September 19, 2016 Service Request No:T1601479

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

Laboratory Results for: L1811089

Dear Ms.Sebastian,

Enclosed are the results of the sample(s) submitted to our laboratory August 22, 2016
For your reference, these analyses have been assigned our service request number **T1601479.**

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:**T1601479
Project: L1811089/L1811089

SAMPLE CROSS-REFERENCE

SAMPLE #	CLIENT SAMPLE ID	DATE	TIME
T1601479-001	PY-1004 BAGHOUSE ASH	8/2/2016	1520
T1601479-002	PY-3004C QUENCH ASH	8/2/2016	1545
T1601479-003	PY-4007 AUXILIARY FUEL	8/1/2016	1605
T1601479-004	PY-4009 AUXILIARY FUEL	8/1/2016	1605
T1601479-005	PY-4010 SCRUBBER PURGE WATER	8/1/2016	1555
T1601479-006	PY-4015 ASH/METALS SPIKING SOLUTION	8/1/2016	1555
T1601479-007	PY-4016 ASH/METALS SPIKING SOLUTION	8/1/2016	1555
T1601479-008	PY-5011 AUXILIARY FUEL	8/2/2016	1345
T1601479-009	PY-5012 AUXILIARY FUEL	8/2/2016	1345
T1601479-010	PY-5015 AUXILIARY FUEL	8/2/2016	1345
T1601479-011	PY-5016 AUXILIARY FUEL	8/2/2016	1345
T1601479-012	PY-5017 SCRUBBER PURGE WATER	8/2/2016	1255
T1601479-013	PY-5018 SCRUBBER PURGE WATER	8/2/2016	1255
T1601479-014	PY-5024 ASH/METALS SPIKING SOLUTION	8/2/2016	1450
T1601479-015	PY-5025 ASH/METALS SPIKING SOLUTION	8/2/2016	1450
T1601479-016	PY-5026 ASH/METALS SPIKING SOLUTION	8/2/2016	1450
T1601479-017	PY-5027 ASH/METALS SPIKING SOLUTION	8/2/2016	1450
T1601479-018	PY-6007 AUXILIARY FUEL	8/3/2016	1433
T1601479-019	PY-6009 AUXIILARY FUEL	8/3/2016	1433
T1601479-020	PY-6010 SCRUBBER PURGE WATER	8/3/2016	1345
T1601479-021	PY-6014 ASH/METALS SPIKING COLUTION	8/3/2016	1500
T1601479-022	PY-6015 ASH/METALS SPIKING SOLUTION	8/3/2016	1500
T1601479-023	PY-6005 BAGHOUSE ASH - DUP	8/3/2016	1545
T1601479-024	PY-6005B KILN ASH - DUP	8/3/2016	1600
T1601479-025	PY-6005C QUENCH ASH - DUP	8/3/2016	1630
T1601479-026	PY-7007 BTU AUDIT SAMPLE	8/3/2016	1200
T1601479-027	PY-7006 DENSITY AUDIT SAMPLE	8/3/2016	1200

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
CB&I

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 #:		
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	Moisture Content	Heat Content(BTU)							Hazardous? Provide Details	Highly Contaminated?	Number of Containers
	L1811089-1 PY-1004 BAGHOUSE ASH	02-Aug-16	15:20	Other		X	X										
	L1811089-2 PY-3004C QUENCH ASH	02-Aug-16	15:45	Other		X	X										
	L1811089-3 PY-4007 AUXILIARY FUEL	01-Aug-16	16:05	Other	X												
	L1811089-4 PY-4009 AUXILIARY FUEL	01-Aug-16	16:05	Other	X												
	L1811089-5 PY-4010 SCRUBBER PURGE WATER	01-Aug-16	15:55	Other	X												
	L1811089-6 PY-4015 ASH/METALS SPIKING SOLUTION	01-Aug-16	15:55	Other	X	X	X										
	L1811089-7 PY-4016 ASH/METALS SPIKING SOLUTION	01-Aug-16	15:55	Other	X												
	L1811089-8 PY-5011 AUXILIARY FUEL	02-Aug-16	13:45	Other		X		X									
	L1811089-9 PY-5012 AUXILIARY FUEL	02-Aug-16	13:45	Other		X		X									
	L1811089-10 PY-5015 AUXILIARY FUEL	02-Aug-16	13:45	Other	X												
	L1811089-11 PY-5016 AUXILIARY FUEL	02-Aug-16	13:45	Other	X												
	L1811089-12 PY-5017 SCRUBBER PURGE WATER	02-Aug-16	12:55	Other	X												
	L1811089-13 PY-5018 SCRUBBER PURGE WATER	02-Aug-16	12:55	Other	X												
	L1811089-14 PY-5024 ASH/METALS SPIKING SOLUTION	02-Aug-16	14:50	Other	X	X	X										
	L1811089-15 PY-5025 ASH/METALS SPIKING SOLUTION	02-Aug-16	14:50	Other	X	X	X										
	L1811089-16 PY-5026 ASH/METALS SPIKING SOLUTION	02-Aug-16	14:50	Other	X												
	L1811089-17 PY-5027 ASH/METALS SPIKING SOLUTION	02-Aug-16	14:50	Other	X												
	L1811089-18 PY-6007 AUXILIARY FUEL	03-Aug-16	14:33	Other		X		X									
	L1811089-19 PY-6009 AUXILIARY FUEL	03-Aug-16	14:33	Other	X												
	L1811089-20 PY-6010 SCRUBBER PURGE WATER	03-Aug-16	13:45	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
			[illegible]	8/02/16	1132	26.6 °C				

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ALS Environmental - Canada
CB&I

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

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	Moisture Content	Heat Content(BTU)							Hazardous? Provide Details	Highly Contaminated?	Number of Containers
	L1811089-21 PY-6014 ASH/METALS SPIKING SOLUTION	03-Aug-16	15:00	Other	X	X	X										
	L1811089-22 PY-6015 ASH/METALS SPIKING SOLUTION	03-Aug-16	15:00	Other	X	X											
	L1811089-23 PY-6005 BAGHOUSE ASH - DUP	03-Aug-16	15:45	Other		X	X										
	L1811089-24 PY-6005B KILN ASH - DUP	03-Aug-16	16:00	Other		X	X										
	L1811089-25 PY-6005C QUENCH ASH - DUP	03-Aug-16	16:30	Other		X	X										
	L1811089-26 PY-7007 ~~DENSITY AUDIT~~ SAMPLE corrected BTU AUDIT SAMPLE	03-Aug-16	12:00	Other		X		X									
	~~L1811089-27 PY-7008 BTU AUDIT SAMPLE~~ CVV 8/26/16	~~03-Aug-16~~	~~12:00~~	~~Other~~				X									
	L1811089-27 PY-7006 DENSITY AUDIT SAMPLE	03 Aug 16	12:00	Other		X											

