Stericycle
Environmental Solutions

2869 Sandstone Drive
Hatfield, PA 19440
215-822-8995

Physical Testing/ Raw Data

		ALS 01A	R16080012	DRY BASIS	AS RECEIVED		FACTOR
							0.67
							1.00
							0.33
TOTAL MOISTURE:	%		33.2	****	33.20	vo	9/12/2007
VOLATILE MATTER:	%		0.00	0.00	0.00		
FIXED CARBON:	%		****	100.00	66.80		
ASH:	%		0.00	0.00	0.00	vo	9/17/2007
PROXIMATE TOTAL:	%		****	100.00	100.00		
HEATING VALUE:	BTU/LB		3904	3904	2610	rc	9/17/2007
SULFUR:	%		0.00	0.00	0.00	rc	9/18/2007
CARBON:	%		24.59	24.59	16.43		
HYDROGEN EXCL WATER:	%		4.38	4.38	2.93		
HYDROGEN INCL WATER:	%		****	****	6.64		
NITROGEN:	%		23.05	23.05	15.40		
CHLORINE:	%		0.00	0.00	0.00		
OXYGEN EXCL WATER:	%		****	47.98	32.05		
OXYGEN INCL WATER:	%		****	****	61.54		
ULT TOTAL EXCL WATER:	%		****	100.00	100.00		
ULT TOTAL INCL WATER:	%		****	****	100.00		

		ALS 05A	R16080012	DRY BASIS	AS RECEIVED		FACTOR
							0.60
							1.00
							0.40
TOTAL MOISTURE:	%		39.9	****	39.90	vo	9/12/2007
VOLATILE MATTER:	%		0.00	0.00	0.00		
FIXED CARBON:	%		****	100.00	60.10		
ASH:	%		0.00	0.00	0.00	vo	9/17/2007
PROXIMATE TOTAL:	%		****	100.00	100.00		
HEATING VALUE:	BTU/LB		4870	4870	2930	rc	9/17/2007
SULFUR:	%		0.00	0.00	0.00	rc	9/18/2007
CARBON:	%		34.37	34.37	20.66		
HYDROGEN EXCL WATER:	%		3.13	3.13	1.88		
HYDROGEN INCL WATER:	%		****	****	6.35		
NITROGEN:	%		23.30	23.30	14.00		
CHLORINE:	%		0.00	0.00	0.00		
OXYGEN EXCL WATER:	%		****	39.20	23.56		
OXYGEN INCL WATER:	%		****	****	58.99		
ULT TOTAL EXCL WATER:	%		****	100.00	100.00		
ULT TOTAL INCL WATER:	%		****	****	100.00		

R16080012-7A 8/23/2016 8:13 AM page 1

		ALS 07A	R16080012	DRY BASIS	AS RECEIVED		FACTOR 0.74 1.00 0.26
TOTAL MOISTURE:	%		26	****	26.00	vo	9/12/2007
VOLATILE MATTER:	%		0.00	0.00	0.00		
FIXED CARBON:	%		****	100.00	74.00		
ASH:	%		0.00	0.00	0.00	vo	9/17/2007
PROXIMATE TOTAL:	%		****	100.00	100.00		
HEATING VALUE:	BTU/LB		3809	3809	2820	rc	9/17/2007
SULFUR:	%		0.00	0.00	0.00	rc	9/18/2007
CARBON:	%		27.68	27.68	20.48		
HYDROGEN EXCL WATER:	%		3.73	3.73	2.76		
HYDROGEN INCL WATER:	%		****	****	5.67		
NITROGEN:	%		25.00	25.00	18.50		
CHLORINE:	%		0.00	0.00	0.00		
OXYGEN EXCL WATER:	%		****	43.59	32.26		
OXYGEN INCL WATER:	%		****	****	55.35		
ULT TOTAL EXCL WATER:	%		****	100.00	100.00		
ULT TOTAL INCL WATER:	%		****	****	100.00		

		ALS 13A	R16080012	DRY BASIS	AS RECEIVED	FACTOR
						0.67
						1.00
						0.33
TOTAL MOISTURE:	%		32.7	****	32.70 vo	9/12/2007
VOLATILE MATTER:	%		0.00	0.00	0.00	
FIXED CARBON:	%		****	100.00	67.30	
ASH:	%		0.00	0.00	0.00 vo	9/17/2007
PROXIMATE TOTAL:	%		****	100.00	100.00	
HEATING VALUE:	BTU/LB		3940	3940	2650 rc	9/17/2007
SULFUR:	%		0.00	0.00	0.00 rc	9/18/2007
CARBON:	%		32.26	32.26	21.71	
HYDROGEN EXCL WATER:	%		3.33	3.33	2.24	
HYDROGEN INCL WATER:	%		****	****	5.90	
NITROGEN:	%		23.98	23.98	16.14	
CHLORINE:	%		0.00	0.00	0.00	
OXYGEN EXCL WATER:	%		****	40.43	27.21	
OXYGEN INCL WATER:	%		****	****	56.25	
ULT TOTAL EXCL WATER:	%		****	100.00	100.00	
ULT TOTAL INCL WATER:	%		****	****	100.00	

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PSC Analytical Services
Hatfield PA

Coal/Refused Derived Fuel Proximate Analysis

ASTM D-3172-89 Proximate
ASTM D-3173-87 Moisture
ASTM D-3174-97 Ash In Oil
ASTM D-3175-89A Volatile Matter

Key		Calculation	Workorder/smp: Control Date: 8/16/16	Workorder/smp: R16080012-1A Date: 8/16	Workorder/smp: DUP R16080012-1A Date: 8/16	Workorder/smp: R16080012-3A Date: 8/16	Workorder/smp: R16080012-5A Date: 8/16
A	**% Air-dry loss**	***					
B	Weight of Crucible and Sample(g)		24.8682	26.5632	21.8413	19.7590	20.8871
C	Weight of Crucible(g)		23.8862	25.4573	19.7700	18.6530	19.5149
D	Weight of Sample(g)	B - C = D	.9820	1.1059	2.0713	1.1060	1.3662
E	Weight of Crucible and Sample(g)	See "B"					
F	Weight(g) after 60 min.at 105 °C						
G	Weight loss (moisture) (g)	E - F = G					
H	**% Residual Moisture**	G/D x 100 = A					
I	Weight of Crucible and Sample(g)						
J	Weight of Crucible(g)						
K	Weight of Sample(g)	I - J = K					
L	Weight of Crucible and Sample(g)	See "I"					
M	Weight(g) after 7 min. at 950 °C						
N	Weight loss (g) at 950 °C	L - M = N					
O	% Loss at 950 °C	N/K x 100 = O					
P	% Residual Moisture	See "H"					
Q	**% Volatile Matter**	O - P = Q					
R	Weight (g) after 4-6 hours at 750 °C		24.0118	25.4549	19.7683	18.6520	19.5120
S	Weight of Crucible(g)		23.8862	25.4573	19.7700	18.6530	19.5149
T	Weight of Ash (g)	R - S = T	.1256	—	—	—	—
U	**% Ash**	T/D x 100 = U	12.8				
V	**% Sulfur** *	*					
W	BTU per pound **	**					
X	BTU sulfur correction **	**					
Y	**BTU per pound corrected** **	**					
Z	BTU per pound, Moisture Ash Free**	**					

