DAQC-1495-14
Site ID 10142 (B4)

MEMORANDUM

To: **STACK TEST FILE – STERICYCLE, INC.**

Through: Harold Burge, Major Source Compliance Section Manager

From: Rob Leishman, Environmental Scientist

Date: 12/30/2014

Subject:

Company:	Stericycle, Inc.
Location:	90 North 1100 West, North Salt Lake, Davis County, Utah
Contact:	Jay Vance, 801-936-1260
Tester:	TRC
Source:	Incinerator Stack
Airs #:	011-00055
Permit#	Title V Operating Permit 1100055002 dated 2/19/2009 Approval Order (AO) DAQE-AN101420011-14 dated 8/12/2014
Action Code:	3A
Subject:	Review of Stack Test Report dated 11/26/2014

On 11/26/2014, DAQ received a test report for the Stericycle incinerator stack in North Salt Lake. Testing was performed on 9/30-10/1/2014, to demonstrate compliance with the particulate matter, PCDD/PCDF, Pb, Cd, Hg, HCl, CO, NO_X and SO_2 emission limits found in Title V Operating Permit 1100055002 dated 2/19/2009, Condition II.B.3.c (a) and AO dated 8/12/2014 Condition II.B.1.e. The DAQ-calculated test results are:

Source	Test Date	Pollutant	Result	Limits
Medical Waste Incinerator Stack	9/30-10/1/2014	NO_X	116 ppmdv @ 7% O_2	250 ppmdv @ 7% O_2 *140 ppmdv @ 7% O_2
		CO	0 ppmdv @ 7% O_2	40 ppmdv @ 7% O_2 *11 ppmdv @ 7% O_2
		SO_2	0.0 ppmdv @ 7% O_2	55 ppmdv @ 7% O_2 *9.0 ppmdv @ 7% O_2
		PCDD/PCDF	0.2 gr/bill. dscf @7% O_2	55 gr/bill. dscf@7% O_2 *4.1 gr/bill. dscf@7% O_2
			0.4 ng/dscm @7% O_2	125 ng/dscm @7% O_2 *9.3 ng/dscm @7% O_2
		Pb	0.00 gr/Mdscf @7% O_2	0.52 gr/Mdscf @7% O_2 *0.016 gr/Mdscf @7% O_2
			0.00 mg/dscm @ 7% O_2	1.2 mg/dscm @ 7% O_2 *0.036 mg/dscm @ 7% O_2

Document Date 12/30/2014
DAQ-2014-017233

Cd	0.00 gr/Mdscf @7% O_2	0.07 gr/Mdscf @7% O_2 *0.0040 gr/Mdscf @7% O_2
	0.00 mg/dscm @ 7% O_2	0.16 mg/dscm @ 7% O_2 *0.040 mg/dscm @ 7% O_2
Hg	0.00 gr/Mdscf @7% O_2	0.24 gr/Mdscf @7% O_2 *0.0079 gr/Mdscf @7% O_2
	0.00 mg/dscm @ 7% O_2	0.55 mg/dscm @ 7% O_2 *0.018 mg/dscm @ 7% O_2
PM	4 mg/dscm @ 7% O_2	34 mg/dscm @ 7% O_2 *25 mg/dscm @ 7% O_2
	0.002 gr/dscf @7% O_2	0.015 gr/dscf @7% O_2 *0.011 gr/dscf @7% O_2
HCl	0 ppmdv @ 7% O_2	100 ppmdv @ 7% O_2 *6.6 ppmdv @ 7% O_2

*Note: These emission limits noted are listed in the AO dated 8/12/2014 Condition II.B.1.e and are applicable after 10/6/2014.

TESTING PARAMETERS: Plant operating parameters were reported as follows at the time of the test:

Parameter	**Test Value**	**Calc. Max/Min**
Max Charge Rate	1799 lb/hr	1956.9 lb/hr
Max Fabric Filter Inlet Temp	334.68 °F	368.1 °F
Max Flue Gas Temp	138 °F	151.8 °F
Min Secondary Chamber Temp	1996.34 °F	1796.7 °F
Min PCDD/PCDF Sorbent Flow	3.1 lb/hr	2.8 lb/hr
Min HCl Sorbent Flow	61.22 lb/hr	55.1 lb/hr
Min Hg Sorbent Flow	3.1 lb/hr	2.8 lb/hr
Min Wet Scrubber Pressure Drop	3.33 in H2O	3.0 in H20
Min Scrubber Liquor pH	5.46	4.91
Min Scrubber Liquor Rate	146.9 gpm	132.21 gpm
Min NH3 Flow Rate	1.0 gph	0.90 gph
Min Urea Flow Rate	1.01 gph	0.91 gph

DEVIATIONS: None noted.

CONCLUSION: In compliance with both existing and new emission limits at the time of testing.

RECOMMENDATION: No further action is necessary.

HPV: No compliance action is recommended.

Division of Air Quality

Instrumental Reference Methods - Gaseous Measurements

Reference Methods 2, 3A, 6C, 7E, 10, & 19

Source Information

Company Name	**Stericycle**
Company Contact:	**Jay Vance**
Contact Phone No.	**801-936-1260**
Stack Designation:	**HMIWI Stack**

CO2 Interferece w/CO
☐ Yes
Wet CEM
☐ Yes
Correct For O2

Test & Review Dates

Test Date:	**10/1/2014**	High Flow Test Date:	1/0/1900
Review Date:	12/24/2014	Mid Flow Test Date:	1/0/1900
Observer:	Rob Leishman	Low Flow Test Date:	1/0/1900
Reviewer:	**ROB LEISHMAN**		

	Emission Limits			Emission Rates		
	SO_2	NO_X	CO	SO2	NOX	CO
lbs/MMBtu						
lbs/hr						
ppm	55.0	250.0	40.0	1.773	115.557	0.197
Percent						
%O2 Correction as a whole #	**7.00**	**7.00**	**7.00**			

Test Information

Stack I.D. inches	As ft^2	Y	Dl H @	Cp	Pbar	Pq (static)
24.50	3.27	0.9820	1.664	0.84	25.34	-0.15

Round

Heat Input

fuel flow rate (Btu/hr)	Heat Input (Btu/hr.)
0.306	

Contractor Information

Contact:	Ralph B. Johnson, III
Contracting Company:	TRC Environmental Corp.
Address:	87 S. Orange, SLC, Ut. 84116
Phone No.:	801-363-7566
Project No.:	

☑ F factor used

8710

Diluent
- ○ O2
- ○ CO2

Method 19 - F factors for Coal, Oil, and Gas

		Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL	Anthracite	○ 10100	○ 10540	○ 1970
	Bituminous	○ 9780	○ 10640	○ 1800
	Lignite	○ 9860	○ 11950	○ 1910
OIL		○ 9190	○ 320	○ 1420
GAS	Natural	◉ 8710	○ 10610	○ 1040
	Propan	○ 8710	○ 10200	○ 1190
	Butane	○ 8710	○ 10390	○ 1250

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Division of Air Quality

NSPS Relative Accuracy Performance Specification Test - CEMS C

Stericycle

HMIWI Stack

lbs/MMBTU
- O2
- CO2
- Clear

Average Emission

Dry	SO_2	NO_X	CO
lbs/Mbtu	0.004	0.181	0.000
lbs/hr			
ppm	1.77	115.56	0.20
ppm corrected for %O2			

Average % concentration

CO_2	O_2
7.80	11.06

Run 1

Dry	SO_2	NO_X	CO	CO_2	O_2	Enter O2 or CO2 / O2
Atomic Weight	64	46	28			
lbs/MMBtu (O2)	-6.07E-03	2.60E-01	-1.33E-04			E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft	-3.324E-07	1.421E-05	-7.271E-09			
lbs/hr	-0.091	3.878	-0.002	7.81	10.94	C For Cal Drift
ppm corrected for %O	-2.79	166.04	-0.14	7.75	10.89	Raw Value

Run 2

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)	-4.25E-03	1.33E-01	-2.66E-04			E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft	-2.327E-07	7.286E-06	-1.454E-08			
lbs/hr	-0.05797	1.81542	-0.00362	7.88	10.94	C For Cal Drift
ppm corrected for %O	-1.95	85.09	-0.28	7.69	10.89	Raw Value

Run 3

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)	-1.26E-03	1.49E-01	9.65E-04			E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft	-6.648E-08	7.884E-06	5.090E-08			
lbs/hr	-0.017806	2.111720	0.013633	7.71	11.30	C For Cal Drift
ppm corrected for %O	-0.58	95.54	1.013	7.51	11.36	Raw Value

Run 4

Dry	SO_2	NO_X	CO	CO_2	O_2	
Atomic Weight	64	46	28			
lbs/MMBtu (O2)						E=Cd x Fd x (20.9/(20.9-%O2d))
lbs/MMBtu (CO2)						E=Cd x Fc x (100 / % CO2d)
lbs/cu.ft						
lbs/hr						C For Cal Drift
ppm corrected for %O				0.00	0.00	Raw Value

Calibration Error Test

Test Date October 1, 2014			O_2				
		CS - Cal. Span	19.41				
		Units	%				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	0.00	0.04	0.04	0.21%	Passed Cal.
		Mid-level	9.79	9.77	0.01	0.07%	Passed Cal.
		High-level	19.41	19.36	0.05	0.24%	Passed Cal.
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of CS - Cal. Span		Low-Level	0.00%				
40 to 60% of Cal. Span		Mid-level	50.42%				
100% of Cal. Span		High-level	100.00%				

Test Date October 1, 2014			CO_2				
		CS - Cal. Span	19.96				
		Units	%				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	0.00	0.15	0.15	0.762%	Passed Cal.
		Mid-level	10.15	10.02	0.13	0.641%	Passed Cal.
		High-level	19.96	19.82	0.14	0.706%	Passed Cal.
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level	0.00%				
40 to 60% of Cal. Span		Mid-level	50.85%				
100% of Cal. Span		High-level	100.00%				

Test Date October 1, 2014			SO2				
		CS - Cal. Span	99.22				
		Units	ppm				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	0.00	0.53	0.53	0.537%	Passed Cal.
		Mid-level	51.29	50.55	0.74	0.746%	Passed Cal.
		High-level	99.22	97.68	1.54	1.553%	Passed Cal.
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level	0.00%				
40 to 60% of Cal. Span		Mid-level	51.69%				
100% of Cal. Span		High-level	100.00%				

Test Date October 1, 2014			NOx				
		CS - Cal. Span	201.50				
		Units	ppm				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	0.00	-0.32	0.32	0.159%	Passed Cal.
		Mid-level	97.10	98.91	1.81	0.898%	Passed Cal.
		High-level	201.50	199.23	2.27	1.127%	Passed Cal.
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level	0.00%				
40 to 60% of Cal. Span		Mid-level	48.19%				
100% of Cal. Span		High-level	100.00%				

Test Date October 1, 2014			CO				
		CS - Cal. Span	101.00				
40		Units	ppm				
Cylinder No.	**Expiration Date**	**Cal. Gas**	**C_V- Certified Concentration**	**C_{Dir} or C_S - Measured Concentration**	Difference	**ACE** Eq. 7E-1 Analyzer Cal. Error	**Status**
		Low-level	0.00	-0.40	0.40	0.396%	Passed Cal.
		Mid-level	50.09	50.96	0.87	0.861%	Passed Cal.
		High-level	101.00	101.76	0.76	0.752%	Passed Cal.
			% of Span	**Sec. 8.2.1 Cal Gas Verification**			
0 to 20% of Cal. Span		Low-Level	0.00%				
40 to 60% of Cal. Span		Mid-level	49.59%				
100% of Cal. Span		High-level	100.00%				

Division of Air Quality Stack Test Review of
Stericycle

	SO_2	NO_X	CO	CO_2	O_2	*HMIWI Stack*
CS Calibration Span	99.22	201.50	101.00	19.96	19.41	☐ CO Calibration Gas
Units	ppm	ppm	ppm	%	%	Unprotectec
CV - Cylinder Value:	SO_2	NO_X	CO	CO_2	O_2	
Low-Level	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
Mid-Level	**51.29**	**97.10**	**50.09**	**10.15**	**9.79**	
High-Level	**99.22**	**201.50**	**101.00**	**19.96**	**19.41**	
0 to 20% of Cal. Span	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	
40 to 60% of Cal. Span	**51.7%**	**48.2%**	**49.6%**	**50.9%**	**50.4%**	
100% of Cal. Span	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	

Cdir - Enter Actual Up-scale Cylinder Value Used To Correct Emission Concentration.