Special Instructions / Regulations / Hazardous Details

Corrections made by CVV 8/29/16

*****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
			Wroogh	8/22/16	1132	26.6 °C				

cym

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: T1-002-TUS-Ash

PAGE 1 OF 1

Bill To: CBI Federal Services
Accounts Payable

Project Name/No: Picatinny Arsenal
Sample Team Member: J. McGee, G. Britt, D. Jarvis, G. Ward
Project Manager: Berani Halley
Purchase Order No.:
Required Report Date: **Normal**

Sample Shipment Date: **8/03/2016**
Laboratory Destination: ALS-TUS via ALS-NY
Laboratory Contact: Ancy Sebastian
Project Contact/Phone: Joyce McGee 865-850-7306
Carrier Waybill No.: **Lab Courier**

Report To: CBI Federal Services
Joyce McGee
2410 Cherahala Drive
Knoxville, TN 37932

Sample Number	Analytical QC	Sample Type/ Description	Date/Time Collected	Container Type	Pre-servative	Requested Testing Program	Sample Notes / Expectations	Disposal Record
PY-1004		Baghouse Ash	8/02/2016 1520	250-mL AmberGlass	Cool, 4C	% Moisture, Density		
PY-3004C		Quench Ash	8/02/2016 1545	250-mL AmberGlass	Cool, 4C	% Moisture, Density		

Special Instructions: These sample are part of Test Condition #1. Please log and report as a separate lab SDG and not as a part of other samples received 8/3/2016. These samples correspond to testing conducted 7/27-7/29-16

Possible Hazard Identification:
Non-haz: ____ Flammable: ____ Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
I. ____ II. ____ III. ____ Project Specific: X (talk to A. Sebastian)

1. Relinquished by: J. McGee, CB&I Federal Servcies — Date: 8/3/16 Time: 1900
2. Relinquished by: — Date: ____ Time: ____

1. Received by: Greg Boydell — Date: 03/AUG/16 Time: 19:00
2. Received by: Cynthia Yeagh — Date: 8/4/16 Time: 1636

Comments: **If samples not received in good condition contact Joyce McGee (865)-850-7306 immediately.**

AUG 22 2016 1132

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: T2-001-TUS

PAGE 1 OF 3

Bill To: CBI Federal Services
Accounts Payable

Project Name/No: Picatinny Arsenal
Sample Team Member: J. McGee, G. Britt, D. Jarvis
Project Manager: Berani Halley
Purchase Order No.:
Required Report Date: **Normal**

Sample Shipment Date: **8/03/2016**
Laboratory Destination: ALS-TUS via ALS-NY
Laboratory Contact: Ancy Sebastian
Project Contact/Phone: Joyce McGee 865-850-7306
Carrier Waybill No.: **Lab Courier**

Report To: CBI Federal Services
Joyce McGee
2410 Cherahala Drive
Knoxville, TN 37932

Sample Number	Analytical QC	Sample Type/ Description	Date/Time Collected	Container Type	Pre-servative	Requested Testing Program	Sample Notes / Expectations	Disposal Record
PY-4007		Auxiliary Fuel	8/01/2016 1605	250-mL Amber Boston Round	Cool, 4C	% Ash	Flammable, Handle w Care. #2 Fuel Oil	
PY-4009		Auxiliary Fuel	8/01/2016 1605	250-mL Amber Boston Round	Cool, 4C	% Ash	Flammable, Handle w Care.#2 Fuel Oil	
PY-4010		Scrubber purge water	8/01/2016 1555	250-mL Amber Glass	Cool, 4C	% Ash		
PY-4015		Ash/Metals Spiking Solution	8/01/2016 1555	250-mL Amber Boston Round	Cool, 4C	% Moisture, Density	Use caution contains Lead. For %Ash, slowly drive off water. **Critical measurement.**	
PY-4016		Ash/Metals Spiking Solution	8/01/2016 1555	250-mL Amber Boston Round	Cool, 4C	% Ash	Use caution contains Lead. For %Ash, slowly drive off water. **Critical measurement.**	

Special Instructions:

Possible Hazard Identification:
Non-haz: ____ Flammable: X Poison B: ____ Unknown: X

Sample Disposal:
Return to Client: ____ Disposal by Lab: X Archive: ____

Turnaround Time:
Normal: X Rush: ____

Level of QC Required:
I. ____ II. ____ III. ____ Project Specific: X (talk to A. Sebastian)

1. Relinquished by: J. McGee, CB&I Federal Servcies — Date: 8/3/16 Time: 1505
1. Received by: Greg Bardell — Date: 03/AUG/16 Time: 19:00
2. Relinquished by: — Date: Time:
2. Received by: — Date: 8/4/16 Time: 1630

Comments: **If samples not received in good condition contact Joyce McGee (865)-850-7306 immediately.**

Reference COC Number: **T2-001-TUS**

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD (Cont.)

Project Name/No.: Picatinny Arsenal

Laboratory Destination: ALS-TUS

Sample Number	Analy QC	Sample Type/ Description	Date/Time Collected	Container Type	Pre-servative	Requested Testing Program	Sample Notes / Expectations	Disposal Record
PY-5011		Auxiliary Fuel	8/02/2016 1345	250-mL Amber Glass	Cool, 4C	Density, Heat Content (Btu)	Flammable, Handle w Care. #2 Fuel Oil	
PY-5012		Auxiliary Fuel	8/02/2016 1345	250-mL Amber Boston Round	Cool, 4C	Density, Heat Content (Btu)	Flammable, Handle w Care. #2 Fuel Oil	
PY-5015		Auxiliary Fuel	8/02/2016 1345	250-mL Amber Boston Round	Cool, 4C	% Ash	Flammable, Handle w Care. #2 Fuel Oil	
PY-5016		Auxiliary Fuel	8/02/2016 1345	250-mL Amber Boston Round	Cool, 4C	% Ash	Flammable, Handle w Care. #2 Fuel Oil	
PY-5017		Scrubber purge water	8/02/2016 1255	250-mL Amber Boston Round	Cool, 4C	% Ash		
PY-5018		Scrubber purge water	8/02/2016 1255	250-mL Amber Boston Round	Cool, 4C	% Ash		
PY-5024		Ash/Metals Spiking Solution	8/02/2016 1450	250-mL Amber Boston Round	Cool, 4C	Density, %Moisture	Use caution contains Lead. For %Ash, slowly drive off water. **Critical measurement.**	
PY-5025		Ash/Metals Spiking Solution	8/02/2016 1450	250-mL Amber Boston Round	Cool, 4C	Density, %Moisture	Use caution contains Lead. For %Ash, slowly drive off water. **Critical measurement.**	
PY-5026		Ash/Metals Spiking Solution	8/02/2016 1450	250-mL Amber Boston Round	Cool, 4C	% Ash	Use caution contains Lead. For %Ash, slowly drive off water. **Critical measurement.**	
PY-5027		Ash/Metals Spiking Solution	8/02/2016 1450	250-mL Amber Boston Round	Cool, 4C	% Ash	Use caution contains Lead. For %Ash, slowly drive off water. **Critical measurement.**	
PY-6007		Auxiliary Fuel	8/03/2016 1443	250-mL Amber Boston Round	Cool, 4C	Density, Heat Content (Btu)	Flammable, Handle w Care. #2 Fuel Oil	
PY-6009		Auxiliary Fuel	8/03/2016 1443	250-mL Amber Boston Round	Cool, 4C	% Ash	Flammable, Handle w Care. #2 Fuel Oil	
PY-6010		Scrubber purge water	8/03/2016 1345	250-mL Amber Glass	Cool, 4C	% Ash		
PY-6014		Ash/Metals Spiking Solution	8/03/2016 1500	250-mL Amber Boston Round	Cool, 4C	Density, %Moisture	Use caution contains Lead. For %Ash, slowly drive off water. **Critical measurement.**	
PY-6015		Ash/Metals Spiking Solution	8/03/2016 1500	250-mL Amber Boston Round	Cool, 4C	% Ash	Use caution contains Lead. For %Ash, slowly drive off water. **Critical measurement.**	