*Analyzed on Sulfur Analyzer SR144 — See Sulfur Book
**Analyzed on LECO AE 350 — See BTU Book
***Weighed on Balance — See Moisture Book
Balance ID:Mettler AE100 — Serial # - H11823
Oven ID: Muffle Furnace — Serial # - Thermolyne 60-727

Analyst Signature:

Reviewer Signature: V. O'Neill 8/22/16

PSC Analytical Services
Hatfield PA

Coal/Refused Derived Fuel Proximate Analysis

ASTM D-3172-89 Proximate
ASTM D-3173-87 Moisture
ASTM D-3174-97 Ash In Oil
ASTM D-3175-89A Volatile Matter

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Key		Calculation	Workorder/smp: R16080012-5A Date: 8/16 (DUP)	Workorder/smp: R16080012-7A Date: 8/16	Workorder/smp: R16080012-9A Date: 8/16	Workorder/smp: R16080012-9A Date: 8/16 (DUP)	Workorder/smp: R16080012-11A Date: 8/16
A	**% Air-dry loss**	***					
B	Weight of Crucible and Sample(g)		23.2057	22.1628	20.2887	19.8802	18.5282
C	Weight of Crucible(g)		22.1463	20.9554	19.1959	18.8815	17.5853
D	Weight of Sample(g)	B - C = D	1.0594	1.1472	1.0928	.9987	.9429
E	Weight of Crucible and Sample(g)	See "B"					
F	Weight(g) after 60 min.at 105 °C						
G	Weight loss (moisture) (g)	E - F = G					
H	**% Residual Moisture**	G/D x 100 = A					
I	Weight of Crucible and Sample(g)						
J	Weight of Crucible(g)						
K	Weight of Sample(g)	I - J = K					
L	Weight of Crucible and Sample(g)	See "I"					
M	Weight(g) after 7 min. at 950 °C						
N	Weight loss (g) at 950 °C	L - M = N					
O	% Loss at 950 °C	N/K x 100 = O					
P	% Residual Moisture	See "H"					
Q	**% Volatile Matter**	O - P = Q					
R	Weight (g) after 4-6 hours at 750 °C		22.1446	20.9524	19.1943	18.8794	17.5865
S	Weight of Crucible(g)		22.1463	20.9554	19.1959	18.8815	17.5853
T	Weight of Ash (g)	R - S = T					.0012
U	**% Ash**	T/D x 100 = U					0.613
V	**% Sulfur** *	*					
W	BTU per pound **	**					
X	BTU sulfur correction **	**					
Y	**BTU per pound corrected** **	**					
Z	BTU per pound, Moisture Ash Free**	**					

*Analyzed on Sulfur Analyzer SR144 — See Sulfur Book
**Analyzed on LECO AE 350 — See BTU Book
***Weighed on Balance — See Moisture Book
Balance ID:Mettler AE100 — Serial # - H11823
Oven ID: Muffle Furnace — Serial # - Thermolyne 60-727

Analyst Signature:

Reviewer Signature: V.G Neill 8/23/16

PSC Analytical Services
Hatfield PA

Coal/Refused Derived Fuel Proximate Analysis

ASTM D-3172-89 Proximate
ASTM D-3173-87 Moisture
ASTM D-3174-97 Ash In Oil
ASTM D-3175-89A Volatile Matter

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Key		Calculation	Workorder/smp: R16080012-13A Date: 8/16	Workorder/smp: R16080012-13A (DUP) Date: 8/16	Workorder/smp: R16080012-15A Date: 8/16	Workorder/smp: Date:	Workorder/smp: Date:
A	**% Air-dry loss**	***					
B	Weight of Crucible and Sample(g)		19.3268	16.2016	17.4613		
C	Weight of Crucible(g)		18.2740	15.1890	16.1673		
D	Weight of Sample(g)	B - C = D	1.0528	1.0126	1.2940		
E	Weight of Crucible and Sample(g)	See "B"					
F	Weight(g) after 60 min.at 105 ^{0} C						
G	Weight loss (moisture) (g)	E - F = G					
H	**% Residual Moisture**	G/D x 100 = A					
I	Weight of Crucible and Sample(g)						
J	Weight of Crucible(g)						
K	Weight of Sample(g)	I - J = K					
L	Weight of Crucible and Sample(g)	See "I"					
M	Weight(g) after 7 min. at 950 ^{0}C						
N	Weight loss (g) at 950 ^{0} C	L - M = N					
O	% Loss at 950 ^{0} C	N/K x 100 = O					
P	% Residual Moisture	See "H"					
Q	**% Volatile Matter**	O - P = Q					
R	Weight (g) after 4-6 hours at 750 ^{0} C		18.2724	15.1865	16.1627		
S	Weight of Crucible(g)		18.2740	15.1890	16.1673		
T	Weight of Ash (g)	R - S = T					
U	**% Ash**	T/D x 100 = U					
V	**% Sulfur ***	*					
W	BTU per pound **	**					
X	BTU sulfur correction **	**					
Y	**BTU per pound corrected ****	**					
Z	BTU per pound, Moisture Ash Free**	**					

*Analyzed on Sulfur Analyzer SR144 — See Sulfur Book
**Analyzed on LECO AE 350 — See BTU Book
***Weighed on Balance — See Moisture Book
Balance ID:Mettler AE100 — Serial # - H11823
Oven ID: Muffle Furnace — Serial # - Thermolyne 60-727

Analyst Signature:

Reviewer Signature: V. O'Neill 8/23/16

AC600

AC600 SN3016 Data

Name	Spike Weight	Sulfur	Nitrogen	Method	Mass	Qvad	Analysis Date
Benzoic 1028	0.0000	0.0000	0.0000	Delta T	1.0207	11370	8/22/2016 5:47:22 AM
Benzoic 1028	0.0000	0.0000	0.0000	Delta T	1.0477	11374	8/22/2016 6:08:55 AM
CONTROL	0.0000	0.0000	0.0000	Delta T	0.4750	12467	8/22/2016 6:20:06 AM
R16080012-2A	0.20460	0.0000	0.0000	Delta T	0.2562	144.70	8/22/2016 8:10:49 AM
R16080012-2A	0.44690	0.0000	0.0000	Delta T	0.2471	79.328	8/22/2016 8:20:15 AM
R16080012-6A	0.30890	0.0000	0.0000	Delta T	0.2629	102.59	8/22/2016 8:29:34 AM
R16080012-8A	0.32290	0.0000	0.0000	Delta T	0.2969	48.150	8/22/2016 8:39:00 AM
R16080012-14A	0.36210	0.0000	0.0000	Delta T	0.2650	6.2175	8/22/2016 8:53:20 AM
R16080012-1A	0.64880	0.0000	166.00	Delta T	0.4400	3904.2	8/22/2016 9:02:39 AM
R16080012-1A	0.55380	0.0000	215.00	Delta T	0.3302	4182.9	8/22/2016 9:12:15 AM
R16080012-5A	0.78540	0.0000	184.00	Delta T	0.3269	4867.9	8/22/2016 9:21:34 AM
R16080012-7A	0.62090	0.0000	200.00	Delta T	0.3282	3809.1	8/22/2016 9:30:52 AM
R16080012-13A	0.73930	0.0000	190.00	Delta T	0.2687	3937.8	8/22/2016 9:51:28 AM