C_{Dir} C_{MA}	**51.29**	**97.10**	**50.09**	**10.15**	**9.79**

Calibration Error Test

Cs - Measured Concentration	SO_2	NO_X	CO	CO_2	O_2
Low-Level	**0.53**	**-0.32**	**-0.40**	**0.15**	**0.04**
Mid-Level	**50.55**	**98.91**	**50.96**	**10.02**	**9.77**
High-Level	**97.68**	**199.23**	**101.76**	**19.82**	**19.36**

Enter Up-scale Analyzer Response to be used during testing.

ACE Eq. 7E-1	**50.55**	**98.91**	**50.96**	**10.02**	**9.77**

NOTE
These cells sc appropriate (after the Cm entered.

If this scan is the Cma and gas value.

Low-Level	0.54%	0.16%	0.40%	0.76%	0.21%
ppmdv Difference	0.533	0.32	0.4	0.152	0.04
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
Mid-Level	0.75%	0.90%	0.86%	0.64%	0.07%
ppmdv Difference	0.74	1.81	0.87	0.128	0.013
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
High-Level	1.55%	1.13%	0.75%	0.71%	0.24%
ppmdv Difference	1.541	2.27	0.76	0.141	0.047
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

☐ Failed Cal Error Dialog

Pre-Test Sampling System Bias

Initial Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level	**0.53**	**-0.32**	**-0.40**	**0.15**	**0.04**
SBi - Zero Bias	0.00%	0.00%	0.00%	0.00%	0.00%
Difference	0	0	0	0	0
Pass or Failed Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas	**51.29**	**97.10**	**50.09**	**10.15**	**9.79**
SBi - Up-Scale Bias	0.75%	0.90%	0.86%	0.64%	0.07%
Difference	0.74	1.81	0.87	0.13	0.01
Pass or Failed Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span
☐ Failed Bias Dialog

Raw Test Data

Test Date: 10/1/2014

	SO_2	NO_X	CO	CO_2	O_2
	-1.0	**115.9**	**-0.10**	**7.8**	**10.9**
	1.0%	**57.5%**	**0.1%**	**38.8%**	**56.1%**

Time	Start	Stop
SO_2		0:21
NO_X	0:00	0:21
CO	0:00	0:21
CO_2/O_2	0:00	0:21

Post-Test System Bias 7E-2 SB=(Cs - Cdir)/CS x 100

Final Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level	1.22	0.12	0.20	0.20	0.70
SBi - Zero Bias	0.69%	0.22%	0.59%	0.24%	3.40%
Difference	**0.7**	**0.4**	**0.6**	**0.0**	**0.7**
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas	50.55	92.02	49.22	9.88	9.78
SBi - Up-Scale Bias	0.00%	3.42%	1.72%	0.71%	0.01%
Difference	0.0	6.9	1.7	0.1	0.0
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span
☑ Failed Bias Dialog

Calibration Drift % of Span - D=ABS(SBf - SBi)

Low-Level Drift	0.69%	0.22%	0.59%	0.24%	3.40%
Difference	0.7	0.4	0.6	0.0	0.7
Pass or Re-Calibrate	**Pass**	**Pass**	**Pass**	**Pass**	**Re-Cal.**
Up-scale Gas Drift	0.75%	2.52%	0.86%	0.07%	0.06%
Difference	**0.7**	**5.1**	**0.9**	**0.3**	**0.0**
Pass or Re-Calibrate	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**

Drift
3% of Span
☐ Failed Drift Dialog

Division of Air Quality Stack Test Review of
Stericycle

HMIWI Stack — **Flow & Moisture**

As ft^2	Pbar	Pq (static)	Ps	Avg Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	25.34	-0.15	25.33	149	7.81	10.94	81.25	29.69	27.52

Y	Cp	Vm cf	Vlc	A_{VG} Tm F	Vm std	Vw std	Bws	S Bws	0.2886
0.9820	0.84	53.335	209.80	81	43.248	9.875	0.1859	0.2886	0.999

AvgSqrtDlp	Vs	scfm wet	acfm	Qsd dscfh	Heat Input Btu/hr
0.5768	38.7	5,585	7,603	2.728E+5	

#1 - Times
Date

Load - Megawatts		
Low	Mid	High

Point No.	dl "p"	sqrt dl "p"	ts F	tm F (in)	tm F (out)	Cp *3D Probe*	Final Vf	Initial Vi	
1	0.250	0.50	147	80	80		209.8		209.8
2	0.300	0.55	148	80	80				0
3	0.220	0.47	146	80	80				0
4	0.200	0.45	148	80	80				0
5	0.220	0.47	148	80	80				0
6	0.250	0.50	150	80	80				
7	0.300	0.55	151	80	80				
8	0.360	0.60	151	81	81				
9	0.400	0.63	151	81	81				
10	0.220	0.47	151	81	81				
11	0.180	0.42	150	81	81				
12	0.300	0.55	**143**	81	81				
13	0.300	0.55	144	81	81				
14	0.360	0.60	144	81	81				
15	0.400	0.63	145	82	82				
16	0.420	0.65	149	82	82				
17	0.480	0.69	150	82	82				
18	**0.650**	0.81	150	82	82				
19	**0.600**	0.77	150	82	82				
20	0.500	0.71	150	83	83				
21	0.400	0.63	150	83	83				
22	0.360	0.60	150	83	83				
23	0.300	0.55	150	83	83				
24	0.250	0.50	149	83	83				

Division of Air Quality Stack Test Review of
Stericycle

	SO_2	NO_X	CO	CO_2	O_2	*HMIWI Stack*
CS Calibration Span	99.22	201.50	101.00	19.96	19.41	
Units	ppm	ppm	ppm	%	%	
CV - Cylinder Value:	SO_2	NO_X	CO	CO_2	O_2	
Low-Level	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
Mid-Level	**51.29**	**97.10**	**50.09**	**10.15**	**9.79**	
High-Level	**99.22**	**201.50**	**101.00**	**19.96**	**19.41**	
0 to 20% of Cal. Span	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	
40 to 60% of Cal. Span	**51.7%**	**48.2%**	**49.6%**	**50.9%**	**50.4%**	
100% of Cal. Span	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	

Cdir - Enter Actual Up-scale Cylinder Value Used To Correct Emission Concentration.

C_{MA}	51.29	97.10	50.09	10.15	9.79

Calibration Error Test

Measured Concentration	SO_2	NO_X	CO	CO_2	O_2
Low-Level	**0.53**	**-0.32**	**-0.40**	**0.15**	**0.04**
Mid-Level	**50.55**	**98.91**	**50.96**	**10.02**	**9.77**
High-Level	**97.68**	**199.23**	**101.76**	**19.82**	**19.36**

Enter Up-scale Analyzer Response to be used during testing.

ACE Eq. 7E-1	50.55	98.91	50.96	10.02	9.77
Low-Level	0.54%	0.16%	0.40%	0.76%	0.21%
ppmdv Difference	0.533	0.32	0.4	0.152	0.04
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
Mid-Level	0.75%	0.90%	0.86%	0.64%	0.07%
ppmdv Difference	0.74	1.81	0.87	0.128	0.013
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
High-Level	1.55%	1.13%	0.75%	0.71%	0.24%
ppmdv Difference	1.541	2.27	0.76	0.141	0.047
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

☐ Failed Cal Error Dialog

Pre-Test Sampling System Bias

Initial Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level	1.22	0.12	0.20	0.20	0.70
SBi - Zero Bias	0.69%	0.22%	0.59%	0.24%	3.40%
Difference	0.684	0.435	0.6	0.048	0.66
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas	50.55	92.02	49.22	9.88	9.78
SBi - Up-Scale Bias	0.00%	3.42%	1.72%	0.71%	0.01%
Difference	0	6.89	1.74	0.141	0.001
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Raw Test Data

Test Date: 10/1/2014

	SO_2	NO_X	CO	CO_2	O_2
	-0.6	**57.8**	**-0.2**	**7.7**	**10.9**
	0.6%	**28.7%**	**0.2%**	**38.5%**	**56.1%**

Time	Start	Stop
SO_2		0:21
NO_X	0:00	0:21
CO	0:00	0:21
CO_2/O_2	0:00	0:21

Post-Test System Bias 7E-2 SB=(Cs - Cdir)/CS x 100

Final Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level	0.19	-0.39	-0.58	0.05	0.18
SBi - Zero Bias	0.35%	0.03%	0.18%	0.52%	0.72%
Difference	**0.3**	**0.1**	**0.2**	**0.1**	**0.1**
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas	49.15	92.29	49.14	9.86	9.80
SBi - Up-Scale Bias	1.41%	3.29%	1.80%	0.82%	0.14%
Difference	1.4	6.6	1.8	0.2	0.0
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias.
± 5% of Span

☐ Failed Bias Dialog

Calibration Drift % of Span - D=ABS(SBf - SBi)

Low-Level Drift	0.34%	0.18%	0.42%	0.28%	2.68%
Difference	1.0	0.5	0.8	0.2	0.5
Pass or Re-Calibrate	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**
Up-scale Gas Drift	1.41%	0.13%	0.08%	0.12%	0.14%
Difference	**1.4**	**0.3**	**0.1**	**0.0**	**0.0**
Pass or Re-Calibrate	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**

Response Spec.
3% of Span

☐ Failed Drift Dialog

Division of Air Quality Stack Test Review of Stericycle

HMIWI Stack — **Flow & Moisture**

As ft^2	Pbar	Pq (static)	Ps	Avg Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	25.34	-0.15	25.33	150	7.88	10.94	81.18	29.70	27.31

Y	Cp	Vm cf	Vlc	A_{VG} Tm F	Vm std	Vw std	Bws	S Bws	0.2983
0.9820	0.84	49.801	220.10	81	40.379	10.360	0.2042	0.2983	0.999

AvgSqrtDlp	Vs	scfm wet	acfm	Qsd dscfh	Heat Input Btu/hr
0.5375	36.2	5,218	7,119	2.492E+5	

#1 - Times
Date

Load - Megawatts		
Low	Mid	High

Point No.	dl "p"	sqrt dl "p"	ts F	tm F (in)	tm F (out)	Cp *3D Probe*	Final Vf	Initial Vi	
1	0.250	0.50	144	81	81		220.1		220.1
2	0.300	0.55	148	81	81				0
3	0.250	0.50	149	81	81				0
4	0.320	0.57	153	81	81				0
5	0.400	0.63	153	81	81				0
6	**0.510**	0.71	153	81	81				
7	**0.550**	0.74	154	81	81				
8	0.300	0.55	154	81	81				
9	0.200	0.45	153	81	81				
10	0.300	0.55	152	81	81				
11	0.170	0.41	152	81	81				
12	0.170	0.41	152	81	81				
13	0.300	0.55	152	81	81				
14	0.170	0.41	145	81	81				
15	0.380	0.62	**142**	81	81				
16	0.250	0.50	146	82	82				
17	0.250	0.50	149	82	82				
18	0.450	0.67	149	82	82				
19	0.320	0.57	151	82	82				
20	0.200	0.45	152	82	82				
21	0.320	0.57	152	82	82				
22	0.200	0.45	149	82	82				
23	0.280	0.53	144	82	82				
24	0.280	0.53	149	82	82				

Division of Air Quality Stack Test Review of Stericycle

	SO_2	NO_X	CO	CO_2	O_2	*HMIWI Stack*
CS Calibration Span	99.22	201.50	101.00	19.96	19.41	
Units	ppm	ppm	ppm	%	%	
CV - Cylinder Value:	SO_2	NO_X	CO	CO_2	O_2	
Low-Level	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	
Mid-Level	**51.29**	**97.10**	**50.09**	**10.15**	**9.79**	
High-Level	**99.22**	**201.50**	**101.00**	**19.96**	**19.41**	
0 to 20% of Cal. Span	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	
40 to 60% of Cal. Span	**51.7%**	**48.2%**	**49.6%**	**50.9%**	**50.4%**	
100% of Cal. Span	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**	

Cdir - Enter Actual Up-scale Cylinder Value Used To Correct Emission Concentration.