Reference COC Number: **T2-001-TUS**

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD (Cont.)

Project Name/No.: Picatinny Arsenal

Laboratory Destination: ALS-TUS

Sample Number	Analy QC	Sample Type/ Description	Date/Time Collected	Container Type	Pre-servative	Requested Testing Program	Sample Notes / Expectations	Disposal Record
PY-6005 (2)	DUP	Baghouse Ash	8/03/2016 1545	250-mL Amber Glass	Cool, 4C	Density, %Moisture		
PY-6005B (2)	DUP	Kiln Ash	8/03/2016 1600	250-mL Amber Glass	Cool, 4C	Density, %Moisture		
PY-6005C (2)	DUP	Quench Ash	8/03/2016 1630	250-mL Amber Glass	Cool, 4C	Density, %Moisture		

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

T1601479 5
ALS Environmental - Canada
CB&I

Client/Project: CBI via ALS ROC Work Order Number:

Received by: Cynthia Vroegh Date & Time: 8/22/16 1132 Matrix: Aqueous/solid

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

Were custody seals on containers? ○ Yes ◉ No ○ NA If yes, how many and where?

If present were custody seals intact? ○ Yes ◉ No If present, were they signed and dated? ○ Yes ◉ No

Arrival Temp C	Temp Blank C	Tracking Number
26.6	NA	1z17w4380341890042

Packing material used? Wet Ice (melted) | Bubble Wrap | 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:
5 - 250ml amber glass bottles and 6 - 4oz wm amber glass jars

Notes, discrepancies, & resolutions:
for samples PY-6005, PY-6005B and PY-6005C we received 2 jars for each.

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)

RIGHT SOLUTIONS | RIGHT PARTNER

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: T2-001-TUS

PAGE 1 OF 3

Bill To: CBI Federal Services
Accounts Payable

Project Name/No: Picatinny Arsenal
Sample Team Member: J. McGee, G. Britt, D. Jarvis
Project Manager: Berani Halley
Purchase Order No.:
Required Report Date: **Normal**

Sample Shipment Date: **8/03/2016**
Laboratory Destination: ALS-TUS via ALS-NY
Laboratory Contact: Ancy Sebastian
Project Contact/Phone: Joyce McGee 865-850-7306
Carrier Waybill No.: **Lab Courier**

Report To: CBI Federal Services
Joyce McGee
2410 Cherahala Drive
Knoxville, TN 37932

Sample Number	Analytical QC	Sample Type/ Description	Date/Time Collected	Container Type	Pre-servative	Requested Testing Program	Sample Notes / Expectations	Disposal Record
PY-4007		Auxiliary Fuel	8/01/2016 1605	250-mL Amber Boston Round	Cool, 4C	% Ash	Flammable, Handle w Care. #2 Fuel Oil	
PY-4009		Auxiliary Fuel	8/01/2016 1605	250-mL Amber Boston Round	Cool, 4C	% Ash	Flammable, Handle w Care.#2 Fuel Oil	
PY-4010		Scrubber purge water	8/01/2016 1555	250-mL Amber Glass	Cool, 4C	% Ash		
PY-4015		Ash/Metals Spiking Solution	8/01/2016 1555	250-mL Amber Boston Round	Cool, 4C	% Moisture, Density	Use caution contains Lead. For %Ash, slowly drive off water. **Critical measurement.**	
PY-4016		Ash/Metals Spiking Solution	8/01/2016 1555	250-mL Amber Boston Round	Cool, 4C	% Ash	Use caution contains Lead. For %Ash, slowly drive off water. **Critical measurement.**	

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: X Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
I. ___ II. ___ III. ___ Project Specific: X (talk to A. Sebastian)

1. Relinquished by: J. McGee, CB&I Federal Servcies — Date: 8/3/16 — Time: 1505
1. Received by: [signature] — Date: 8/15/16 — Time: 0955
2. Relinquished by: — Date: — Time:
2. Received by: — Date: — Time:

Comments: **If samples not received in good condition contact Joyce McGee (865)-850-7306 immediately.**

Reference COC Number: T2-001-TUS

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD (Cont.)