Element	Average	Std. Deviation	RSD	Count
Mass	0.4281	0.3	64.89	13
Qvad	4330.26	4625.873	106.8	13

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Date of report: 8/22/2016 10:01 AM
User ID: Vaughan O'Neill

Run Details					Results			Elemental Ratio
Run	Run #	Weight	Created on	User ID	Carbon	Hydrogen	Nitrogen	C/N
BLANK	4		8/16/2016 8:56:39 AM	Voneill	5	365	-55	
BLANK	5		8/16/2016 9:02:12 AM	Voneill	5	334	-59	
K1	6	2.573	8/16/2016 9:07:44 AM	Voneill	18.696	52.164	6.828	
BLANK	7		8/16/2016 9:13:16 AM	Voneill	9	444	-63	
K2	8	3.114	8/16/2016 9:18:48 AM	Voneill	18.678	52.702	6.773	
BLANK	9		8/16/2016 9:24:20 AM	Voneill	9	456	-64	
ACE	10	3.435	8/16/2016 9:29:52 AM	Voneill	70.69%	6.65%	10.30%	
080012 1A	11	2.905	8/16/2016 9:35:24 AM	Voneill	24.59%	4.38%	23.05%	
080012 1A2	12	2.388	8/16/2016 9:49:55 AM	Voneill	25.48%	4.75%	19.61%	
080012 5A	13	2.933	8/16/2016 9:55:27 AM	Voneill	34.37%	3.13%	23.32%	
080012 7A	14	2.782	8/16/2016 10:03:32 AM	Voneill	27.68%	3.73%	25.03%	
080012 13A	15	2.846	8/16/2016 10:13:21 AM	Voneill	32.26%	3.33%	23.98%	
080012 2A	18	3.935	8/16/2016 10:41:14 AM	Voneill	1.70%	11.64%	0.72%	
080012 2A	19	3.590	8/16/2016 10:49:12 AM	Voneill	0.51%	11.51%	0.72%	
080012 6A	20	3.505	8/16/2016 11:04:23 AM	Voneill	0.41%	11.30%	0.67%	
080012 6A2	21	3.455	8/16/2016 11:12:16 AM	Voneill	0.50%	11.29%	0.71%	
080012 8A	22	3.475	8/16/2016 11:19:49 AM	Voneill	0.43%	11.46%	0.74%	
080012 8A2	23	3.490	8/16/2016 11:27:21 AM	Voneill	0.47%	11.51%	0.76%	
080012 14A	24	3.307	8/16/2016 12:04:55 PM	Voneill	0.40%	11.29%	0.72%	
080012 14A2	25	3.350	8/16/2016 12:12:02 PM	Voneill	0.42%	11.47%	0.75%	
BLANK	28		8/16/2016 12:37:04 PM	Voneill	47	801	-75	
BLANK	29		8/16/2016 12:42:36 PM	Voneill	-5	433	-77	

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		ALS 01A	R16080012	DRY BASIS	AS RECEIVED		FACTOR
							0.67
							1.00
							0.33
TOTAL MOISTURE:	%		33.2	****	33.20	vo	9/12/2007
VOLATILE MATTER:	%		0.00	0.00	0.00		
FIXED CARBON:	%		****	100.00	66.80		
ASH:	%		0.00	0.00	0.00	vo	9/17/2007
PROXIMATE TOTAL:	%		****	100.00	100.00		
HEATING VALUE:	BTU/LB		3904	3904	2610	rc	9/17/2007
SULFUR:	%		0.00	0.00	0.00	rc	9/18/2007
CARBON:	%		24.59	24.59	16.43		
HYDROGEN EXCL WATER:	%		4.38	4.38	2.93		
HYDROGEN INCL WATER:	%		****	****	6.64		
NITROGEN:	%		23.05	23.05	15.40		
CHLORINE:	%		0.00	0.00	0.00		
OXYGEN EXCL WATER:	%		****	47.98	32.05		
OXYGEN INCL WATER:	%		****	****	61.54		
ULT TOTAL EXCL WATER:	%		****	100.00	100.00		
ULT TOTAL INCL WATER:	%		****	****	100.00		

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LECO
Delivering the Right Results

Name	Method	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Blank	Sulfur	8/16/2016 8:50 AM	-0.000609 %		1350	
Description	Type					
	Blank					
Sulfur Certified (±) (not a standard)						

Sample Mass	Comments	Sulfur	Analysis Date
0.3500 g		-0.000609 %	8/16/2016 8:50 AM

Name	Method	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Blank	Sulfur	8/16/2016 8:57 AM	0.000228 %		1350	
Description	Type					
	Blank					
Sulfur Certified (±) (not a standard)						

Sample Mass	Comments	Sulfur	Analysis Date
0.3500 g		0.000228 %	8/16/2016 8:57 AM

Name	Method	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Blank	Sulfur	8/16/2016 9:06 AM	0.000382 %		1350	
Description	Type					
	Blank					
Sulfur Certified (±) (not a standard)						

Sample Mass	Comments	Sulfur	Analysis Date
0.3500 g		0.000382 %	8/16/2016 9:06 AM

Name	Method	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
502-672	Sulfur	8/16/2016 9:11 AM	2.06 %	0.0773	1350	0.00159 %
Description	Type					
	Drift					
Sulfur Certified (±) 0.0700 %						

Sample Mass	Comments	Sulfur	Analysis Date
0.2035 g		2.06 %	8/16/2016 9:09 AM
0.2149 g		2.06 %	8/16/2016 9:11 AM

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Name	Method	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
502-085	Sulfur	8/16/2016 9:23 AM	32.9 %	0.0633	1350	0.0208 %
Description	Type					
	Drift					
Sulfur Certified (±) 0.900 %						

Sample Mass	Comments	Sulfur	Analysis Date
0.1222 g		32.9 %	8/16/2016 9:20 AM

0.1265 g 32.9 % 8/16/2016 9:23 AM

Name	Method					
COAL	Sulfur					
Description	Type					
CONTROL	Sample	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Sulfur Certified (±) (not a standard)		8/16/2016 9:29 AM	1.79 %	0.402	1350	0.00721 %

Sample Mass	Comments	Sulfur	Analysis Date
0.2589 g		1.79 %	8/16/2016 9:26 AM
0.2818 g		1.80 %	8/16/2016 9:29 AM

Name	Method					
ALS	Sulfur					
Description	Type					
R16080012-13A	Sample	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Sulfur Certified (±) (not a standard)		8/16/2016 9:37 AM	0.00273 %		1350	

Sample Mass	Comments	Sulfur	Analysis Date
0.2159 g		0.00273 %	8/16/2016 9:37 AM

Name	Method					
ALS	Sulfur					
Description	Type					
R16080012-1A	Sample	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Sulfur Certified (±) (not a standard)		8/16/2016 9:42 AM	0.00198 %	7.84	1350	0.000155 %