C_{MA}	51.29	97.10	50.09	10.15	9.79

Calibration Error Test

Measured Concentration	SO_2	NO_X	CO	CO_2	O_2
Low-Level	**0.53**	**-0.32**	**-0.40**	**0.15**	**0.04**
Mid-Level	**50.55**	**98.91**	**50.96**	**10.02**	**9.77**
High-Level	**97.68**	**199.23**	**101.76**	**19.82**	**19.36**

Enter Up-scale Analyzer Response to be used during testing.

ACE Eq. 7E-1	50.55	98.91	50.96	10.02	9.77
Low-Level	0.54%	0.16%	0.40%	0.76%	0.21%
ppmv Difference	0.533	0.32	0.4	0.152	0.04
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
Mid-Level	0.75%	0.90%	0.86%	0.64%	0.07%
ppmv Difference	0.74	1.81	0.87	0.128	0.013
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
High-Level	1.55%	1.13%	0.75%	0.71%	0.24%
ppmv Difference	1.541	2.27	0.76	0.141	0.047
Status	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

☐ Failed Cal Error Dialog

Pre-Test Sampling System Bias

Initial Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level	0.19	-0.39	-0.58	0.05	0.18
SBi - Zero Bias	0.35%	0.03%	0.18%	0.52%	0.72%
Difference	0.346	0.07	0.18	0.103	0.139
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas	49.15	92.29	49.14	9.86	9.80
SBi - Up-Scale Bias	1.41%	3.29%	1.80%	0.82%	0.14%
Difference	1.399	6.62	1.82	0.164	0.028
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias. ± 5% of Span

☐ Failed Bias Dialog

Raw Test Data

Test Date: 10/1/2014

	SO_2	NO_X	CO	CO_2	O_2
	-0.5	**63.5**	**0.7**	**7.5**	**11.4**
	0.5%	**31.5%**	**0.7%**	**37.6%**	**58.5%**

Time	Start	Stop
SO_2		0:21
NO_X	0:00	0:21
CO	0:00	0:21
CO_2/O_2	0:00	0:21

Post-Test System Bias 7E-2 SB=(Cs - Cdir)/CS x 100

Final Values	SO_2	NO_X	CO	CO_2	O_2
C_O - Low-Level	-0.42	-0.42	-0.40	0.06	0.30
SBi - Zero Bias	0.96%	0.05%	0.00%	0.45%	1.32%
Difference	**0.9**	**0.1**	**0.0**	**0.1**	**0.3**
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**
C_M - Up-scale Gas	48.64	94.81	49.58	9.87	9.93
SBi - Up-Scale Bias	1.92%	2.03%	1.37%	0.79%	0.80%
Difference	1.9	4.1	1.4	0.2	0.2
Pass or Invalid Run	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**	**Passed Cal.**

System Bias. ± 5% of Span

☐ Failed Bias Dialog

Calibration Drift % of Span - D=ABS(SBf - SBi)

Low-Level Drift	0.61%	0.01%	0.18%	0.07%	0.61%
Difference	0.6	0.0	0.2	0.0	0.1
Pass or Re-Calibrate	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**
Up-scale Gas Drift	0.51%	1.25%	0.44%	0.04%	0.66%
Difference	**0.5**	**2.5**	**0.4**	**0.0**	**0.1**
Pass or Re-Calibrate	**Pass**	**Pass**	**Pass**	**Pass**	**Pass**

Response Spec. **3% of Span**

☐ Failed Drift Dialog

Division of Air Quality Stack Test Review of Stericycle

HMIWI Stack — **Flow & Moisture**

As ft^2	Pbar	Pq (static)	Ps	Avg Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	25.34	-0.15	25.33	150	7.71	11.30	80.99	29.69	27.26

Y	Cp	Vm cf	Vlc	A_{VG} Tm F	Vm std	Vw std	Bws	S Bws	0.2965
0.9820	0.84	52.972	239.40	82	42.927	11.269	0.2079	0.2965	0.999

AvgSqrtDlp	Vs	scfm wet	acfm	Qsd dscfh	Heat Input Btu/hr
0.5799	39.1	5,636	7,687	2.679E+5	

Load - Megawatts

Low	Mid	High

#1 - Times
Date

Point No.	dl "p"	sqrt dl "p"	ts F	tm F (in)	tm F (out)	Cp *3D Probe*	Final Vf	Initial Vi	
1	0.230	0.48	144	81	81		239.4		239.4
2	0.230	0.48	**143**	81	81				0
3	0.300	0.55	144	81	81				0
4	0.270	0.52	145	81	81				0
5	0.270	0.52	150	81	81				0
6	0.380	0.62	152	81	81				
7	0.450	0.67	152	81	81				
8	0.450	0.67	152	81	81				
9	**0.550**	0.74	152	82	82				
10	0.500	0.71	152	82	82				
11	0.380	0.62	152	82	82				
12	0.380	0.62	151	82	82				
13	0.320	0.57	**143**	82	82				
14	0.320	0.57	147	82	82				
15	0.350	0.59	150	82	82				
16	0.300	0.55	152	82	82				
17	0.300	0.55	153	82	82				
18	0.230	0.48	150	82	82				
19	0.450	0.67	152	82	82				
20	0.280	0.53	152	82	82				
21	0.320	0.57	151	82	82				
22	0.350	0.59	152	82	82				
23	0.300	0.55	150	82	82				
24	0.280	0.53	150	82	82				

Division of Air Quality
Compliance Demonstration
Method 23 - PCDD/PCDF

Source Information

Company Name	**Stericycle - Incinerator Stack**
Company Contact:	**Jay Vance**
Contact Phone No.	**801-936-1260**
Source Designation:	**Incinerator Stack**

Test & Review Dates

Test Date:	9/30-10/1/2014
Review Date:	12/19/2014
Observer:	**Rob Leishman**
Reviewer:	**Rob Leishman**

Tabs Are Shown

Particulate Emission Limits

lbs/MMBtu	lbs/hr	gr/dscf		
125.000	100.000	55.000		

Emission Rates corrected to 7% O2

gr/bill. Dscf	ng/dscm	gr/dscf		
0.1576	**0.3607**	**1.08E-10**		

Test Information

Stack_I.D._inches	As ft^2	Y	Dl H @	Cp	Pbar	Pq (static)	Dn
22.50	2.76	0.9820	1.664	0.84	25.27	-0.15	0.257

Round

Contractor Information

Contracting Company:	Air Pollution Testing (APT)
Contact:	Andrew Burning - Alex Mongold
Phone No.:	801-974-0481
Project No.:	

F factors for Coal, Oil, and Gas

	Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL			
Anthrocite 2	10100	10540	1970
Bituminous 2	9780	10640	1800
Lignite	9860	11950	1910
OIL	9190	320	1420
GAS			
Natural	8710	10610	1040
Propane	8710	10200	1190
Butane	8710	10390	1250

☐ F factor used

lbs/MMBtu

- O2
- CO2

Summary

Division of Air Quality

Compliance Demonstration of Reference Methods 23 - Total PCDD/PCDF Stericycle - Incinerator Stack

Testing Results				
Test Date	9/30-10/1/2014	9/30-10/1/2014	9/30-10/1/2014	9/30-10/1/2014
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	2.76	2.76	2.76	
Pbar	25.27	25.27	25.27	
Pq (static)	-0.15	-0.15	-0.15	
Ps	25.26	25.26	25.26	
Avg. Ts F	134.88	137.10	142.25	
CO2 - F_{CO2}	7.50	7.70	7.90	
O2	11.70	11.50	11.20	
N2+C	80.80	80.80	80.90	
Md	29.67	29.69	29.71	
Ms	27.29	27.19	27.68	
Y	0.98	0.98	0.98	
Cp	0.84	0.84	0.84	
Vm cf	174.59	164.58	189.65	
Vlc	808.70	777.40	700.60	
$A_{VG.}$ Tm F	73.29	78.83	70.83	
Vm std	143.87	134.18	157.16	
Vw std	38.07	36.59	32.98	
Bws	0.21	0.21	0.17	
S Bws	0.20	0.22	0.25	
Avg. Sqrt Dlp	0.66	0.64	0.54	
Vs	43.75	43.14	35.92	
scfm wet	5431.52	5334.79	4404.42	
acfm	7248.66	7146.25	5950.82	
Qsd dscfh	259340.75	251500.54	218431.99	
# Sample Points	8.00	8.00	8.00	
Dn	0.257	0.260	0.306	
An	3.60E-04	3.69E-04	5.11E-04	
Start Time				
End Time				
Total Test time	240.00	240.00	240.00	
Time @ point	5.00	5.00	5.00	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	6.5095E-10	
Run 2	0	6.9625E-10	
Run 3	0	1.76888E-09	
Run 4			

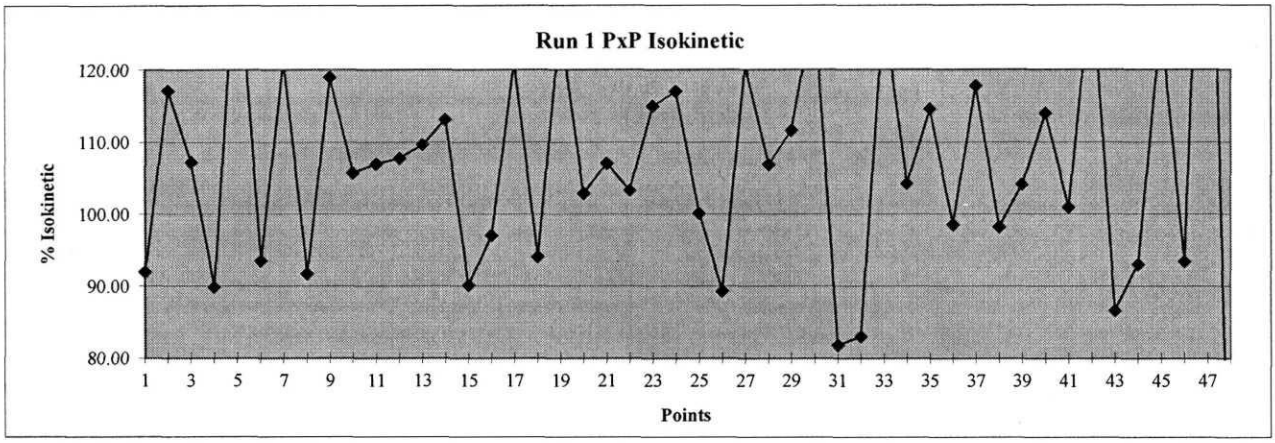
Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.00000000	0.00000000	0.000000000		0.00000000
ng/dscm	0.1598	0.1832	0.3975		0.2468
lbs/MMBtu					