Project Name/No.: Picatinny Arsenal

Laboratory Destination: ALS-TUS

Sample Number	Analy QC	Sample Type/ Description	Date/Time Collected	Container Type	Pre-servative	Requested Testing Program	Sample Notes / Expectations	Disposal Record
PY-5011		Auxiliary Fuel	8/02/2016 1345	250-mL Amber Glass	Cool, 4C	Density, Heat Content (Btu)	Flammable, Handle w Care. #2 Fuel Oil	
PY-5012		Auxiliary Fuel	8/02/2016 1345	250-mL Amber Boston Round	Cool, 4C	Density, Heat Content (Btu)	Flammable, Handle w Care. #2 Fuel Oil	
PY-5015		Auxiliary Fuel	8/02/2016 1345	250-mL Amber Boston Round	Cool, 4C	% Ash	Flammable, Handle w Care. #2 Fuel Oil	
PY-5016		Auxiliary Fuel	8/02/2016 1345	250-mL Amber Boston Round	Cool, 4C	% Ash	Flammable, Handle w Care. #2 Fuel Oil	
PY-5017		Scrubber purge water	8/02/2016 1255	250-mL Amber Boston Round	Cool, 4C	% Ash		
PY-5018		Scrubber purge water	8/02/2016 1255	250-mL Amber Boston Round	Cool, 4C	% Ash		
PY-5024		Ash/Metals Spiking Solution	8/02/2016 1450	250-mL Amber Boston Round	Cool, 4C	Density, %Moisture	Use caution contains Lead. For %Ash, slowly drive off water. **Critical measurement.**	
PY-5025		Ash/Metals Spiking Solution	8/02/2016 1450	250-mL Amber Boston Round	Cool, 4C	Density, %Moisture	Use caution contains Lead. For %Ash, slowly drive off water. **Critical measurement.**	
PY-5026		Ash/Metals Spiking Solution	8/02/2016 1450	250-mL Amber Boston Round	Cool, 4C	% Ash	Use caution contains Lead. For %Ash, slowly drive off water. **Critical measurement.**	
PY-5027		Ash/Metals Spiking Solution	8/02/2016 1450	250-mL Amber Boston Round	Cool, 4C	% Ash	Use caution contains Lead. For %Ash, slowly drive off water. **Critical measurement.**	
PY-6007		Auxiliary Fuel	8/03/2016 1443	250-mL Amber Boston Round	Cool, 4C	Density, Heat Content (Btu)	Flammable, Handle w Care. #2 Fuel Oil	
PY-6009		Auxiliary Fuel	8/03/2016 1443	250-mL Amber Boston Round	Cool, 4C	% Ash	Flammable, Handle w Care. #2 Fuel Oil	
PY-6010		Scrubber purge water	8/03/2016 1345	250-mL Amber Glass	Cool, 4C	% Ash		
PY-6014		Ash/Metals Spiking Solution	8/03/2016 1500	250-mL Amber Boston Round	Cool, 4C	Density, %Moisture	Use caution contains Lead. For %Ash, slowly drive off water. **Critical measurement.**	
PY-6015		Ash/Metals Spiking Solution	8/03/2016 1500	250-mL Amber Boston Round	Cool, 4C	% Ash	Use caution contains Lead. For %Ash, slowly drive off water. **Critical measurement.**	

ANALYSIS REQUEST AND CHAIN-OF-CUSTODY RECORD

REFERENCE COC NO.: T2-002-TUS-Audit

PAGE 1 OF 1

Bill To: CBI Federal Services
Accounts Payable

Project Name/No: Picatinny Arsenal
Sample Team Member: J. McGee, G. Britt, D. Jarvis, G. Ward
Project Manager: Berani Halley
Purchase Order No.:
Required Report Date: Normal

Sample Shipment Date: 8/03/2016
Laboratory Destination: ALS-TUS via ALS-NY
Laboratory Contact: Ancy Sebastian
Project Contact/Phone: Joyce McGee 865-850-7306
Carrier Waybill No.: Lab Courier

Report To: CBI Federal Services
Joyce McGee
2410 Cherahala Drive
Knoxville, TN 37932

Sample Number	Analytical QC	Sample Type/ Description	Date/Time Collected	Container Type	Pre-servative	Requested Testing Program	Sample Notes / Expectations	Disposal Record
PY-7007		Density Audit sample	8/03/2016 1200	500 ml amber glass	None	Density	Report Density at 25°C	
PY-7008		BTU Audit sample	8/03/2016 1200	500 ml amber glass	None	Heat Content (Btu)		

Special Instructions:

Possible Hazard Identification:
Non-haz: ___ Flammable: x Poison B: ___ Unknown: X

Sample Disposal:
Return to Client: ___ Disposal by Lab: X Archive: ___

Turnaround Time:
Normal: X Rush: ___

Level of QC Required:
I. ___ II. ___ III. ___ Project Specific: X (talk to A. Sebastian)

1. Relinquished by: J. McGee, CB&I Federal Services Date: 8/3/16 Time: 1400
1. Received by: Date: 8/15/16 Time: 0955
2. Relinquished by: Date: Time:
2. Received by: Date: Time:

Comments: **If samples not received in good condition contact Joyce McGee (865)-850-7306 immediately.**

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

T1601479 5
ALS Environmental - Canada
CB&I

Client/Project: ALS ROC Work Order Number:

Received by: Mellissa Himebauch Date & Time: 8/15/16 0955 Matrix: Aqueous

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

Were custody seals on containers? ◉ Yes ○ No ○ NA If yes, how many and where? 1 Outside cooler

If present were custody seals intact? ◉ Yes ○ No If present, were they signed and dated? ◉ Yes ○ No

Arrival Temp C	Temp Blank C	Tracking Number
26.2	n/a	1z17w4380140394227

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:
Received 16 glass bottles and 2 jars

Notes, discrepancies, & resolutions:
Samples in Fridge A - sample PY-7008 was not included in shipment and sample PY-7006 was not included on COC.

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)

RIGHT SOLUTIONS | RIGHT PARTNER

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

Attn: Ancy Sebastian
Project: L1811089 Date Received: 8/22/16

Case Narrative

Sample Receipt

Nineteen samples were received on 8/15/16 at 0939 at a temperature of 5.6˚C and eight samples were reiceved on 8/22/16 at 1132 ambient.

Analysis was performed on 27 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
Burlington, ON L7L 6A4

Attn: Ancy Sebastian
Project: L1811089 Date Received: 8/22/16

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 duplicate Bulk Density on samples -001, -002, -023, -024, and -025.