Sample Mass	Comments	Sulfur	Analysis Date
0.2196 g		0.00187 %	8/16/2016 9:40 AM
0.2333 g		0.00209 %	8/16/2016 9:42 AM

Name	Method					
ALS	Sulfur					
Description	Type					
R16080012-5A	Sample	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Sulfur Certified (±) (not a standard)		8/16/2016 9:45 AM	0.00173 %		1350	

Sample Mass	Comments	Sulfur	Analysis Date
0.2632 g		0.00173 %	8/16/2016 9:45 AM

Name	Method					
ALS	Sulfur					
Description	Type					
R16080012-7A	Sample	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Sulfur Certified (±) (not a standard)		8/16/2016 9:52 AM	0.00126 %		1350	

Sample Mass	Comments	Sulfur	Analysis Date
0.2673 g		0.00126 %	8/16/2016 9:52 AM

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Name	Method
Blank	Oil

Description	Type	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Sulfur Certified (±) (not a standard)	Blank	8/16/2016 11:17 AM	-0.0000924 %		1350	

Sample Mass	Comments	Sulfur	Analysis Date
0.3500 g		-0.0000924 %	8/16/2016 11:17 AM

Name	Method
Blank	Oil

Description	Type	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Sulfur Certified (±) (not a standard)	Blank	8/16/2016 11:21 AM	0.0000397 %		1350	

Sample Mass	Comments	Sulfur	Analysis Date
0.3500 g		0.0000397 %	8/16/2016 11:21 AM

Name	Method
Blank	Oil

Description	Type	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Sulfur Certified (±) (not a standard)	Blank	8/16/2016 11:23 AM	0.0000528 %		1350	

Sample Mass	Comments	Sulfur	Analysis Date
0.3500 g		0.0000528 %	8/16/2016 11:23 AM

Name	Method
502-848	Oil

Description	Type	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Sulfur Certified (±) 0.0340 %	Standard	8/16/2016 12:13 PM	0.251 %	1.91	1350	0.00479 %

Sample Mass	Comments	Sulfur	Analysis Date
0.0794 g		0.248 %	8/16/2016 12:07 PM
0.0793 g		0.254 %	8/16/2016 12:13 PM

Name	Method
ALS	Oil

Description	Type	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
R16080012-2A Sulfur Certified (±) (not a standard)	Sample	8/16/2016 12:49 PM	-0.000619 %	-70.2	1350	0.000434 %

Sample Mass	Comments	Sulfur	Analysis Date
0.0947 g		-0.000926 %	8/16/2016 12:42 PM
0.1056 g		-0.000312 %	8/16/2016 12:49 PM

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Name	Method
ALS	Oil

Description	Type	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
R16080012-6A Sulfur Certified (±) (not a standard)	Sample	8/16/2016 12:54 PM	-0.000836 %	-34.3	1350	0.000287 %

Sample Mass	Comments	Sulfur	Analysis Date
0.0910 g		-0.000633 %	8/16/2016 12:51 PM
0.0940 g		-0.00104 %	8/16/2016 12:54 PM

Name	Method					
ALS	Oil					
Description	Type	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
R16080012-8A	Sample	8/16/2016 12:59 PM	-0.00178 %	-26.0	1350	0.000463 %
Sulfur Certified (±) (not a standard)						

Sample Mass	Comments	Sulfur	Analysis Date
0.0755 g		-0.00211 %	8/16/2016 12:56 PM
0.0828 g		-0.00145 %	8/16/2016 12:59 PM

Name	Method					
ALS	Oil					
Description	Type	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
R16080012-14A	Sample	8/16/2016 1:04 PM	-0.00103 %	-48.5	1350	0.000499 %
Sulfur Certified (±) (not a standard)						

Sample Mass	Comments	Sulfur	Analysis Date
0.0802 g		-0.00138 %	8/16/2016 1:02 PM
0.1383 g		-0.000675 %	8/16/2016 1:04 PM

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PSC Analytical Services,
Reading, PA

Ash in Oil Log

Date	Workorder	Sample #	Method	A: Weight of Crucible(g)	B: Weight of Crucible + Sample(g)	C: Weight of Sample(g)	D: Weight of Crucible + Ash(g)	E: Weight of Ash(g)	F: % Ash	Analyst
7-21-16	R16070037	1A		57.5380	69.0240	11.4860	57.5517	0.0137	0.12%	KK
		2A		63.0708	74.3736	11.3028	63.1737	0.1029	0.91	
		DUP		55.6822	67.1007	11.4185	55.7678	0.0856	0.75	0.83
7-28-16	R16070044	1A		57.4100	68.3312	10.9212	57.4103	0.0003	<0.01	KK
		2A		61.8056	72.0948	10.2892	61.9079	0.1023	0.99	
	R16070048	1A		55.7296	65.7644	—	55.6222	—	<0.01	
		2A		57.5450	67.8971	—	57.5405	—		
	R16070051	1A		63.0619	73.8598	—	63.0465	—		
		DUP		61.8469	72.1941	—	61.8441	—		
8-3-16	R16080005	1A		57.3593	67.5240	10.1647	57.3609	0.0016	0.07	
		DUP		70.0175	80.3103	10.2928	70.0280	0.0105	0.10	0.06
		2A		61.8451	71.8874	10.0423	61.9465	0.0614	0.01	KK
8-15-16	R16080016	1A		57.3240	67.4020	10.0780	57.3388	0.0148	0.15	KK
	16	2A		70.0057	81.3622	11.3565	70.1536	0.1479	~~0.01~~ 1.30	
	11	1A		61.9090	71.5777	—	61.8962	—	<0.01	
	12	2A	ALS	60.2641	70.0978	—	60.2636	—		
	DUP	2A		64.1035	75.1646	~~0.0002~~ 11.0611	64.1037	0.0002	0.002 = <0.01	
	12	4A		61.9237	72.3683	—	61.9248	—	<0.01	
	12	6A		55.5389	65.9024	—	55.5355	—		
	12	8A		62.8944	72.1961	—	62.8922	—		
	12	10A		63.0297	74.3232	—	63.0276	—		
	12	DUP		63.5412	73.7130	—	63.5411	—		
	12	12		57.5405	67.9143	—	57.5396	—		
	12	14		60.8372	70.1994	—	60.8347	—		
	12	16		61.4122	71.6616	—	61.4112	—		

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Signature: _____ Date: _____
Reviewed By: U. Odell Date: 8/18/16

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8-17-16 ALS Density/Gravity

R16080012-1A
mass = 12.9254g
Vol = 10 ml
Density = 1.29 g/ml = 10.76 #/gal

R16080012-5A
Mass = 7.8276g
Vol = 10 ml
Density = ~~7.83~~ 0.78 g/ml 6.51 #/gal

R16080012-7A
Mass = 10.4463 g
vol = 10 ml
Density = ~~10.0~~ ~~1.45~~ 1.04 g/ml 8.68 #/gal ~~12.1 #/gal~~

R16080012-13A
Mass = 8.9175
Vol = 10 ml
Density = 0.89 g/ml 7.44 #/gal

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R16080012-13A DUP
Mass = 9.1822g
Vol = 10 ml
Density = 0.92 g/ml