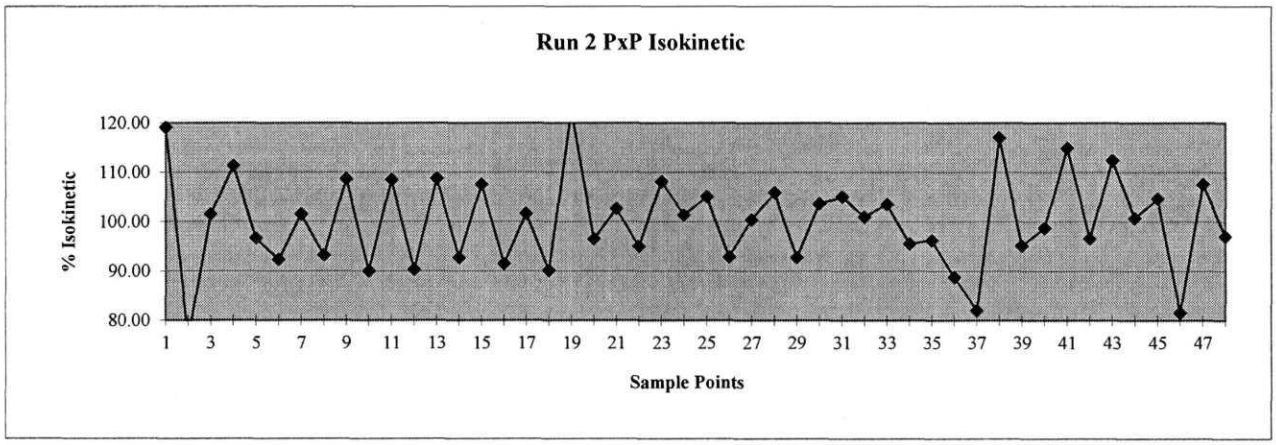
Final Total Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./billion dscf	0.0698	0.0801	0.1737		0.1079
gr/bill dscf @7% O	0.1055	0.1184	0.2489		0.1576
ng/dscm @7%O2	0.24	0.27	0.57		0.3607

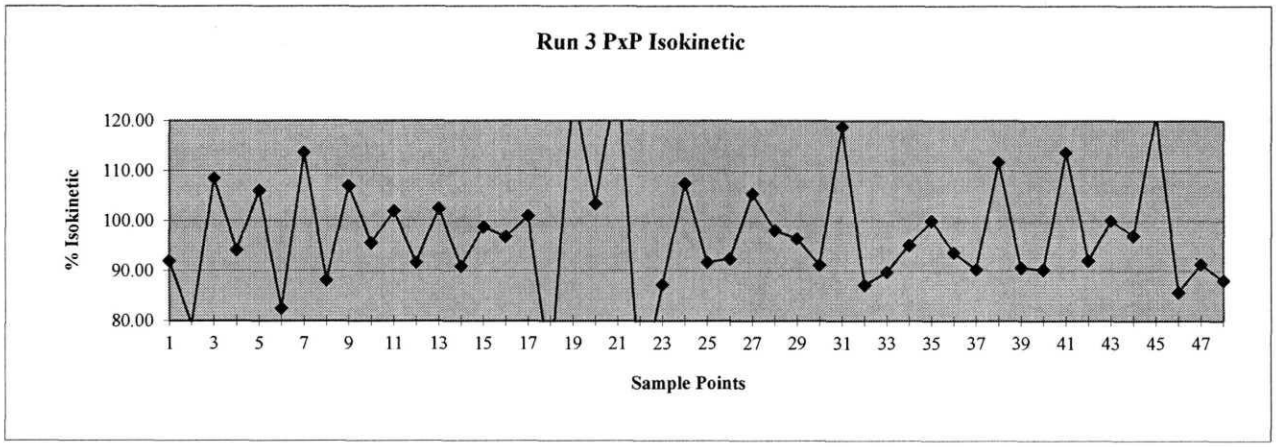
O2

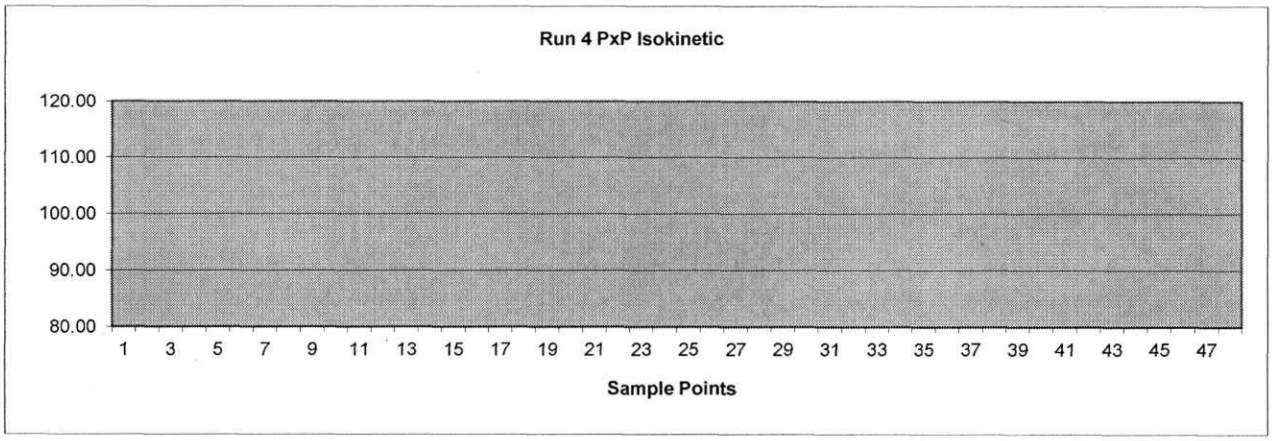
CO2

F factor used


Run 1 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Points


Run 2 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 3 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 4 PxP Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	9/30-10/1/2014	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
2.76	25.27	-0.15	25.26	135	7.50	11.70	80.80	29.67	27.29
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2042
0.9820	0.84	174.586	808.70	73.29	143.872	38.066	0.2092	0.2042	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.656	43.75	5,432	7,249	2.59E+05	8	0.257	240	5.00	1.359792
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	531.288	0.30	0.95	135	63	63
2	533.850	0.30	0.95	131	64	64
3	537.130	0.39	1.24	131	64	64
4	540.550	0.42	1.33	133	64	64
5	543.520	0.42	1.33	132	64	64
6	548.100	0.45	1.43	132	64	64
7	551.300	0.43	1.36	134	64	64
8	555.350	0.45	1.43	135	64	64
9	558.480	0.40	1.27	134	66	66
10	562.330	0.40	1.27	134	66	66
11	565.750	0.43	1.36	132	67	67
12	569.350	0.43	1.36	133	68	68
13	572.980	0.71	2.25	134	68	68
14	577.710	0.70	2.22	133	69	69
15	582.570	0.50	1.59	132	69	69
16	585.850	0.55	1.74	135	70	70
17	589.550	0.45	1.43	134	72	72
18	593.750	0.39	1.24	135	71	71
19	596.780	0.39	1.24	136	73	73
20	600.860	0.45	1.43	135	71	71
21	604.420	0.45	1.43	135	72	72
22	608.130	0.37	1.17	135	72	72
23	611.380	0.37	1.17	136	73	73
24	615.000	0.35	1.11	138	73	73
25	618.578	0.43	1.36	134	73	73
26	621.980	0.37	1.17	133	77	77
27	624.820	0.30	0.95	132	77	77
28	628.280	0.30	0.95	134	77	77
29	631.340	0.32	1.01	133	78	78
30	634.650	0.40	1.27	135	77	77
31	638.900	0.40	1.27	135	77	77
32	641.600	0.45	0.43	138	78	78
33	644.510	0.50	1.59	139	78	78
34	649.240	0.50	1.59	135	78	78
35	653.090	0.45	1.43	136	79	79
36	657.110	0.37	1.17	135	79	79
37	660.250	0.37	1.17	136	79	79
38	664.000	0.55	1.74	138	79	79
39	667.800	0.75	2.38	137	79	79
40	672.500	0.60	1.90	136	80	80
41	677.120	0.60	1.90	136	81	81
42	681.220	0.40	1.27	139	80	80
43	685.610	0.45	1.43	138	80	80
44	688.650	0.45	1.43	136	80	80
45	691.920	0.40	1.27	136	81	81
46	696.120	0.37	1.17	136	80	80
47	699.100	0.35	1.11	137	80	80
48	704.500	0.32	1.01	136	80	80
	705.874					

Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
808.7		808.7
		0.0
		0.0
		0.0
		0.0

Isokinetics	107.0	
Test Date	9/30-10/1/2014	
Start Time	enter	enter
End Time	enter	

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
2.76	25.27	-0.15	25.26	137	7.70	11.50	80.80	29.69	27.19
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2164
0.9820	0.84	164.581	777.40	79	134.180	36.592	0.2143	0.2164	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.644	43.14	5,335	7,146	2.52E+05	8	0.26	240	5.00	1.23
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	706.250	0.50	1.59	135.0	77.0	77.0
2	710.720	0.45	1.47	134.0	77.0	77.0
3	713.440	0.35	1.02	133.0	77.0	77.0
4	716.640	0.35	1.02	135.0	78.0	78.0
5	720.150	0.40	1.16	135.0	77.0	77.0
6	723.400	0.40	1.16	136.0	77.0	77.0
7	726.500	0.42	1.22	136.0	78.0	78.0
8	730.000	0.45	1.31	138.0	78.0	78.0
9	733.320	0.52	1.51	138.0	78.0	78.0
10	737.480	0.52	1.51	139.0	79.0	79.0
11	740.930	0.60	1.74	137.0	79.0	79.0
12	745.400	0.48	1.39	137.0	79.0	79.0
13	748.730	0.42	1.22	138.0	79.0	79.0
14	752.480	0.35	1.02	138.0	79.0	79.0
15	755.400	0.40	1.16	138.0	80.0	80.0
16	759.030	0.70	2.03	138.0	81.0	81.0
17	763.110	0.60	1.74	139.0	80.0	80.0
18	767.300	0.40	1.16	137.0	80.0	80.0
19	770.340	0.35	1.02	137.0	80.0	80.0
20	774.210	0.28	0.84	136.0	80.0	80.0
21	776.940	0.28	0.84	136.0	81.0	81.0
22	779.850	0.32	0.93	137.0	80.0	80.0
23	782.720	0.32	0.93	136.0	80.0	80.0
24	785.990	0.35	1.02	137.0	80.0	80.0
25	789.192	0.29	0.81	135.0	80.0	80.0
26	792.220	0.32	0.93	135.0	80.0	80.0
27	795.030	0.35	1.02	136.0	79.0	79.0
28	798.200	0.35	1.02	135.0	80.0	80.0
29	801.550	0.38	1.10	136.0	79.0	79.0
30	804.600	0.38	1.10	138.0	79.0	79.0
31	808.000	0.42	1.22	139.0	79.0	79.0
32	811.620	0.42	1.22	139.0	79.0	79.0
33	815.100	0.40	1.16	137.0	79.0	79.0
34	818.590	0.42	1.22	140.0	79.0	79.0
35	821.880	0.50	1.45	139.0	78.0	78.0
36	825.490	0.55	1.60	139.0	78.0	78.0
37	828.980	0.55	1.60	139.0	77.0	77.0
38	832.200	0.60	1.74	140.0	78.0	78.0
39	837.000	0.58	1.68	139.0	78.0	78.0
40	840.840	0.50	1.45	139.0	79.0	79.0
41	844.550	0.38	1.10	138.0	79.0	79.0
42	848.320	0.35	1.02	137.0	78.0	78.0
43	851.360	0.35	1.02	136.0	78.0	78.0
44	854.900	0.32	0.93	136.0	79.0	79.0
45	857.940	0.39	1.13	137.0	80.0	80.0
46	861.430	0.39	1.13	138.0	79.0	79.0
47	864.140	0.35	1.02	136.0	78.0	78.0
48	867.530	0.41	1.19	138.0	78.0	78.0
	870.831					

Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
777.40		777.4
		0.0
		0.0
		0.0
		0.0