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

Attn: Ancy Sebastian
Project: L1811089 Date Received: 8/22/16

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-1004 BAGHOUSE ASH	8/2/16	1520	T1601479-001	1.62	n/a	n/a	0.1770	n/a
			Duplicate	1.65	n/a	n/a	*	n/a
PY-3004C QUENCH ASH	8/2/16	1545	T1601479-002	47.16	n/a	n/a	0.2802	n/a
			Duplicate	47.17	n/a	n/a	*	n/a
PY-4007 AUXILIARY FUEL	8/1/16	1605	T1601479-003	n/a	0.02	n/a	n/a	n/a
			Duplicate	n/a	0.07	n/a	n/a	n/a
PY-4009 AUXILIARY FUEL	8/1/16	1605	T1601479-004	n/a	0.04	n/a	n/a	n/a
			Duplicate	n/a	0.05	n/a	n/a	n/a
PY-4010 SCRUBBER PURGE WATER	8/1/16	1555	T1601479-005	n/a	0.06	n/a	n/a	n/a
			Duplicate	n/a	0.07	n/a	n/a	n/a
PY-4015 ASH/METALS SPIKING SOLUTION	8/1/16	1555	T1601479-006	n/a	3.87	n/a	n/a	1.0571
			Duplicate	n/a	4.20	n/a	n/a	1.0569
PY-4016 ASH/METALS SPIKING SOLUTION	8/1/16	1555	T1601479-007	n/a	3.76	n/a	n/a	n/a
			Duplicate	n/a	4.22	n/a	n/a	n/a
PY-5011 AUXILIARY FUEL	8/2/16	1345	T1601479-008	n/a	n/a	19,542	n/a	0.8379
			Duplicate	n/a	n/a	19,493	n/a	0.8374
PY-5012 AUXILIARY FUEL	8/2/16	1345	T1601479-009	n/a	n/a	19,574	n/a	0.8374
			Duplicate	n/a	n/a	19,460	n/a	0.8372
PY-5015 AUXILIARY FUEL	8/2/16	1345	T1601479-010	n/a	<0.01	n/a	n/a	n/a
			Duplicate	n/a	0.06	n/a	n/a	n/a
PY-5016 AUXILIARY FUEL	8/2/16	1345	T1601479-011	n/a	<0.01	n/a	n/a	n/a
			Duplicate	n/a	0.01	n/a	n/a	n/a
PY-5017 SCRUBBER PURGE WATER	8/2/16	1255	T1601479-012	n/a	0.06	n/a	n/a	n/a
			Duplicate	n/a	0.06	n/a	n/a	n/a
PY-5018 SCRUBBER PURGE WATER	8/2/16	1255	T1601479-013	n/a	0.09	n/a	n/a	n/a
			Duplicate	n/a	0.07	n/a	n/a	n/a
PY-5024 ASH/METALS SPIKING SOLUTION	8/2/16	1450	T1601479-014	n/a	3.99	n/a	n/a	1.0567
			Duplicate	n/a	3.38	n/a	n/a	1.0568

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

Attn: Ancy Sebastian
Project: L1811089 Date Received: 8/22/16

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-5025 ASH/METALS SPIKING SOLUTION	8/2/16	1450	T1601479-015	n/a	4.21	n/a	n/a	1.0570
			Duplicate	n/a	4.04	n/a	n/a	1.0569
PY-5026 ASH/METALS SPIKING SOLUTION	8/2/16	1450	T1601479-016	n/a	4.12	n/a	n/a	n/a
			Duplicate	n/a	3.98	n/a	n/a	n/a
PY-5027 ASH/METALS SPIKING SOLUTION	8/2/16	1450	T1601479-017	n/a	4.20	n/a	n/a	n/a
			Duplicate	n/a	4.04	n/a	n/a	n/a
PY-6007 AUXILIARY FUEL	8/3/16	1433	T1601479-018	n/a	n/a	19,477	n/a	0.8380
			Duplicate	n/a	n/a	19,495	n/a	0.8375
PY-6009 AUXIILARY FUEL	8/3/16	1433	T1601479-019	n/a	0.12	n/a	n/a	n/a
			Duplicate	n/a	0.16	n/a	n/a	n/a
PY-6010 SCRUBBER PURGE WATER	8/3/16	1345	T1601479-020	n/a	0.25	n/a	n/a	n/a
			Duplicate	n/a	0.22	n/a	n/a	n/a
PY-6014 ASH/METALS SPIKING COLUTION	8/3/16	1500	T1601479-021	n/a	4.01	n/a	n/a	1.0576
			Duplicate	n/a	2.98	n/a	n/a	1.0571
PY-6015 ASH/METALS SPIKING SOLUTION	8/3/16	1500	T1601479-022	n/a	4.12	n/a	n/a	n/a
			Duplicate	n/a	4.22	n/a	n/a	n/a
PY-6005 BAGHOUSE ASH - DUP	8/3/16	1545	T1601479-023	1.27	n/a	n/a	0.2238	n/a
			Duplicate	1.16	n/a	n/a	*	n/a
PY-6005B KILN ASH - DUP	8/3/16	1600	T1601479-024	0.22	n/a	n/a	0.7348	n/a
			Duplicate	0.20	n/a	n/a	*	n/a
PY-6005C QUENCH ASH - DUP	8/3/16	1630	T1601479-025	45.22	n/a	n/a	0.3756	n/a
			Duplicate	45.20	n/a	n/a	*	n/a
PY-7007 BTU AUDIT SAMPLE	8/3/16	1200	T1601479-026	n/a	n/a	19,437	n/a	n/a
			Duplicate	n/a	n/a	19,097	n/a	n/a
PY-7006 DENSITY AUDIT SAMPLE	8/3/16	1200	T1601479-027	n/a	n/a	n/a	n/a	0.9969
			Duplicate	n/a	n/a	n/a	n/a	0.9967

Notes:
*Not enough sample to perform duplicate analysis.

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

Attn: Ancy Sebastian
Project: L1811089 Date Received: 8/22/16

Quality Control

			Moisture	Ash	Heating Value		Density
			D2216	D482	D240		D1475
			wt%	As Received wt%	As Received BTU/lb		g/cm^3
Prep Blank			0.04	100.02	n/a		n/a
				9/6/16			
LCS			Sand/Nano	AR1722	Benzoic		Nanopure
			2941	5113	4823		
		Observed Value	13.38	22.56	11,401		0.9974
		True Value	13.32	22.42	11,374		0.9972
		%R	100	101	100		100
Duplicate			T1601479-001	T1601479-004	T1601479-026		T1601479-027
		Observed Value	1.62	0.04	19,437		0.9969
		Duplicate Value	1.65	0.05	19,097		0.9967
		%RPD	2.0	22.2	1.8		0.0

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

Attn: Ancy Sebastian
Project: L1811089 Date Received: 8/22/16

Raw Data

ALS Environmental - Tucson, AZ

Air Dry Loss

Gravimetric, 35C

Reporting Limit: 0.01

Detection Limit: 0.01

Analyst: KS

Analysis Date: 08/30/16

Analyst Review: KS 8/31/2016

Supervisor Review: 8/31/16

Temperature °C	Start Time	End Time
40	8/30/2016 1440	8/31/2016 0725

SX Type	Sample Number	Cruc. Wt. g	Cruc. & Wet Sx Wt. g	Cruc. & Dried Sx Wt. g	ADL Moisture	Remarks
	T1601479-001	87.63	117.21	116.94	0.91	COMPOSITE 2 INTO 1 FOR SX 023-025
	T1601479-002	89.46	242.72	171.93	46.19	
	T1601479-023	92.22	131.15	130.89	0.67	
	T1601479-024	93.37	284.94	284.70	0.13	
	T1601479-025	92.21	347.82	234.54	44.32	

Remarks

ALS Environmental - Tucson, AZ

Air Dry Loss

Gravimetric, 35C

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

Analyst: KS
Analysis Date: 8/30/2016
Analyst Review: KS 8/31/2016
Supervisor Review:

Temperature °C	Start Time	End Time
40	8/30/2016 1440	8/31/2016 0725

SX Type	Sample Number	Cruc. Wt. g	Cruc. & Wet Sx Wt. g	Cruc. & Dried Sx Wt. g	ADL Moisture	Remarks
	T160 1479 - 001	87.63	117.21	116.94		Two into one Composite
	002	89.46	247.72	171.93		for SX 023-025
	023	92.22	131.15	130.89		
	024	93.37	284.94	284.70		
	025	92.21	347.82	234.54		