Average = 0.91 g/ml
7.59 lb/gal

N. O'Neill
8/18/16

R16080044-2A 8/24/2016 6:23 AM page 1

		ALS 02A	R16080044	DRY BASIS	AS RECEIVED	Analyst/Date	FACTOR
							0.60
							1.00
							0.40
TOTAL MOISTURE:	%		40.46	****	40.46	~~4/13/15 12:00 AM~~	8-22-16
VOLATILE MATTER:	%			0.00	0.00		
FIXED CARBON:	%		****	100.00	59.54		
ASH:	%		0.00	0.00	0.00	~~4/14/15 12:00 AM~~	8-22-16
PROXIMATE TOTAL:	%		****	100.00	100.00		
HEATING VALUE:	BTU/LB		5883.5	5883.5	3500	~~4/14/15 12:00 AM~~	8-22-16
SULFUR:	%		0.00	0.00	0.00	~~4/13/15 12:00 AM~~	8-22-16
CARBON:	%		32.57	32.57	19.39	~~4/13/15 12:00 AM~~	8-22-16
HYDROGEN EXCL WATER:	%		3.20	3.20	1.91		
HYDROGEN INCL WATER:	%		****	****	6.43		
NITROGEN:	%		26.76	26.76	15.93		
CHLORINE:	%			0.00	0.00		
OXYGEN EXCL WATER:	%		****	37.47	22.31		
OXYGEN INCL WATER:	%		****	****	58.24		
ULT TOTAL EXCL WATER:	%		****	100.00	100.00		
ULT TOTAL INCL WATER:	%		****	****	100.00		
DENSITY	lb/gal		7.26		7.26	8-22-16	

Dry Heating Value → 4726 x .60 = 2810 As Rec

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		ALS 08A	R16080044	DRY BASIS	AS RECEIVED	Analyst/Date	FACTOR
							0.49
							1.00
							0.51
TOTAL MOISTURE:	%		51.08	****	51.08	4/13/15 12:00 AM	
VOLATILE MATTER:	%			0.00	0.00		
FIXED CARBON:	%		****	100.00	48.92		
ASH:	%		0.00	0.00	0.00	4/14/15 12:00 AM	
PROXIMATE TOTAL:	%		****	100.00	100.00		
HEATING VALUE:	BTU/LB		6575.5	6575.5	3220	4/14/15 12:00 AM	
SULFUR:	%		0.00	0.00	0.00	4/13/15 12:00 AM	
CARBON:	%		34.50	34.50	16.88	4/13/15 12:00 AM	
HYDROGEN EXCL WATER:	%		3.05	3.05	1.49		
HYDROGEN INCL WATER:	%		****	****	7.21		
NITROGEN:	%		24.07	24.07	11.78		
CHLORINE:	%			0.00	0.00		
OXYGEN EXCL WATER:	%		****	38.38	18.77		
OXYGEN INCL WATER:	%		****	****	64.14		
ULT TOTAL EXCL WATER:	%		****	100.00	100.00		
ULT TOTAL INCL WATER:	%		****	****	100.00		
DENSITY	lb/gal		7.59		7.59		

		ALS 18A	R16080044	DRY BASIS	AS RECEIVED	Analyst/Date	FACTOR
							0.57
							1.00
TOTAL MOISTURE:	%		43.38	****	43.38	4/13/15 12:00 AM	0.43
VOLATILE MATTER:	%			0.00	0.00		
FIXED CARBON:	%		****	100.00	56.62		
ASH:	%		0.00	0.00	0.00	4/14/15 12:00 AM	
PROXIMATE TOTAL:	%		****	100.00	100.00		
HEATING VALUE:	BTU/LB		4860.9	4860.9	2750	4/14/15 12:00 AM	
SULFUR:	%		0.00	0.00	0.00	4/13/15 12:00 AM	
CARBON:	%		33.84	33.84	19.16	4/13/15 12:00 AM	
HYDROGEN EXCL WATER:	%		3.09	3.09	1.75		
HYDROGEN INCL WATER:	%		****	****	6.60		
NITROGEN:	%		24.68	24.68	13.97		
CHLORINE:	%			0.00	0.00		
OXYGEN EXCL WATER:	%		****	38.39	21.74		
OXYGEN INCL WATER:	%		****	****	60.26		
ULT TOTAL EXCL WATER:	%		****	100.00	100.00		
ULT TOTAL INCL WATER:	%		****	****	100.00		
DENSITY	lb/gal		6.84		6.84		

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R16080044-20A 8/24/2016 6:23 AM page 1

		ALS 20A	R16080044	DRY BASIS	AS RECEIVED	Analyst/Date	FACTOR
							0.56
							1.00
							0.44
TOTAL MOISTURE:	%		44.1	****	44.10	4/13/15 12:00 AM	
VOLATILE MATTER:	%			0.00	0.00		
FIXED CARBON:	%		****	100.00	55.90		
ASH:	%		0.00	0.00	0.00	4/14/15 12:00 AM	
PROXIMATE TOTAL:	%		****	100.00	100.00		
HEATING VALUE:	BTU/LB		3942.1	3942.1	2200	4/14/15 12:00 AM	
SULFUR:	%		0.00	0.00	0.00	4/13/15 12:00 AM	
CARBON:	%		32.46	32.46	18.15	4/13/15 12:00 AM	
HYDROGEN EXCL WATER:	%		3.15	3.15	1.76		
HYDROGEN INCL WATER:	%		****	****	6.70		
NITROGEN:	%		26.52	26.52	14.82		
CHLORINE:	%			0.00	0.00		
OXYGEN EXCL WATER:	%		****	37.87	21.17		
OXYGEN INCL WATER:	%		****	****	60.33		
ULT TOTAL EXCL WATER:	%		****	100.00	100.00		
ULT TOTAL INCL WATER:	%		****	****	100.00		
DENSITY	lb/gal		7.12		7.12		

AC600

AC600 SN3016 Data

Nitrogen Adjustee

Name	Spike Weight	Sulfur	Nitrogen	Method	Mass	Qvad	Analysis Date
Benzoic 1028	0.0000	0.0000	0.0000	Delta T	1.0207	11370	8/22/2016 5:47:22 AM
Benzoic 1028	0.0000	0.0000	0.0000	Delta T	1.0477	11374	8/22/2016 6:08:55 AM
CONTROL	0.0000	0.0000	0.0000	Delta T	0.4750	12467	8/22/2016 6:20:06 AM
R16080044-1A	0.35070	0.0000	0.0000	Delta T	0.2882	21.189	8/22/2016 10:00:47 AM
R16080044-1A	0.33610	0.0000	0.0000	Delta T	0.2314	45.843	8/22/2016 10:10:08 AM
R16080044-7A	0.32740	0.0000	0.0000	Delta T	0.2879	25.255	8/22/2016 10:19:28 AM
R16080044-17A	0.34670	0.0000	0.0000	Delta T	0.3181	-21446	8/22/2016 10:35:02 AM
R16080044-19A	0.35340	0.0000	0.0000	Delta T	0.3526	45.411	8/22/2016 10:45:13 AM
R16080044-17A	0.34230	0.0000	0.0000	Delta T	0.2199	79.606	8/22/2016 10:54:35 AM
R16080044-2A	0.65160	0.0000	211.00	Delta T	0.3235	5883.5	8/22/2016 11:03:55 AM
R16080044-2A	0.61560	0.0000	211.00	Delta T	0.2284	4171.3	8/22/2016 11:13:16 AM
R16080044-8A	0.76430	0.0000	190.00	Delta T	0.2271	6575.5	8/22/2016 11:22:38 AM
R16080044-18A	0.59230	0.0000	195.00	Delta T	0.3377	4860.9	8/22/2016 11:31:56 AM
R16080044-20A	0.58930	0.0000	210.00	Delta T	0.2902	3942.1	8/22/2016 11:43:37 AM
502-680	0.0000	0.0000	0.0000	Delta T	0.3563	14142	8/22/2016 11:53:27 AM
502-680	0.0000	0.0000	0.0000	Delta T	0.3517	14160	8/22/2016 12:18:03 PM