Isokinetics	99.9
Test Date	9/30-10/1/2014
Start Time	enter
End Time	enter

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
2.76	25.27	-0.15	25.26	142	7.90	11.20	80.90	29.71	27.68
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2470
0.9820	0.84	189.653	700.60	71	157.163	32.977	0.1734	0.2470	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.539	35.92	4,404	5,951	2.18E+05	8	0.306	240	5.00	1.69
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	873.272	0.15	0.86	138	61	61
2	875.920	0.15	0.86	131	61	61
3	878.220	0.19	1.08	133	61	61
4	881.750	0.19	1.08	133	62	62
5	884.820	0.17	0.97	133	62	62
6	888.090	0.25	1.43	141	62	62
7	891.150	0.17	0.97	141	63	63
8	894.640	0.19	1.08	143	64	64
9	897.500	0.25	1.43	142	64	64
10	901.480	0.30	1.71	142	65	65
11	905.380	0.30	1.71	142	65	65
12	909.540	0.33	1.88	141	67	67
13	913.480	0.35	2.00	140	65	65
14	918.000	0.40	2.28	140	67	67
15	922.300	0.60	3.42	141	67	67
16	928.000	0.45	2.57	143	68	68
17	932.850	0.35	2.00	143	68	68
18	937.320	0.30	1.71	144	68	68
19	940.180	0.30	1.71	145	69	69
20	945.350	0.30	1.71	145	70	70
21	949.600	0.28	1.60	145	70	70
22	954.750	0.25	1.43	143	70	70
23	957.250	0.25	1.43	143	70	70
24	960.530	0.28	1.60	144	70	70
25	964.800	0.30	1.71	140	72	72
26	968.600	0.32	1.82	141	72	72
27	972.550	0.32	1.82	142	72	72
28	977.050	0.28	1.60	141	73	73
29	980.980	0.28	1.60	140	73	73
30	984.850	0.35	2.00	140	74	74
31	988.940	0.35	2.00	142	76	76
32	994.280	0.32	1.82	142	76	76
33	998.030	0.40	2.28	142	76	76
34	1002.340	0.40	2.28	143	75	75
35	1006.900	0.42	2.39	142	76	76
36	1011.820	0.42	2.39	144	76	76
37	1016.420	0.32	1.82	143	77	77
38	1020.310	0.32	1.82	146	77	77
39	1025.110	0.35	2.00	146	77	77
40	1029.180	0.35	2.00	146	77	77
41	1033.230	0.28	1.60	146	77	77
42	1037.800	0.25	1.43	146	77	77
43	1041.300	0.25	1.43	146	78	78
44	1045.110	0.19	1.08	148	78	78
45	1048.330	0.19	1.08	149	78	78
46	1052.350	0.19	1.08	146	78	78
47	1055.200	0.32	1.82	146	78	78
48	1059.130	0.32	1.82	145	78	78
	1062.925					

Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
700.6		700.6
		0.0
		0.0
		0.0
		0.0

Isokinetics	97.3
Test Date	9/30-10/1/2014
Start Time	enter
End Time	enter

Division of Air Quality
Compliance Demonstration
Method 29- Cadmium (Cd)

Source Information

Company Name	**Stericycle - Incinerator Stack**
Company Contact:	**Jay Vance**
Contact Phone No.	**801-936-1260**
Source Designation:	**Incinerator Stack**

Test & Review Dates

Test Date:	9/30/2014	
Review Date:	12/15/2014	Tabs Are Shown
Observer:	**Rob Leishman**	
Reviewer:	**Rob Leishman**	

Particulate Emission Limits

lbs/MMBtu	lbs/hr	gr/dscf		
	1.200	0.520		

Emission Rates - "Front Half"

lbs/MMBtu	**lbs/hr**	**gr/dscf**		
	0.0000	**0.0000**		

Test Information

Stack_I.D._inches	**As ft^2**	Y	Dl H @	Cp	Pbar	Pq (static)	**Dn**
24.50	3.27	0.9926	1.604	0.84	25.27	-0.15	0.256

Round

Contractor Information

Contracting Company:	TRC Environmental Corp.
Contact:	Ralph B. Johnson, III
Phone No.:	801-363-7566
Project No.:	

F factors for Coal, Oil, and Gas

	Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL			
Anthrocite 2	10100	10540	1970
Bituminous 2	9780	10640	1800
Lignite	9860	11950	1910
OIL	9190	320	1420
GAS			
Natural	8710	10610	1040
Propane	8710	10200	1190
Butane	8710	10390	1250

☐ F factor used

lbs/MMBtu

- O2
- CO2

Summary

Division of Air Quality

Compliance Demonstration of
Reference Method 29 - Cadmium (Cd)
Stericycle - Incinerator Stack

Testing Results				
Test Date	9/30/2014	9/30/2014	9/30/2014	9/30/2014
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	3.27	3.27	3.27	3.27
Pbar	25.27	25.27	25.27	25.27
Pq (static)	-0.15	-0.15	-0.15	-0.15
Ps	25.26	25.26	25.26	25.26
Avg. Ts F	138.31	140.71	145.63	143.81
CO2 - F_{CO2}	7.50	7.70	7.90	7.50
O2	11.70	11.50	11.20	11.60
N2+C	80.80	80.80	80.90	80.90
Md	29.67	29.69	29.71	29.66
Ms	27.30	27.26	27.72	27.41
Y	0.99	0.99	0.99	0.99
Cp	0.84	0.84	0.84	0.84
Vm cf	177.26	161.79	222.72	208.61
Vlc	791.90	737.70	805.90	881.60
$A_{VG.}$ Tm F	76.90	84.40	75.23	76.67
Vm std	146.63	131.91	185.29	172.95
Vw std	37.27	34.72	37.93	41.50
Bws	0.20	0.21	0.17	0.19
S Bws	0.22	0.24	0.27	0.26
Avg. Sqrt Dlp	0.65	0.62	0.53	0.57
Vs	43.66	41.73	35.19	38.56
scfm wet	6390.03	6082.82	5087.15	5591.83
acfm	8577.14	8197.47	6911.78	7574.72
Qsd dscfh	305692.95	288914.71	253359.29	270586.97
# Sample Points	20.00	20.00	20.00	20.00
Dn	0.256	0.256	0.335	0.310
An	3.57E-04	3.57E-04	6.12E-04	5.24E-04
Start Time				
End Time				
Total Test time	240.00	240.00	240.00	240.00
Time @ point	5.00	5.00	5.00	5.00

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	0.0000006	
Run 2	0	0.0000009	
Run 3	0	0.0000006	
Run 4	0	0.0000015	

Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.0000001	0.0000001	0.0000000	0.0000	0.0000001
lbs/hr	0.000003	0.000004	0.000002	0.0000	0.0000035
lbs/MMBtu					

Total Emissions Summary corrected to 7% O2					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./Mdscf	0.000095	0.000156	0.000072	0.000200	0.000142
mg/dscm@7%	0.000228	0.000373	0.000171	0.000479	0.000341

*Note: AVG based on Runs 2,3&4 Only
Run 1 failed isokinetic requirements.

O2
CO2

F factor used

Summary

Division of Air Quality

Compliance Demonstration of Reference Method 29 -Lead (Pb) Stericycle - Incinerator Stack

Testing Results				
Test Date	9/30/2014	9/30/2014	9/30/2014	9/30/2014
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	3.27	3.27	3.27	3.27
Pbar	25.27	25.27	25.27	25.27
Pq (static)	-0.15	-0.15	-0.15	-0.15
Ps	25.26	25.26	25.26	25.26
Avg. Ts F	138.31	140.71	145.63	143.81
CO2 - F_{CO2}	7.50	7.70	7.90	7.50
O2	11.70	11.50	11.20	11.60
N2+C	80.80	80.80	80.90	80.90
Md	29.67	29.69	29.71	29.66
Ms	27.30	27.26	27.72	27.41
Y	0.99	0.99	0.99	0.99
Cp	0.84	0.84	0.84	0.84
Vm cf	177.26	161.79	222.72	208.61
Vlc	791.90	737.70	805.90	881.60
$A_{VG.}$ Tm F	76.90	84.40	75.23	76.67
Vm std	146.63	131.91	185.29	172.95
Vw std	37.27	34.72	37.93	41.50
Bws	0.20	0.21	0.17	0.19
S Bws	0.22	0.24	0.27	0.26
Avg. Sqrt Dlp	0.65	0.62	0.53	0.57
Vs	43.66	41.73	35.19	38.56
scfm wet	6390.03	6082.82	5087.15	5591.83
acfm	8577.14	8197.47	6911.78	7574.72
Qsd dscfh	305692.95	288914.71	253359.29	270586.97
# Sample Points	20.00	20.00	20.00	20.00
Dn	0.256	0.256	0.335	0.310
An	3.57E-04	3.57E-04	6.12E-04	5.24E-04
Start Time				
End Time				
Total Test time	240.00	240.00	240.00	240.00
Time @ point	5.00	5.00	5.00	5.00

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	0.0000016	
Run 2	0	0.0000012	
Run 3	0	0.0000008	
Run 4	0	0.0000009	

Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.0000002	0.0000001	0.0000001	0.0000	0.0000001
lbs/hr	0.000007	0.000006	0.000002	0.0000	0.0000047
lbs/MMBtu					

Total Emissions Summary corrected to 7% O2					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./Mdscf	0.000254	0.000208	0.000095	0.000120	0.000141
mg/dscm@7%	0.000609	0.000497	0.000229	0.000287	0.000338

*Note: AVG based on Runs 2,3&4 Only
Run 1 failed isokinetic requirements.

O2
CO2

F factor used

Summary

Division of Air Quality

Compliance Demonstration of
Reference Method 29 - Mercury (Hg)
Stericycle - Incinerator Stack

Testing Results				
Test Date	9/30/2014	9/30/2014	9/30/2014	9/30/2014
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	3.27	3.27	3.27	3.27
Pbar	25.27	25.27	25.27	25.27
Pq (static)	-0.15	-0.15	-0.15	-0.15
Ps	25.26	25.26	25.26	25.26
Avg. Ts F	138.31	140.71	145.63	143.81
CO2 - F_{CO2}	7.50	7.70	7.90	7.50
O2	11.70	11.50	11.20	11.60
N2+C	80.80	80.80	80.90	80.90
Md	29.67	29.69	29.71	29.66
Ms	27.30	27.26	27.72	27.41
Y	0.99	0.99	0.99	0.99
Cp	0.84	0.84	0.84	0.84
Vm cf	177.26	161.79	222.72	208.61
Vlc	791.90	737.70	805.90	881.60
$A_{VG.}$ Tm F	76.90	84.40	75.23	76.67
Vm std	146.63	131.91	185.29	172.95
Vw std	37.27	34.72	37.93	41.50
Bws	0.20	0.21	0.17	0.19
S Bws	0.22	0.24	0.27	0.26
Avg. Sqrt Dlp	0.65	0.62	0.53	0.57
Vs	43.66	41.73	35.19	38.56
scfm wet	6390.03	6082.82	5087.15	5591.83
acfm	8577.14	8197.47	6911.78	7574.72
Qsd dscfh	305692.95	288914.71	253359.29	270586.97
# Sample Points	20.00	20.00	20.00	20.00
Dn	0.256	0.256	0.335	0.310
An	3.57E-04	3.57E-04	6.12E-04	5.24E-04
Start Time				
End Time				
Total Test time	240.00	240.00	240.00	240.00
Time @ point	5.00	5.00	5.00	5.00

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	0.0000033	
Run 2	0	0.0000033	
Run 3	0	0.0000034	
Run 4	0	0.0000036	