Remarks

R# 573875

ALS Envrionmental - Tucson, AZ

Total Solids or Moisture_overnight

Sand mass, g	Water mass, g	Wt%, TV	Wt%, observed	%R
1.0142	0.1558	13.32	13.38	100.5
1.0093	0.1157	10.28	10.28	100.0

Oven used	Temperature °C	Start Time	End Time 1
Oven# 2	103.4	9/12/2016 16:55	9/13/2016 9:40

Analyst	CM
Analysis Date	09/12/16
Analyst Review	CM 9/13/16
Secondary Review	9/13/14

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	0.4129	1.4388	1.4384	0.04	0.04	99.96			
SX	Sand (2941) & nanopure		STD	0.4166	1.5866	1.4301	13.38	13.38	86.62			
SX	Sand (2941) & nanopure		STD D	0.4138	1.5388	1.4231	10.28	10.28	89.72			
SX	T1601545-001		1	0.4149	1.4224	1.2594	16.18	16.18	83.82			
SX	T1601545-002		2	0.4097	1.4201	1.2491	16.92	16.92	83.08			
SX	T1601531-001		3	1.1817	2.1907	2.0385	15.08	15.08	84.92			
SX	T1601479-001		4	0.4146	1.4293	1.4221	0.71	0.71	99.29			
DUP	T1601479-001		5	0.4134	1.4369	1.4293	0.74	0.74	99.26	4.5	4.5	
SX	T1601479-002		6	0.4184	1.4337	1.4153	1.81	1.81	98.19			
DUP	T1601479-002		7	0.4201	1.4355	1.4170	1.82	1.82	98.18	0.5	0.5	
SX	T1601479-023		8	0.4128	1.4235	1.4174	0.60	0.60	99.40			
DUP	T1601479-023		9	0.4144	1.4272	1.4222	0.49	0.49	99.51	20.0	20.0	
SX	T1601479-024		10	0.4132	1.4137	1.4128	0.09	0.09	99.91			
DUP	T1601479-024		11	0.4131	1.4164	1.4156	0.08	0.08	99.92	12.0	12.0	
SX	T1601479-025		12	0.4164	1.4219	1.4056	1.62	1.62	98.38			
DUP	T1601479-025		13	0.4167	1.4306	1.4146	1.58	1.58	98.42	2.7	2.7	
SX	T1601551-001		14	1.1854	2.2194	2.1427	7.42	7.42	92.58			
SX	T1601551-002		15	1.1892	2.2077	2.1312	7.51	7.51	92.49			
SX	T1601551-003		16	1.1866	2.2404	2.1925	4.55	4.55	95.45			
SX	T1601551-004		17	1.1757	2.2045	2.1807	2.31	2.31	97.69			
SX	T1601551-005		18	1.1754	2.2999	2.2741	2.29	2.29	97.71			
SX	T1601551-006		19	1.1892	2.2183	2.1947	2.29	2.29	97.71			
SX	T1601514-001		20	1.1733	2.1925	2.0396	15.00	15.00	85.00			
SX	T1601514-002		21	1.1786	2.2924	2.2684	2.15	2.15	97.85			

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 #: 513875
Instrument: T-TGA-01
Run Status: Draft

CAS Lab: TUCSON
Team: Elemental
Assigned To : CMULL
Run Date: 09/12/2016 11:26 AM

Seq#	Lab Sample ID	Bottle	QC Type	Container Barcode	Client Sample ID	Method / Test / Prep Method	Df	Parent
1	T1601545-001	.01			B6I0211-01	ASTM D3173-03 / Moisture /	1	
2	T1601545-002	.01			B6I0211-02	ASTM D3173-03 / Moisture /	1	
3	T1601531-001	.02			SV-PB13-Bark	ASTM D3173-11 / Moisture /	1	
4	T1601551-001	.02			R1 Bark	ASTM D3173-11 / Moisture /	1	
5	T1601551-002	.02			R2 Bark	ASTM D3173-11 / Moisture /	1	
6	T1601551-003	.02			R3 Bark	ASTM D3173-11 / Moisture /	1	
7	T1601551-004	.02			R1 Dust	ASTM D3173-11 / Moisture /	1	
8	T1601551-005	.02			R2 Dust	ASTM D3173-11 / Moisture /	1	
9	T1601551-006	.02			R3 Dust	ASTM D3173-11 / Moisture /	1	
10	T1601514-001	.01			Hogged Fuel	ASTM D3173-11 / Moisture /	1	
11	T1601514-002	.01			Sander Dust	ASTM D3173-11 / Moisture /	1	

R#513872

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	09/12/16
Analyst Review	CM 9/13/16
Secondary Review	9/13/16

Oven/Furnace used	Temperature °C	Start Time	End Time 1	End Time 2	End Time 3	End Time 4
Furnace# 2	750	11:35	13:35	2nd start time: 15:35	2nd end time: 16:45	

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		NE	59.0956	60.1073	60.1073	60.1089			100.00	100.16			100.16	-0.16			
SX	QAR 5212		AZ	69.9585	70.9614	70.0578	70.0594			9.90	10.06			10.06	89.94			%R 98.4, T.V.=10.22
DUP	QAR 5212		BLACK	70.3392	71.3519	70.4407	70.4419			10.02	10.14			10.14	89.86	0.8		%R 99.2 , T.V.=10.22
SX	T1601479-013		R	45.0614	46.1042	45.0615	45.0623			0.01	0.09			0.09	99.91			
DUP	T1601479-013		Z	37.5629	38.5952	37.5627	37.5636			-0.02	0.07			0.07	99.93	24.0		
SX	T1601479-014		7	38.5673	39.5706	38.6064	38.6073			3.90	3.99			3.99	96.01			
DUP	T1601479-014		E	38.4357	39.5599	38.4733	38.4737			3.34	3.38			3.38	96.62	16.5		
SX	T1601479-015		CD	13.5111	14.5345	13.5540	13.5542			4.19	4.21			4.21	95.79			
DUP	T1601479-015		B	10.0878	11.1242	10.1297	10.1297			4.04	4.04			4.04	95.96	4.1		Step 1 Pre-Ash Crucibles
SX	T1601479-016		D	13.4328	14.4493	13.4747	13.4747			4.12	4.12			4.12	95.88			Step 2 Collect masses and ash
DUP	T1601479-016		#5	28.9801	30.0112	29.0210	29.0211			3.97	3.98			3.98	96.02	3.6		at 750C for 2hrs.
SX	T1601479-017		14	26.8297	27.8661	26.8727	26.8732			4.15	4.20			4.20	95.80			Step 3 Cool & re-mass
DUP	T1601479-017		9	27.3362	28.3689	27.3778	27.3779			4.03	4.04			4.04	95.96	3.9		Step 4 Ash at 750 for 1 hr
SX	T1601479-019		C	42.5811	43.5917	42.5815	42.5823			0.04	0.12			0.12	99.88			Step 5 Cool & re-mass
DUP	T1601479-019		T	41.5571	42.6052	41.5579	41.5588			0.08	0.16			0.16	99.84	30.9		
SX	T1601479-020		A	37.5017	38.7025	37.5038	37.5047			0.17	0.25			0.25	99.75			
DUP	T1601479-020		1	37.0885	38.1015	37.0901	37.0907			0.16	0.22			0.22	99.78	14.0		
SX	T1601479-021		HZ	37.9959	39.0342	38.0362	38.0375			3.88	4.01			4.01	95.99			
DUP	T1601479-021		IR	38.7241	39.8261	38.7561	38.7569			2.90	2.98			2.98	97.02	29.5		
SX	T1601479-022		Q	38.3042	39.3983	38.3483	38.3493			4.03	4.12			4.12	95.88			
DUP	T1601479-022		N	39.0083	40.0644	39.0524	39.0529			4.18	4.22			4.22	95.78	2.4		