Element	Average	Std. Deviation	RSD	Count
Mass	0.3973	0.3	64.68	16
Qvad	4232.32	8649.853	204.4	16

certified reference Material
14240 BTU/lb
502-680

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23/2016 10:22:31 AM

AC600

AC600 SN3016 Data

Name	Spike Weight	Sulfur	Nitrogen	Method	Mass	Qvad	Analysis Date
R16080044-2A DUP	0.83770	0.0000	211.00	Delta T	0.2017	4387.9	8/30/2016 10:46:39 AM
R16080044-2A DUP	0.76310	0.0000	211.00	Delta T	0.3390	4726.3	8/30/2016 10:58:26 AM

Element	Average	Std. Deviation	RSD	Count
Mass	0.2703	0.10	35.91	2
Qvad	4557.08	239.314	5.251	2

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Delivering the Right Results

Name	Method	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Blank	Sulfur	8/22/2016 9:55 AM	-0.000790 %		1350	
Description	Type					
	Blank					
Sulfur Certified (±) (not a standard)						

Sample Mass	Comments	Sulfur	Analysis Date
0.3500 g		-0.000790 %	8/22/2016 9:55 AM

Name	Method	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Blank	Sulfur	8/22/2016 9:58 AM	-0.000638 %		1350	
Description	Type					
	Blank					
Sulfur Certified (±) (not a standard)						

Sample Mass	Comments	Sulfur	Analysis Date
0.3500 g		-0.000638 %	8/22/2016 9:58 AM

Name	Method	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Blank	Sulfur	8/22/2016 9:59 AM	0.00143 %		1350	
Description	Type					
	Blank					
Sulfur Certified (±) (not a standard)						

Sample Mass	Comments	Sulfur	Analysis Date
0.3500 g		0.00143 %	8/22/2016 9:59 AM

Name	Method	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
502-672	Sulfur	8/22/2016 10:09 AM	2.06 %	0.0689	1350	0.00142 %
Description	Type					
	Drift					
Sulfur Certified (±) 0.0700 %						

Sample Mass	Comments	Sulfur	Analysis Date
0.2155 g		2.06 %	8/22/2016 10:07 AM
0.2020 g		2.06 %	8/22/2016 10:09 AM

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Name	Method	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
502-085	Sulfur	8/22/2016 10:32 AM	32.9 %	0.420	1350	0.138 %
Description	Type					
	Drift					
Sulfur Certified (±) 0.900 %						

Sample Mass	Comments	Sulfur	Analysis Date
0.1198 g		32.8 %	8/22/2016 10:28 AM

0.1243 g	33.0 %	8/22/2016 10:32 AM

Name	Method					
COAL	Sulfur					
Description	Type	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
CONTROL	Sample	8/22/2016 10:39 AM	1.80 %	0.255	1350	0.00459 %
Sulfur Certified (±) (not a standard)						

Sample Mass	Comments	Sulfur	Analysis Date
0.2849 g		1.79 %	8/22/2016 10:35 AM
0.2460 g		1.80 %	8/22/2016 10:39 AM

Name	Method					
ALS	Sulfur					
Description	Type	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
R16080044-2A	Sample	8/22/2016 11:18 AM	0.0000798 %		1350	
Sulfur Certified (±) (not a standard)						

Sample Mass	Comments	Sulfur	Analysis Date
0.2376 g		0.0000798 %	8/22/2016 11:18 AM

Name	Method					
ALS	Sulfur					
Description	Type	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
R16080044-8A	Sample	8/22/2016 11:20 AM	0.00122 %		1350	
Sulfur Certified (±) (not a standard)						

Sample Mass	Comments	Sulfur	Analysis Date
0.2447 g		0.00122 %	8/22/2016 11:20 AM

Name	Method					
ALS	Sulfur					
Description	Type	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
R16080044-18A	Sample	8/22/2016 11:22 AM	0.00126 %		1350	
Sulfur Certified (±) (not a standard)						

Sample Mass	Comments	Sulfur	Analysis Date
0.2482 g		0.00126 %	8/22/2016 11:22 AM

Name	Method					
ALS	Sulfur					
Description	Type	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
R16080044-20A	Sample	8/22/2016 11:35 AM	0.000740 %	68.9	1350	0.000510 %
Sulfur Certified (±) (not a standard)						

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Sample Mass	Comments	Sulfur	Analysis Date
0.2767 g		0.00110 %	8/22/2016 11:24 AM
0.2203 g		0.000379 %	8/22/2016 11:35 AM

Name	Method
Blank	Oil

Description	Type	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Sulfur Certified (±) (not a standard)	Blank	8/22/2016 12:09 PM	-0.0000154 %		1350	

Sample Mass	Comments	Sulfur	Analysis Date
0.3500 g	0	-0.0000154 %	8/22/2016 12:09 PM

Name	Method	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Blank	Oil					
Description	Type					
Sulfur Certified (±) (not a standard)	Blank	8/22/2016 12:11 PM	0.0000694 %		1350	

Sample Mass	Comments	Sulfur	Analysis Date
0.3500 g		0.0000694 %	8/22/2016 12:11 PM

Name	Method	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
Blank	Oil					
Description	Type					
Sulfur Certified (±) (not a standard)	Blank	8/22/2016 12:13 PM	-0.0000540 %		1350	

Sample Mass	Comments	Sulfur	Analysis Date
0.3500 g		-0.0000540 %	8/22/2016 12:13 PM

Name	Method	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
502-848	Oil					
Description	Type					
Sulfur Certified (±) 0.0340 %	Standard	8/22/2016 12:25 PM	0.252 %	2.71	1350	0.00684 %

Sample Mass	Comments	Sulfur	Analysis Date
0.1009 g		0.247 %	8/22/2016 12:20 PM
0.0851 g		0.257 %	8/22/2016 12:25 PM

Name	Method	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
502-427	Oil					
Description CONTROL	Type					
Sulfur Certified (±) (not a standard)	Sample	8/22/2016 12:46 PM	0.104 %	2.75	1350	0.00286 %

Sample Mass	Comments	Sulfur	Analysis Date
0.1096 g		0.102 %	8/22/2016 12:40 PM
0.1113 g		0.106 %	8/22/2016 12:46 PM