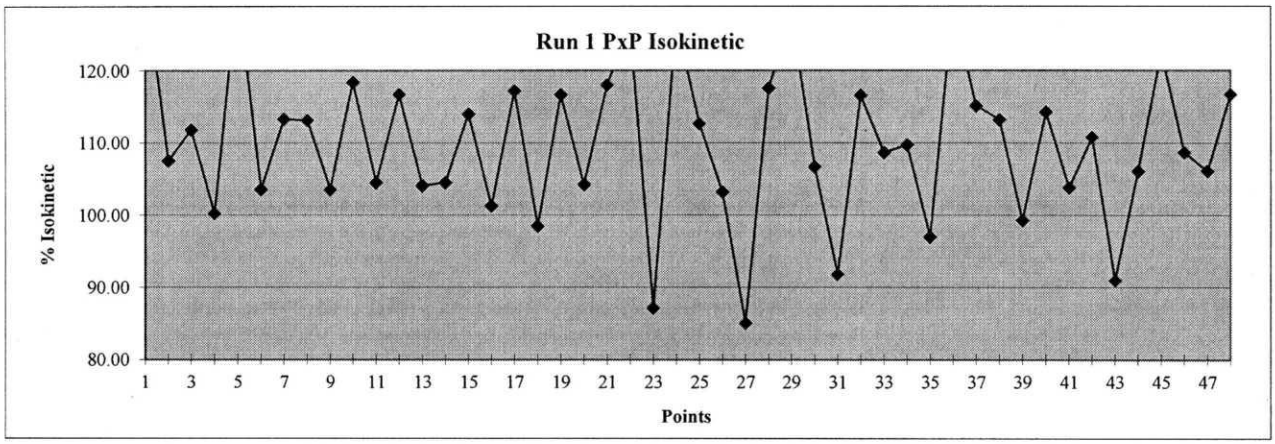
Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.0000003	0.0000004	0.0000003	0.0000	0.0000003
lbs/hr	0.000015	0.000016	0.000010	0.0000	0.0000134
lbs/MMBtu					

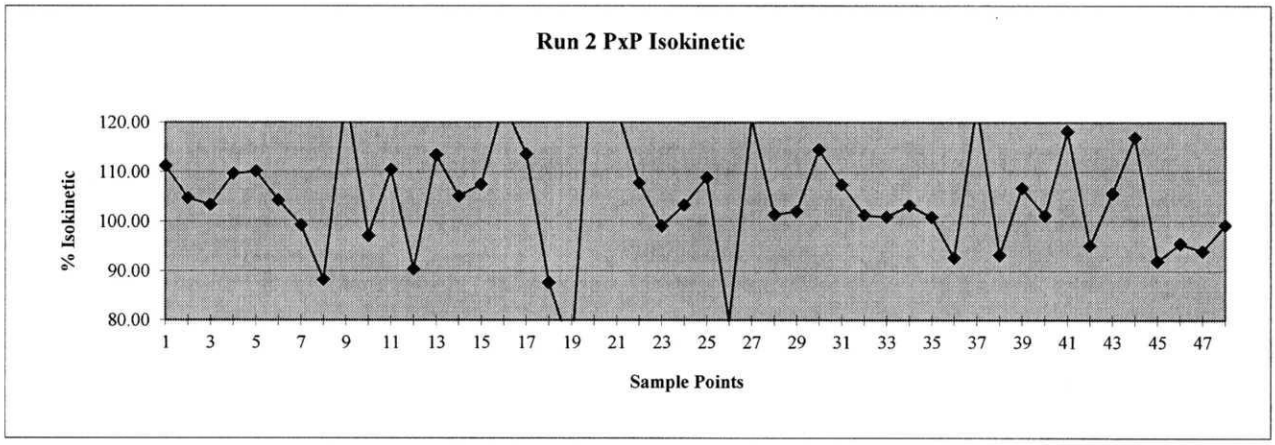
Total Emissions Summary corrected to 7% O2					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./Mdscf	0.000525	0.000571	0.000406	0.000480	0.000486
mg/dscm@7%	0.001256	0.001367	0.000972	0.001150	0.001163

*Note: AVG based on Runs 2,3&4 Only
Run 1 failed isokinetic requirements.

O2
CO2

F factor used


Run 1 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Points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% Isokinetic
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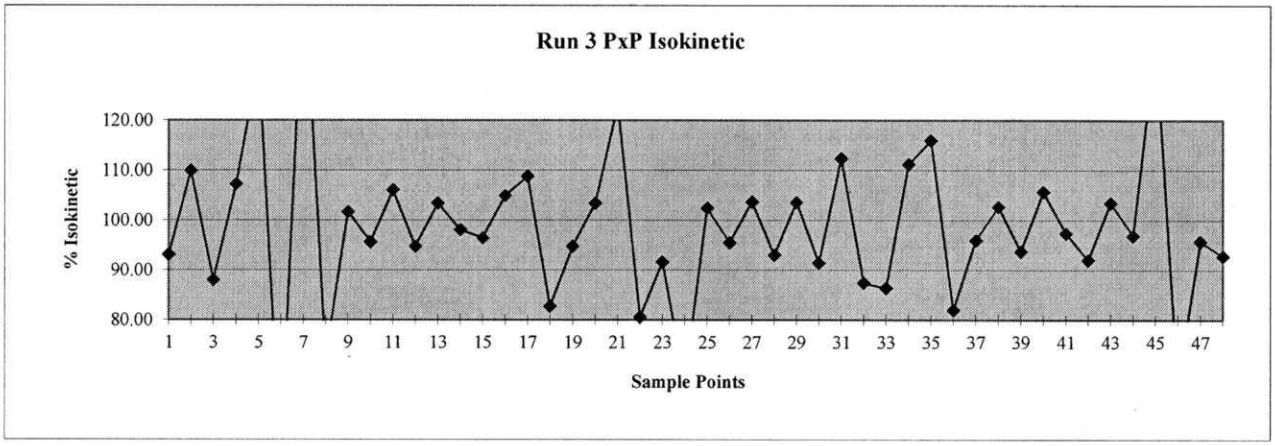
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points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% Isokinetic
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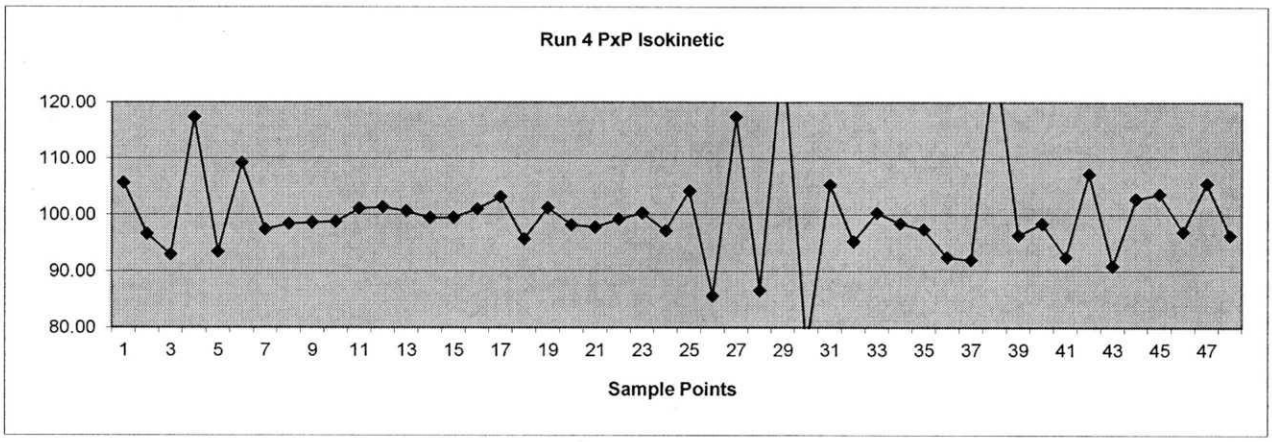
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 4 PxP Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	9/30/2014	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	25.27	-0.15	25.26	138	7.50	11.70	80.80	29.67	27.30
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2233
0.9926	0.84	177.256	791.90	76.90	146.632	37.275	0.2027	0.2233	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.653	43.66	6,390	8,577	3.06E+05	20	0.256	240	5.00	1.299375
					TRUE				
Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)	Imp. Liquid Collected		
1	716.282	0.37	1.11	135	63	63	Wt. (Final)	Wt. (Initial)	lc
2	720.350	0.35	1.05	135	68	68	791.9		791.9
3	723.580	0.35	1.05	135	68	68			0.0
4	726.940	0.32	0.96	135	68	68			0.0
5	729.820	0.35	1.05	135	68	68			0.0
6	733.770	0.32	0.96	136	69	69			0.0
7	736.750	0.37	1.11	137	69	69			
8	740.250	0.35	1.05	136	70	70	Isokinetics	109.9	
9	743.660	0.39	1.17	137	70	70	Test Date	9/30/2014	
10	746.950	0.39	1.17	137	71	71	Start Time	enter	enter
11	750.720	0.41	1.23	136	72	72	End Time	enter	
12	754.140	0.41	1.23	136	72	72			
13	757.960	0.85	2.55	137	73	73			
14	762.850	0.77	2.31	136	74	74			
15	767.540	0.52	1.56	137	74	74			
16	771.750	0.60	1.80	138	75	75			
17	775.770	0.41	1.23	138	75	75			
18	779.620	0.43	1.29	138	76	76			
19	782.940	0.43	1.29	139	76	76			
20	786.870	0.39	1.17	139	77	77			
21	790.220	0.46	1.38	138	77	77			
22	794.340	0.43	1.29	137	77	77			
23	798.620	0.37	1.11	138	77	77			
24	801.350	0.37	1.11	139	78	78			
25	805.328	0.32	0.96	140	79	79			
26	808.620	0.32	0.96	138	79	79			
27	811.640	0.30	0.90	138	79	79			
28	814.050	0.30	0.90	139	79	79			
29	817.380	0.32	0.96	139	79	79			
30	821.120	0.43	1.29	140	79	79			
31	824.730	0.43	1.29	141	80	80			
32	827.840	0.45	1.35	141	80	80			
33	831.880	0.45	1.35	139	80	80			
34	835.650	0.43	1.29	139	81	81			
35	839.380	0.38	1.14	139	81	81			
36	842.480	0.32	0.96	139	81	81			
37	846.260	0.32	0.96	141	82	82			
38	849.640	0.49	1.47	140	82	82			
39	853.750	0.72	2.16	140	82	82			
40	858.110	0.65	1.95	140	82	82			
41	862.880	0.55	1.65	139	83	83			
42	866.880	0.50	1.50	140	83	83			
43	870.950	0.55	1.65	141	83	83			
44	874.450	0.50	1.50	141	84	84			
45	878.350	0.45	1.35	140	84	84			
46	882.630	0.38	1.14	140	84	84			
47	886.120	0.43	1.29	141	84	84			
48	889.740	0.39	1.17	140	84	84			
	893.538								