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 #: 513872
Instrument: T-TGA-01
Run Status: Logged

CAS Lab: TUCSON
Team: Elemental
Assigned To : CMULL
Run Date: 09/12/2016 04:45 PM

Seq#	Lab Sample ID	Bottle	QC Type	Container Barcode	Client Sample ID	Method / Test / Prep Method	Df	Parent
1	T1601479-013	.01			PY-5018 SCRUBBER PURGE WATER	ASTM D482-03 / Ash /	1	
2	T1601479-014	.01			PY-5024 ASH/METALS SPIKING SOLUTION	ASTM D482-03 / Ash /	1	
3	T1601479-015	.01			PY-5025 ASH/METALS SPIKING SOLUTION	ASTM D482-03 / Ash /	1	
4	T1601479-016	.01			PY-5026 ASH/METALS SPIKING SOLUTION	ASTM D482-03 / Ash /	1	
5	T1601479-017	.01			PY-5027 ASH/METALS SPIKING SOLUTION	ASTM D482-03 / Ash /	1	
6	T1601479-019	.01			PY-6009 AUXIILARY FUEL	ASTM D482-03 / Ash /	1	
7	T1601479-020	.01			PY-6010 SCRUBBER PURGE WATER	ASTM D482-03 / Ash /	1	
8	T1601479-021	.01			PY-6014 ASH/METALS SPIKING COLUTION .	ASTM D482-03 / Ash /	1	
9	T1601479-022	.01			PY-6015 ASH/METALS SPIKING SOLUTION	ASTM D482-03 / Ash /	1	

AC600

CM 9/6/16 R#512951

9/12/16

Analysis Date	Name	Vessel	Mass	Spike Weight	Sulfur	Qvad	BTU ar	Description	Comments
9/6/2016 12:05:35 PM	Benzoic (4823)	1	0.9538	0.00000	0.00000	11400.7	11401		%R 100.2
9/6/2016 12:11:06 PM	QAR 5212	3	1.0005	0.00000	3.75000	11945.5	11946		%R 98.2
9/6/2016 12:16:44 PM	T1601498-001	1	0.4122	0.00000	0.00000	6829.81	6830		
9/6/2016 12:22:14 PM	T1601498-002	3	0.4410	0.00000	0.00000	13222.2	13222		
9/6/2016 12:27:44 PM	T1601498-002 D	1	0.4605	0.00000	0.00000	13248.0	13248		RPD 0.20%
9/6/2016 12:33:13 PM	T1601520-001	3	0.3799	0.00000	0.190000	9667.62	9668		
9/6/2016 12:38:43 PM	T1601500-001	1	0.4003	0.00000	0.00000	8319.59	8320		
9/6/2016 12:44:44 PM	T1601479-008	3	0.4453	0.00000	0.00000	19541.6	19542		
9/6/2016 12:50:25 PM	T1601479-009	1	0.4630	0.00000	0.00000	19573.7	19574		
9/6/2016 12:56:08 PM	T1601479-008 D	3	0.4590	0.00000	0.00000	19492.9	19493		RPD 0.25%
9/6/2016 1:01:38 PM	T1601479-009 D	1	0.4767	0.00000	0.00000	19459.9	19460		RPD 0.58%
9/6/2016 1:07:09 PM	T1601479-018	3	0.4775	0.00000	0.00000	19476.6	19477		
9/6/2016 1:12:39 PM	T1601479-018 D	1	0.4985	0.00000	0.00000	19495.4	19495		RPD 0.09%
9/6/2016 1:18:23 PM	T1601479-026	3	0.4641	0.00000	0.00000	19437.3	19437		
9/6/2016 1:30:22 PM	T1601479-026 D	1	0.4738	0.00000	0.00000	19097.4	19097		RPD 1.76%
9/6/2016 1:35:54 PM	T1601502-001	3	0.4017	0.00000	0.00000	8110.13	8110		
9/6/2016 1:42:12 PM	T1601502-002	1	0.3918	0.00000	0.00000	8133.12	8133		
9/6/2016 1:47:44 PM	T1601495-001	3	0.4041	0.00000	0.0200000	6895.66	6896		
9/6/2016 1:53:15 PM	T1601514-001	1	0.3864	0.00000	0.00000	7639.90	7640		
9/6/2016 1:58:45 PM	T1601514-002	3	0.3886	0.00000	0.00000	7980.61	7981		
9/6/2016 2:05:19 PM	T1601506-001	1	0.4013	0.00000	0.100000	6420.56	6421		
9/6/2016 2:11:30 PM	T1601504-001	3	0.4036	0.00000	0.00000	8550.47	8550		NS
9/6/2016 2:19:19 PM	T1601504-002	1	0.3941	0.00000	0.00000	8974.18	8974		NS
9/6/2016 2:25:02 PM	T1601504-003	3	0.3936	0.00000	0.00000	7986.55	7987		NS
9/6/2016 2:30:36 PM	AR 100 #3567	1	0.4696	0.00000	0.960000	18411.5	18411		%R 100.1
9/6/2016 2:36:15 PM	Benzoic (4823)	3	1.0159	0.00000	0.00000	11361.6	11362		%R 99.9

Need Sulfur

Analytical Run Worksheet

Run #: 512951
Instrument: T-Calorimeter-01
Run Status: Draft

CAS Lab: TUCSON
Team: Elemental
Assigned To : CMULL
Run Date: 09/06/2016 02:17 PM