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Name	Method	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
ALS	Oil					
Description R16080044-1A	Type					
Sulfur Certified (±) (not a standard)	Sample	8/22/2016 12:54 PM	0.000399 %	24.2	1350	0.0000964 %

Sample Mass	Comments	Sulfur	Analysis Date
0.0887 g		0.000467 %	8/22/2016 12:51 PM
0.0987 g		0.000331 %	8/22/2016 12:54 PM

Name	Method					
ALS	Oil					
Description	Type	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
R16080044-7A	Sample	8/22/2016 12:57 PM	0.000132 %		1350	
Sulfur Certified (±) (not a standard)						

Sample Mass	Comments	Sulfur	Analysis Date
0.0922 g		0.000132 %	8/22/2016 12:57 PM

Name	Method					
ALS	Oil					
Description	Type	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
R16080044-17A	Sample	8/22/2016 1:00 PM	-0.000416 %		1350	
Sulfur Certified (±) (not a standard)						

Sample Mass	Comments	Sulfur	Analysis Date
0.0749 g		-0.000416 %	8/22/2016 1:00 PM

Name	Method					
R16080044-19A	Oil					
Description	Type	Analysis Date	Sulfur Average	Sulfur %RSD	Furnace Temperature	Sulfur Std. Dev.
	Sample	8/22/2016 1:03 PM	0.000259 %		1350	
Sulfur Certified (±) (not a standard)						

Sample Mass	Comments	Sulfur	Analysis Date
0.1229 g		0.000259 %	8/22/2016 1:03 PM

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PSC Analytical Services
Hatfield PA

Coal/Refused Derived Fuel Proximate Analysis

ASTM D-3172-89 Proximate
ASTM D-3173-87 Moisture
ASTM D-3174-97 Ash In Oil
ASTM D-3175-89A Volatile Matter

Control = 13.4%

Key		Calculation	Workorder/smp: R1608004H-8A Date: 8-22-16	Workorder/smp: R1608004H-18A Date:	Workorder/smp: R1608004H-20A Date:	Workorder/smp: Date:	Workorder/smp: Date:
A	**% Air-dry loss**	***					
B	Weight of Crucible and Sample(g)		51.06	43.38	44.10		
C	Weight of Crucible(g)		22.2397	19.8339	17.6403		
D	Weight of Sample(g)	B - C = D	20.9527	18.6513	16.1607		
E	Weight of Crucible and Sample(g)	See "B"					
F	Weight(g) after 60 min.at 105 °C						
G	Weight loss (moisture) (g)	E - F = G					
H	**% Residual Moisture**	G/D x 100 = A					
I	Weight of Crucible and Sample(g)						
J	Weight of Crucible(g)						
K	Weight of Sample(g)	I - J = K					
L	Weight of Crucible and Sample(g)	See "I"					
M	Weight(g) after 7 min. at 950 °C						
N	Weight loss (g) at 950 °C	L - M = N					
O	% Loss at 950 °C	N/K x 100 = O					
P	% Residual Moisture	See "H"					
Q	**% Volatile Matter**	O - P = Q					
R	Weight (g) after 4-6 hours at 750 °C		20.9520	18.6502	16.1600		
S	Weight of Crucible(g)		20.9527	18.6513	16.1607		
T	Weight of Ash (g)	R - S = T	—	—	—		
U	**% Ash**	T/D x 100 = U					
V	**% Sulfur ***	*	0.00122	0.00126	0.000740		
W	BTU per pound **	**	6575.5	4860.9	3942.1		
X	BTU sulfur correction **	**					
Y	**BTU per pound corrected ****	**					
Z	BTU per pound, Moisture Ash Free**	**					

*Analyzed on Sulfur Analyzer SR144 — See Sulfur Book
**Analyzed on LECO AE 350 — See BTU Book
***Weighed on Balance — See Moisture Book
Balance ID:Mettler AE100 — Serial # - H11823
Oven ID: Muffle Furnace — Serial # - Thermolyne 60-727

Analyst Signature: 84

Reviewer Signature: V. O'Neill 8/30/16

PSC Analytical Services
Hatfield PA

Coal/Refused Derived Fuel Proximate Analysis

ASTM D-3172-89 Proximate
ASTM D-3173-87 Moisture
ASTM D-3174-97 Ash In Oil
ASTM D-3175-89A Volatile Matter

DGP

Key		Calculation	Workorder/smp: R1608004H-14A Date: 8-22-16	Workorder/smp: R1608004H-16A Date:	Workorder/smp: R1608004H-24A Date:	Workorder/smp: R1608004H-2A Date:	Workorder/smp: R1608004H-2A Date:
A	**% Air-dry loss**	***					
B	Weight of Crucible and Sample(g)		44.44	52.69	52.89	40.46	~~40.46~~
C	Weight of Crucible(g)		16.2199	26.5093	24.8406	20.8102	23.2998
D	Weight of Sample(g)	B - C = D	15.1860	25.4547	23.8777	19.7668	22.1452
E	Weight of Crucible and Sample(g)	See "B"	1.0339				
F	Weight(g) after 60 min.at 105 ^{0} C						
G	Weight loss (moisture) (g)	E - F = G					
H	**% Residual Moisture**	G/D x 100 = A					
I	Weight of Crucible and Sample(g)						
J	Weight of Crucible(g)						
K	Weight of Sample(g)	I - J = K					
L	Weight of Crucible and Sample(g)	See "I"					
M	Weight(g) after 7 min. at 950 ^{0}C						
N	Weight loss (g) at 950 ^{0} C	L - M = N					
O	% Loss at 950 ^{0} C	N/K x 100 = O					
P	% Residual Moisture	See "H"					
Q	**% Volatile Matter**	O - P = Q					
R	Weight (g) after 4-6 hours at 750 ^{0} C		15.1863	25.4539	23.8757	19.7660	22.1441
S	Weight of Crucible(g)		15.1860	25.4547	23.8777	19.7668	22.1452
T	Weight of Ash (g)	R - S = T	0.0003	—	—	—	—
U	**% Ash**	T/D x 100 = U	0.03				
V	**% Sulfur ***	*	—	—	—	20.01	—
W	BTU per pound **	**	—	—	—	5883.5	—
X	BTU sulfur correction **	**					
Y	**BTU per pound corrected ****	**					
Z	BTU per pound, Moisture Ash Free**	**					

*Analyzed on Sulfur Analyzer SR144 — See Sulfur Book
**Analyzed on LECO AE 350 — See BTU Book
***Weighed on Balance — See Moisture Book
Balance ID:Mettler AE100 — Serial # - H11823
Oven ID: Muffle Furnace — Serial # - Thermolyne 60-727