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	25.27	-0.15	25.26	141	7.70	11.50	80.80	29.69	27.26
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2375
0.9926	0.84	161.787	737.70	84	131.907	34.724	0.2084	0.2375	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.622	41.73	6,083	8,197	2.89E+05	20	0.256	240	5.00	1.08
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	893.708	0.40	1.16	141.0	83.0	83.0
2	897.340	0.35	1.02	141.0	83.0	83.0
3	900.540	0.35	0.95	141.0	83.0	83.0
4	903.700	0.32	0.86	141.0	82.0	82.0
5	906.900	0.38	1.03	141.0	82.0	82.0
6	910.400	0.38	1.03	141.0	83.0	83.0
7	913.720	0.44	1.19	141.0	83.0	83.0
8	917.120	0.44	1.19	141.0	83.0	83.0
9	920.140	0.52	1.40	141.0	83.0	83.0
10	924.810	0.52	1.40	141.0	84.0	84.0
11	928.430	0.58	1.68	140.0	84.0	84.0
12	932.780	0.58	1.68	139.0	84.0	84.0
13	936.340	0.42	1.13	141.0	85.0	85.0
14	940.150	0.32	0.86	139.0	85.0	85.0
15	943.240	0.32	0.86	139.0	85.0	85.0
16	946.400	0.38	1.83	140.0	85.0	85.0
17	950.350	0.45	1.22	141.0	85.0	85.0
18	954.300	0.35	0.95	140.0	85.0	85.0
19	956.990	0.35	0.95	139.0	86.0	86.0
20	959.250	0.30	0.81	139.0	86.0	86.0
21	963.180	0.30	0.81	139.0	86.0	86.0
22	966.680	0.32	0.86	140.0	86.0	86.0
23	969.850	0.40	1.08	139.0	86.0	86.0
24	973.110	0.35	0.95	140.0	86.0	86.0
25	976.288	0.30	0.81	140.0	86.0	86.0
26	979.390	0.30	0.81	143.0	85.0	85.0
27	981.650	0.35	0.95	142.0	85.0	85.0
28	985.350	0.30	0.81	141.0	85.0	85.0
29	988.230	0.32	0.86	142.0	85.0	85.0
30	991.220	0.32	0.86	142.0	84.0	84.0
31	994.570	0.38	1.03	140.0	84.0	84.0
32	998.000	0.38	1.03	141.0	84.0	84.0
33	1001.230	0.40	1.08	142.0	84.0	84.0
34	1004.530	0.42	1.13	141.0	84.0	84.0
35	1007.990	0.52	1.40	141.0	84.0	84.0
36	1011.750	0.52	1.40	142.0	84.0	84.0
37	1015.200	0.55	1.49	142.0	85.0	85.0
38	1019.940	0.58	1.68	143.0	84.0	84.0
39	1023.600	0.45	1.22	142.0	84.0	84.0
40	1027.300	0.45	1.22	141.0	84.0	84.0
41	1030.810	0.38	1.03	141.0	84.0	84.0
42	1034.580	0.35	0.95	140.0	85.0	85.0
43	1037.500	0.35	0.95	139.0	84.0	84.0
44	1040.740	0.35	0.95	140.0	85.0	85.0
45	1044.330	0.32	0.81	140.0	85.0	85.0
46	1047.030	0.32	0.81	142.0	85.0	85.0
47	1049.830	0.32	0.81	140.0	85.0	85.0
48	1052.590	0.32	0.81	142.0	84.0	84.0
	1055.495					

Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
737.70		737.7
		0.0
		0.0
		0.0
		0.0

Isokinetics	104.6
Test Date	9/30/2014
Start Time	enter
End Time	enter

Stericycle - Incinerator Stac				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	25.27	-0.15	25.26	146	7.90	11.20	80.90	29.71	27.72
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2691
0.9926	0.84	222.719	805.90	75	185.288	37.934	0.1699	0.2691	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.527	35.19	5,087	6,912	2.53E+05	20	0.335	240	5.00	2.18
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	55.635	0.15	1.19	138.0	64.0	64.0
2	58.840	0.15	1.19	140.0	64.0	64.0
3	62.620	0.18	1.42	133.0	62.0	62.0
4	65.940	0.15	1.19	135.0	65.0	65.0
5	69.650	0.17	1.34	136.0	65.0	65.0
6	74.500	0.20	1.58	140.0	66.0	66.0
7	76.610	0.15	1.19	148.0	69.0	69.0
8	81.800	0.17	1.34	148.0	67.0	67.0
9	84.450	0.26	2.05	147.0	67.0	67.0
10	89.040	0.30	2.37	145.0	68.0	68.0
11	93.690	0.26	2.05	146.0	69.0	69.0
12	98.500	0.33	2.60	144.0	70.0	70.0
13	103.350	0.33	2.60	143.0	70.0	70.0
14	108.650	0.36	2.84	144.0	71.0	71.0
15	113.900	0.48	3.80	145.0	71.0	71.0
16	119.840	0.45	3.55	146.0	72.0	72.0
17	126.110	0.34	2.60	147.0	73.0	73.0
18	131.750	0.30	2.37	148.0	73.0	73.0
19	135.800	0.30	2.37	148.0	74.0	74.0
20	140.450	0.26	2.05	147.0	74.0	74.0
21	145.180	0.26	2.05	148.0	75.0	75.0
22	150.810	0.30	2.37	145.0	75.0	75.0
23	154.780	0.30	2.37	143.0	75.0	75.0
24	159.300	0.60	2.05	145.0	76.0	76.0
25	164.010	0.30	2.37	149.0	76.0	76.0
26	169.050	0.28	2.21	149.0	77.0	77.0
27	173.600	0.28	2.21	149.0	78.0	78.0
28	178.550	0.26	2.05	149.0	78.0	78.0
29	182.830	0.26	2.05	148.0	78.0	78.0
30	187.600	0.28	2.21	147.0	79.0	79.0
31	191.980	0.30	2.37	147.0	79.0	79.0
32	197.550	0.30	2.37	147.0	80.0	80.0
33	201.890	0.36	2.84	147.0	80.0	80.0
34	206.580	0.33	2.60	146.0	81.0	81.0
35	212.380	0.40	3.16	146.0	81.0	81.0
36	219.030	0.40	3.16	146.0	81.0	81.0
37	223.730	0.26	2.05	146.0	81.0	81.0
38	228.180	0.26	2.05	149.0	82.0	82.0
39	232.940	0.33	2.60	146.0	82.0	82.0
40	237.840	0.28	2.21	149.0	82.0	82.0
41	242.920	0.28	2.21	149.0	82.0	82.0
42	247.600	0.20	1.58	148.0	82.0	82.0
43	251.350	0.20	1.58	147.0	82.0	82.0
44	255.570	0.20	1.58	146.0	83.0	83.0
45	259.530	0.26	2.05	150.0	83.0	83.0
46	265.820	0.26	2.05	147.0	83.0	83.0
47	268.940	0.30	2.37	147.0	83.0	83.0
48	273.720	0.30	2.37	147.0	83.0	83.0
	278.354					

Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
805.9		805.9
		0.0
		0.0
		0.0
		0.0

Isokinetics	97.8
Test Date	9/30/2014
Start Time	enter
End Time	enter

Stericycle - Incinerator Stac			Flow & Moisture				Test Date	9/30/2014	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	25.27	-0.15	25.26	144	7.50	11.60	80.90	29.66	27.41
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2570
0.9926	0.84	208.614	881.60	77	172.952	41.497	0.1935	0.2570	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.575	38.56	5,592	7,575	2.71E+05	20	0.31	240	5.00	1.91

						TRUE				
Mv@	Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)	Imp. Liquid Collected		
	1	435.509	0.30	1.73	144.0	78.0	78.0	Wt. (Final)	Wt. (Initial)	lc
4.391	2	439.900	0.30	1.73	146.0	77.0	77.0	881.6		881.6
4.000	3	443.900	0.28	1.61	146.0	77.0	77.0			0.0
3.720	4	447.620	0.25	1.44	146.0	76.0	76.0			0.0
4.430	5	452.050	0.18	1.04	145.0	76.0	76.0			0.0
3.000	6	455.050	0.18	1.04	147.0	76.0	76.0			0.0
3.500	7	458.550	0.30	1.73	148.0	76.0	76.0			
4.020	8	462.570	0.25	1.44	148.0	76.0	76.0	Isokinetics	99.9	
3.710	9	466.280	0.36	2.07	148.0	77.0	77.0	Test Date	9/30/2014	
4.461	10	470.741	0.44	2.53	144.0	77.0	77.0	Start Time	enter	
4.950	11	475.691	0.55	3.16	145.0	78.0	78.0	End Time	enter	
5.659	12	481.350	0.55	3.16	145.0	77.0	77.0			
5.663	13	487.013	0.64	3.58	145.0	78.0	78.0			
6.072	14	493.085	0.64	3.58	145.0	78.0	78.0			
5.998	15	499.083	0.50	2.80	145.0	78.0	78.0			
5.317	16	504.400	0.53	2.97	144.0	78.0	78.0			
5.559	17	509.959	0.40	2.24	144.0	78.0	78.0			
4.942	18	514.901	0.38	2.13	144.0	78.0	78.0			
4.470	19	519.371	0.28	1.57	142.0	78.0	78.0			
4.072	20	523.443	0.34	1.90	142.0	78.0	78.0			
4.349	21	527.792	0.33	1.85	142.0	78.0	78.0			
4.268	22	532.060	0.32	1.79	143.0	78.0	78.0			
4.260	23	536.320	0.35	1.96	144.0	78.0	78.0			
4.500	24	540.820	0.34	1.90	143.0	78.0	78.0			
4.300	25	545.120	0.28	1.57	143.0	77.0	77.0			
4.180	26	549.300	0.30	1.68	145.0	77.0	77.0			
3.550	27	552.850	0.28	1.57	148.0	77.0	77.0			
4.690	28	557.540	0.25	1.40	146.0	76.0	76.0			
3.270	29	560.810	0.20	1.12	144.0	76.0	76.0			
4.370	30	565.180	0.28	1.57	144.0	76.0	76.0			
3.050	31	568.230	0.35	1.96	143.0	76.0	76.0			
4.710	32	572.940	0.38	2.13	142.0	76.0	76.0			
4.440	33	577.380	0.40	2.24	141.0	76.0	76.0			
4.800	34	582.180	0.30	1.68	140.0	76.0	76.0			
4.090	35	586.270	0.32	1.79	142.0	76.0	76.0			
4.170	36	590.440	0.40	2.24	142.0	76.0	76.0			
4.420	37	594.860	0.25	1.40	144.0	76.0	76.0			
3.480	38	598.340	0.32	1.79	144.0	76.0	76.0			
5.480	39	603.820	0.50	2.80	145.0	76.0	76.0			
5.130	40	608.950	0.50	2.80	143.0	76.0	76.0			
5.250	41	614.200	0.30	1.68	140.0	76.0	76.0			
3.840	42	618.040	0.25	1.40	143.0	76.0	76.0			
4.060	43	622.100	0.22	1.23	142.0	77.0	77.0			
3.240	44	625.340	0.22	1.23	142.0	75.0	75.0			
3.650	45	628.990	0.30	1.68	142.0	75.0	75.0			
4.290	46	633.280	0.25	1.40	141.0	75.0	75.0			
3.670	47	636.950	0.22	1.23	141.0	75.0	75.0			
3.750	48	640.700	0.22	1.23	141.0	75.0	75.0			
3.423		644.123								

Division of Air Quality
Compliance Demonstration
Method 5 - Particulate

Source Information

Company Name	**Stericycle - HMIWI Stack**
Company Contact:	**Jay Vance**
Contact Phone No.	**801-936-1260**
Source Designation:	**HMIWI Stack**

Test & Review Dates

Test Date:	10/1/2014	
Review Date:	12/26/2014	Tabs Are Shown
Observer:	**Rob Leishman**	
Reviewer:	**Rob Leishman**	

Particulate Emission Limits

ppm@7%O2	lbs/hr	gr/dscf		
100.000	50.000	50.000		

Emission Rates - "Front Half"

ppm@7%O2	lbs/hr	gr/dscf		
3,697.0	**0.0466**	**1.7382**		

Test Information

Stack_I.D._inches	As ft^2	Y	Dl H @	Cp	Pbar	Pq (static)	Dn
24.50	3.27	0.9926	1.064	0.84	25.34	-0.15	0.31

Round

Contractor Information

Contracting Company:	TRC Environmental Corp.
Contact:	Ralph B. Johnson, III
Phone No.:	801-363-7566
Project No.:	

F factors for Coal, Oil, and Gas

	Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL			
Anthrocite 2	10100	10540	1970
Bituminous 2	9780	10640	1800
Lignite	9860	11950	1910
OIL	9190	320	1420
GAS			
Natural	8710	10610	1040
Propane	8710	10200	1190
Butane	8710	10390	1250

☐ F factor used

lbs/MMBtu
- O2
- CO2

Summary

Division of Air Quality

Compliance Demonstration of
Reference Methods 26A - Particulate
Stericycle - HMIWI Stack