Seq#	Lab Sample ID	Bottle	QC Type	Container Barcode	Client Sample ID	Method / Test / Prep Method	Df	Parent
1	T1601498-001	.02			SV-PB13-Bark	ASTM D5865-10ae1 / BTU /	1	
2	T1601498-002	.02			SV-PB13-Coal	ASTM D5865-10ae1 / BTU /	1	
3	T1601520-001	.02			Composite wk of 8/4/16	ASTM D5865-10ae1 / BTU /	1	
4	T1601500-001	.02			Boiler fuel screw feeder	ASTM E711-87(2004) / BTU /	1	
5	T1601479-008	.01			PY-5011 AUXILIARY FUEL	ASTM D240 / BTU /	1	
6	T1601479-009	.01			PY-5012 AUXILIARY FUEL	ASTM D240 / BTU /	1	
7	T1601479-018	.01			PY-6007 AUXILIARY FUEL	ASTM D240 / BTU /	1	
8	T1601479-026	.01			PY-7007 BTU AUDIT SAMPLE	ASTM D240 / BTU /	1	
9	T1601502-001	.01			Sander Dust	ASTM E711-87(2004) / BTU /	1	
10	T1601502-002	.02			Hogged Fuel	ASTM E711-87(2004) / BTU /	1	
11	T1601495-001	.01			Wood Sample 8/25/16	ASTM D5865-10ae1 / BTU /	1	
12	T1601514-001	.01			Hogged Fuel	ASTM E711-87(2004) / BTU /	1	
13	T1601514-002	.01			Sander Dust	ASTM E711-87(2004) / BTU /	1	
14	T1601506-001	.02			Zolandz-MRF Semi-Annual-August	ASTM D5865-10ae1 / BTU /	1	
15	T1601504-001	.01			Run 2	ASTM E711-87(2004) / BTU /	1	
16	T1601504-002	.01			Run 3	ASTM E711-87(2004) / BTU /	1	
17	T1601504-003	.01			Run 4	ASTM E711-87(2004) / BTU /	1	

ALS Environmental - Tucson

Density / Specific Gravity by Pycnometer

ASTM D891 / D1217

Work Group #:	513446
Analyst:	Humberto Seeger
Analysis Date:	9/9/16 0:00
Analyst Review:	HAS
Supervisor Review:	(HW) 9/12/16

Temp. °C	24.5
H20 Density	0.9972

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	23.6806
sx	LCS Nanopure H2O		27.2688	50.8889	23.6201	0.9974		1.0003		10.0			
dup	LCSD Nanopure H2O		27.2681	50.8754	23.6073	0.9969	0.9972	0.9997	1.0000	10.0	10.0000		
sx	T1601479-006		27.2690	52.3007	25.0317	1.0571		1.0600		2.0			
dup	T1601479-006D		27.2670	52.2947	25.0277	1.0569	1.0570	1.0599	1.0600	2.0	1.9950		
sx	T1601479-008		27.2670	47.1097	19.8427	0.8379		0.8403		36.9			
dup	T1601479-008D		27.2705	47.1005	19.8300	0.8374	0.8377	0.8398	0.8400	37.0	36.9452		
sx	T1601479-009		27.2692	47.0991	19.8299	0.8374		0.8398		37.0			
dup	T1601479-009D		27.2693	47.0942	19.8249	0.8372	0.8373	0.8396	0.8397	37.0	37.0213		
sx	T1601479-014		27.2695	52.2931	25.0236	1.0567		1.0597		2.0			
dup	T1601479-014D		27.2669	52.2915	25.0246	1.0568	1.0567	1.0597	1.0597	2.0	2.0248		
sx	T1601479-015		27.2667	52.2960	25.0293	1.0570		1.0599		2.0			
dup	T1601479-015D		27.2663	52.2937	25.0274	1.0569	1.0569	1.0599	1.0599	2.0	2.0022		
sx	T1601479-018		27.2666	47.1120	19.8454	0.8380		0.8404		36.9			
dup	T1601479-018D		27.2706	47.1030	19.8324	0.8375	0.8378	0.8399	0.8401	37.0	36.9236		
sx	T1601479-021		27.2682	52.3135	25.0453	1.0576		1.0606		1.9			
dup	T1601479-021D		27.2673	52.2995	25.0322	1.0571	1.0574	1.0601	1.0603	2.0	1.9467		
sx	T1601479-027		27.2669	50.8752	23.6083	0.9969		0.9998		10.0			
dup	T1601479-027D		27.2670	50.8692	23.6022	0.9967	0.9968	0.9995	0.9996	10.1	10.0507		

Analytical Run Worksheet

Run #: 513446
Instrument: T-Balance-04
Run Status: Logged

CAS Lab: TUCSON
Team: Elemental
Assigned To : HSEEGER
Run Date: 09/09/2016 08:20 AM

Seq#	Lab Sample ID	Bottle	QC Type	Container Barcode	Client Sample ID	Method / Test / Prep Method	Df	Parent
1	T1601479-006	.01			PY-4015 ASH/METALS SPIKING SOLUTION	ASTM D1475-98(08) / Density /	1	
2	T1601479-008	.01			PY-5011 AUXILIARY FUEL	ASTM D1475-98(08) / Density /	1	
3	T1601479-009	.01			PY-5012 AUXILIARY FUEL	ASTM D1475-98(08) / Density /	1	
4	T1601479-014	.01			PY-5024 ASH/METALS SPIKING SOLUTION	ASTM D1475-98(08) / Density /	1	
5	T1601479-015	.01			PY-5025 ASH/METALS SPIKING SOLUTION	ASTM D1475-98(08) / Density /	1	
6	T1601479-018	.01			PY-6007 AUXILIARY FUEL	ASTM D1475-98(08) / Density /	1	
7	T1601479-021	.01			PY-6014 ASH/METALS SPIKING COLUTION	ASTM D1475-98(08) / Density /	1	
8	T1601479-027	.01			PY-7006 DENSITY AUDIT SAMPLE	ASTM D1475-98(08) / Density /	1	

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:	8/30/2016; 9/8/16
Analyst Review:	KS 8/31/2016; 9/8/2016
Supervisor Review:	HAS 9/9/16

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
	T1601479-001			766.6	794.6	9.6	2.2	159.2	0.1757	0.1757		
	T1601479-002			766.6	848.2	9.6	4.1	296.6	0.2751	0.2751		
	T1601479-023			766.6	805.2	9.6	2.4	173.6	0.2223	0.2223		
	T1601479-024			766.6	957.8	9.6	3.6	260.4	0.7341	0.7341		
	T1601479-025			766.6	908.3	9.6	5.3	383.4	0.3696	0.3696		

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

Bulk Density performed on SX 001 On 9/8/16

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:	9/8/2016
Analyst Review:	KS 9/8/2016
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
	T160479-001			766.60	794.57	9.60	2.70					

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