Analyst Signature: 85

Reviewer Signature: V. O'Neill 8/30/16

PSC Analytical Services,
Reading, PA

Ash in Oil Log

Date	Workorder	Sample #	Method	A: Weight of Crucible(g)	B: Weight of Crucible + Sample(g)	C: Weight of Sample(g)	D: Weight of Crucible + Ash(g)	E: Weight of Ash(g)	F: % Ash	Analyst
8-19-16	R16080032	1A		70.1416	80.7636		70.1255	—	<0.01	
		2A		57.3130	67.8926	10.5796	57.5231	0.2101	1.99	
		DUP		61.8947	72.9895	11.0948	62.1051	0.2104	1.90	1.95
8-22-16	R16080044	1A	ALS	66.2635	77.4200	11.1565	66.2265	-0.037	<0.01	
		DUP		62.8910	73.6353	10.7443	62.8991	0.0081	0.08	0.04
		7A		61.4109	71.9782	10.5673	61.4121	0.0012	0.01	
		17A		60.8338	71.6736	10.8398	60.8358	0.0020	0.02	
		19A		63.5410	73.3252	9.7842	63.5425	0.0015	0.02	
		5A		60.2612	70.2946	10.0334	60.2628	0.0016	0.02	
		DUP		64.1032	74.6391	10.5359	64.1046	0.0014	0.01	0.02
		13A		61.9164	72.4516	10.5352	61.8983	~~<0.01~~	<0.01	
		15A		57.5254	67.8045	10.2791	57.5262	0.0008	0.08	
		23A		63.0149	73.7193	—	63.0143	—	<0.01	
8-23-16	R16080048	1A		70.1027	80.1308		70.0942	—	<0.01	
		2A		57.4844	68.3570	10.8726	57.7065	0.2221	2.04	
		DUP		55.5201	66.2867	10.7666	55.7812	0.2611	2.43	2.24
	R16080065	1A		62.1160	72.1492	10.0332	62.0389	—	<0.01	
		2A		66.1758	75.5278	9.3520	66.1729	—	<0.01	
		3A		61.9000	72.6549	10.7549	61.9092	0.0092	0.09	

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8-22-16 ALS Density/Gravity

R1680044-2A

Mass = 8.3285 g

Volume = 10ml

Density = 0.83 g/ml

Average = 0.87 g/ml → 7.26 lb/gal

R1680044-2A DUP

Mass = 9.0874 g

Volume = 10 ml

Density = 0.91 g/ml → 7.59 lb/gal

R1680044-8A

Mass = 8.4911 g

Volume = 10 ml

Density = 0.85 g/ml → 7.09 lb/gal

R1680044-18A

Mass = 8.2370 g

Volume = 10 ml

Density = 0.82 g/ml → 6.84 lb/gal

R1680044-20A

Mass = 8.5771 g

Volume = 10 ml

Density = 0.86 g/ml → 7.12 lb/gal

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Date of report: 8/22/2016 2:53 PM
User ID: Vaughan O'Neill

Run Details					Results			Elemental Ratio
Run	Run #	Weight	Created on	User ID	Carbon	Hydrogen	Nitrogen	C/N
BLANK	3		8/22/2016 12:26:10 PM	Voneill	1	361	-28	
BLANK	4		8/22/2016 12:31:31 PM	Voneill	-5	304	-42	
K1	5	2.777	8/22/2016 12:36:53 PM	Voneill	18.967	53.430	6.670	
BLANK	6		8/22/2016 12:42:15 PM	Voneill	5	418	-39	
K2	7	2.721	8/22/2016 12:47:36 PM	Voneill	18.794	52.076	6.683	
BLANK	8		8/22/2016 12:52:58 PM	Voneill	10	397	-43	
BLANK	9		8/22/2016 12:58:20 PM	Voneill	-11	263	-44	
ACE	10	2.831	8/22/2016 1:03:41 PM	Voneill	71.06%	6.56%	10.39%	
080044 2A	11	3.586	8/22/2016 1:09:03 PM	Voneill	33.50%	3.21%	25.64%	
080044 2A2	12	3.314	8/22/2016 1:14:25 PM	Voneill	31.64% 32.57	3.19% 3.20	27.88% 26.76	
080044 8A	13	3.050	8/22/2016 1:19:46 PM	Voneill	34.50%	3.05%	24.07%	
080044 18A	14	3.375	8/22/2016 1:25:08 PM	Voneill	33.84%	3.09%	24.68%	
080044 20A	15	3.664	8/22/2016 1:30:30 PM	Voneill	32.46%	3.15%	26.52%	
080044 1A	18	4.010	8/22/2016 1:48:43 PM	Voneill	0.68%	11.45%	0.99%	
080044 1A2	19	3.065	8/22/2016 1:55:32 PM	Voneill	0.57% 0.63	11.28% 11.37	0.97% 0.98	
080044 7A	20	2.905	8/22/2016 2:02:55 PM	Voneill	0.61% ~~0.63~~	11.25% ~~11.27~~	0.96% ~~0.97~~	
080044 7A2	21	2.530	8/22/2016 2:09:42 PM	Voneill	0.66% 0.64	11.09% 11.17	1.0% 0.98	
080044 17A	22	2.977	8/22/2016 2:21:45 PM	Voneill	0.53%	11.06%	0.93%	
080044 17A2	23	3.075	8/22/2016 2:28:29 PM	Voneill	0.52% 0.53	11.05% 11.06	0.95% 0.94	
080044 19A	24	3.148	8/22/2016 2:35:34 PM	Voneill	0.56%	11.26%	0.93%	
080044 19A2	25	3.310	8/22/2016 2:41:58 PM	Voneill	0.53% 0.55	11.32% 11.29	0.93% 0.93	
BLANK	26		8/22/2016 2:47:19 PM	Voneill	21	567	-37	
BLANK	27		8/22/2016 2:52:42 PM	Voneill	-3	319	-46	

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	R16080044							
	1A	7A	17A	19A	5A	13A	15A	23A
Carbon	0.63	0.64	0.53	0.55	-	-	-	-
Hydrogen	11.37	11.17	11.06	11.29	-	-	-	-
Nitrogen	0.98	0.98	0.94	0.93	-	-	-	-
Ash	0.04	0.01	0.02	0.02	0.02	<0.01	0.01	<0.01
Sulfur	0.00	0.00	0.00	0.00	-	-	-	-
total	13.02	12.80	12.55	12.79	0.02	0.00	0.01	0.00
oxy diff	86.98	87.20	87.45	87.21	99.98	100.00	99.99	100.00
Cl	-	-	-	-	-	-	-	-
density	8.48	8.48	8.44	8.48	-	-	-	-
hv/lb	33.52	25.26	79.61	45.41	-	-	-	-
hv corr.	33.51	25.25	79.62	45.41	#VALUE!	#VALUE!	#VALUE!	#VALUE!
hv/gal	*284.07*	*214.24*	*671.64*	*384.94*	*#VALUE!*	*#VALUE!*	*#VALUE!*	*#VALUE!*
LHV	-1003.78	-993.79	-929.39	-984.58	#VALUE!	#VALUE!	#VALUE!	#VALUE!
kf	-	-	-	-	-	-	-	-
water diss.	-	-	-	-	-	-	-	-
FLASH POINT	-	-	-	-	-	-	-	-

Stericycle Environmental Solutions

Date: *31-Aug-16*

CLIENT: ALS
Project: Picatinny Arsenal
Lab Order: R16080026

CASE NARRATIVE

Project R16080012 & R16080044 :Due to the composition of the sample not all of the moisture was extracted from the sample which cause
The results to be lower than expected.

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