / Density /	1	
4	T1601416-014	.01			PY-2023 ASH SPIKING SOLUTION	ASTM D1475-98(08) / Density /	1	
5	T1601416-015	.01			PY-2024 ASH SPIKING SOLUTION	ASTM D1475-98(08) / Density /	1	
6	T1601416-019	.01			PY-3007 AUXILIARY FUEL	ASTM D1475-98(08) / Density /	1	
7	T1601416-022	.01			PY-3014 ASH SPIKING SOLUTION	ASTM D1475-98(08) / Density /	1	