Testing Results				
Test Date	11/8/2012	11/8/2012	11/8/2012	11/8/2012
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	3.27	3.27	3.27	
Pbar	25.34	25.34	25.34	
Pq (static)	-0.15	-0.15	-0.15	
Ps	25.33	25.33	25.33	
Avg. Ts F	148.54	149.88	149.63	
CO2 - F_{CO2}	7.90	7.90	7.70	
O2	10.90	10.90	11.30	
N2+C	81.20	81.20	81.00	
Md	29.70	29.70	29.68	
Ms	27.55	27.34	27.29	
Y	0.99	0.99	0.99	
Cp	0.84	0.84	0.84	
Vm cf	53.34	49.80	52.97	
Vlc	209.80	220.10	239.40	
$A_{VG.}$ Tm F	81.58	81.46	81.67	
Vm std	43.95	41.01	43.64	
Vw std	9.88	10.36	11.27	
Bws	0.18	0.20	0.21	
S Bws	0.29	0.30	0.30	
Avg. Sqrt Dlp	0.58	0.54	0.58	
Vs	38.68	36.22	39.11	
scfm wet	5580.67	5214.97	5633.13	
acfm	7597.76	7115.44	7682.84	
Qsd dscfh	273407.65	249799.36	268622.02	
# Sample Points	24.00	24.00	24.00	
Dn	0.310	0.310	0.310	
An	5.24E-04	5.24E-04	5.24E-04	
Start Time				
End Time				
Total Test time	60.00	60.00	60.00	
Time @ point	2.50	2.50	2.50	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0.0014	0.0025	0
Run 2	0.0007	0.0024	0
Run 3	0.0007	0.0026	0
Run 4			

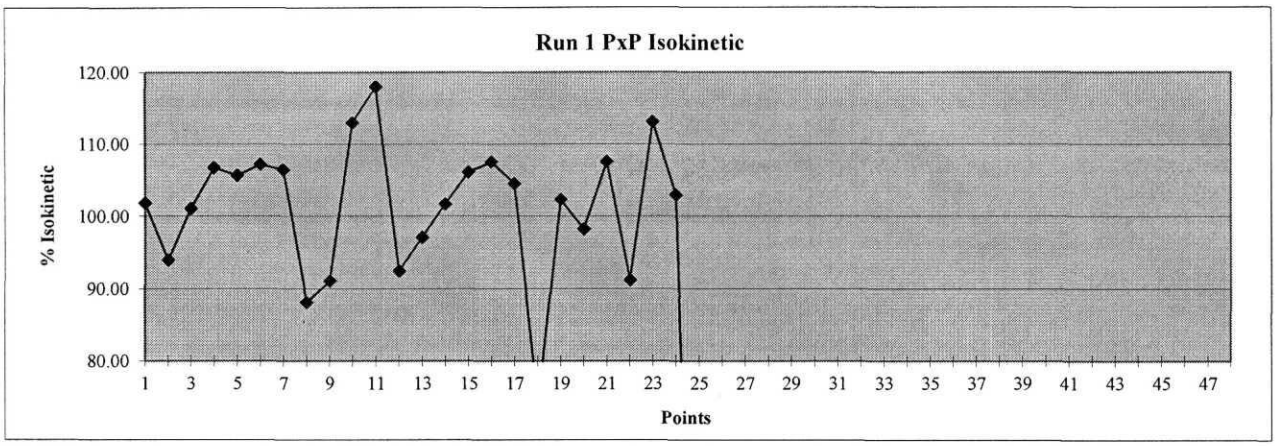
Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.0014	0.0012	0.0012		0.0012
lbs/hr	0.0535	0.0416	0.0448		0.0466
mg/dscm@7%	4.355856	3.710208	3.866778		3.9776
gr./dscf@7%O2	0.001903491	0.001621345	0.001689765		0.0017382

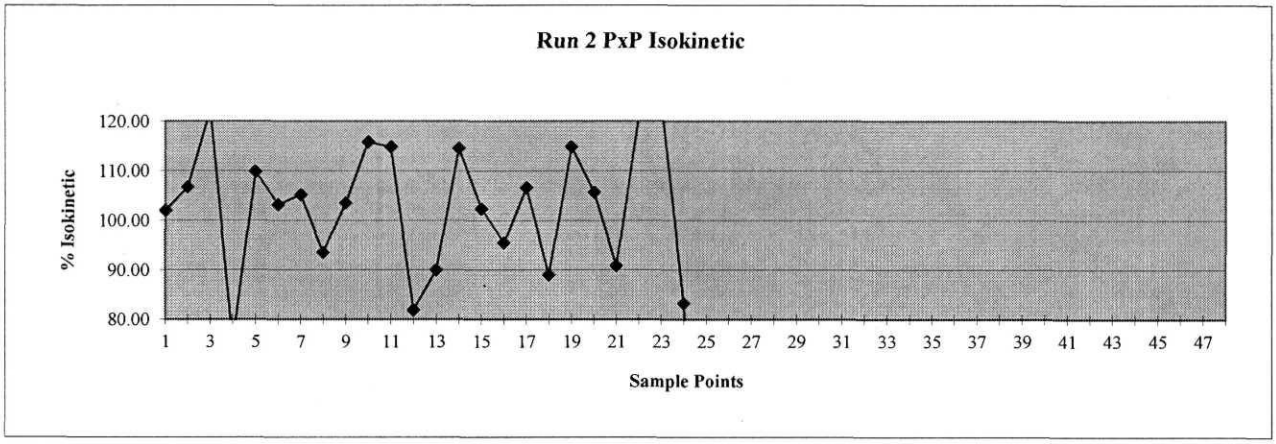
Total Emissions Summary w/back half condensable					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./Mdscf	1.9035	1.6213	1.6898		1.7382
lbs/hr	0.05350	0.04163	0.04479		0.0466
ppmdv	2.874E+03	2.448E+03	2.551E+03		2.624E+03
at 7% O2	3994.644851	3402.537383	3693.87868		3697.020305

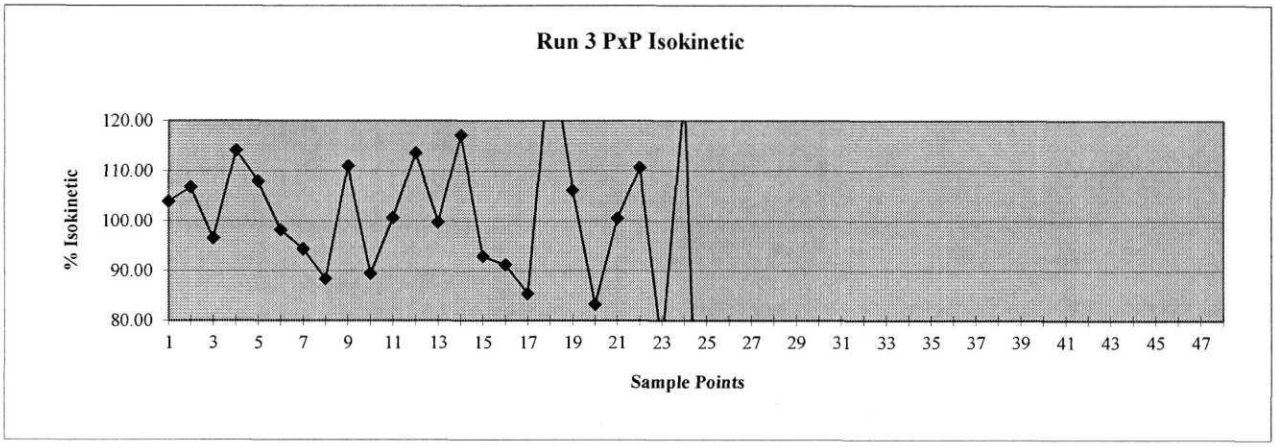
O2

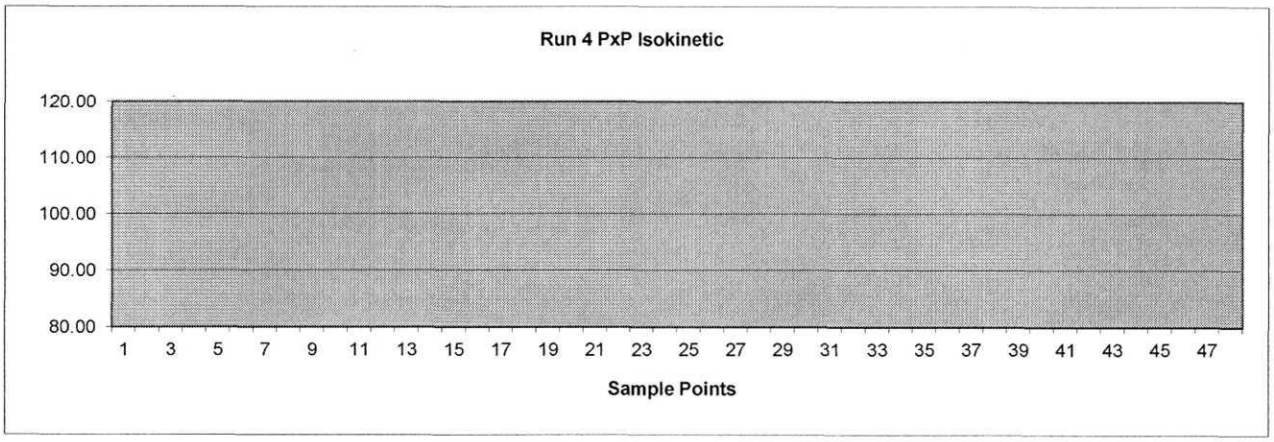
CO2

F factor used


Run 1 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Points


Run 2 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 3 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 4 PxP Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points

Stericycle - HMIWI Stack				Flow & Moisture			Test Date	11/8/2012	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	25.34	-0.15	25.33	149	7.90	10.90	81.20	29.70	27.55
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2886
0.9926	0.84	53.337	209.80	81.58	43.950	9.875	0.1835	0.2886	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.577	38.68	5,581	7,598	2.73E+05	24	0.31	60	2.50	2.005000
					TRUE				
Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)	Imp. Liquid Collected		
1	278.478	0.25	1.46	147.0	80.0	80.0	Wt. (Final)	Wt. (Initial)	lc
2	280.430	0.30	1.76	148.0	80.0	80.0	209.8		209.8
3	282.400	0.22	1.29	146.0	80.0	80.0			0.0
4	284.220	0.20	1.17	148.0	80.0	80.0			0.0
5	286.050	0.22	1.29	148.0	80.0	80.0			0.0
6	287.950	0.25	1.46	150.0	80.0	80.0			0.0
7	290.000	0.30	1.76	151.0	81.0	81.0			
8	292.230	0.36	2.11	151.0	81.0	81.0	Isokinetics	100.5	
9	294.250	0.40	2.34	151.0	81.0	81.0	Test Date	11/8/2012	
10	296.450	0.22	1.29	151.0	81.0	81.0	Start Time	enter	enter
11	298.480	0.18	1.05	150.0	81.0	81.0	End Time	enter	
12	300.400	0.30	1.76	143.0	81.0	81.0			
13	302.350	0.30	1.76	144.0	82.0	82.0			
14	304.400	0.36	2.11	144.0	82.0	82.0			
15	306.750	0.40	2.34	145.0	82.0	82.0			
16	309.330	0.42	2.45	149.0	82.0	82.0			
17	312.000	0.48	2.81	150.0	82.0	82.0			
18	314.770	0.65	3.80	150.0	83.0	83.0			
19	317.050	0.60	3.51	150.0	83.0	83.0			
20	320.080	0.50	2.93	150.0	83.0	83.0			
21	322.740	0.40	2.34	150.0	83.0	83.0			
22	325.350	0.36	2.11	150.0	83.0	83.0			
23	327.450	0.30	1.76	150.0	83.0	83.0			
24	329.830	0.25	1.46	149.0	84.0	84.0			
25	331.815								
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48									

Stericycle - HMIWI Stack				Flow & Moisture			Test Date	5/13/2009	
As ft^2	**Pbar**	**Pq (static)**	**Ps**	**Avg. Ts F**	**CO2 - F_{CO2}**	**O2**	**N2+C**	**Md**	**Ms**
3.27	25.34	-0.15	25.33	150	7.90	10.90	81.20	29.70	27.34
Y	**Cp**	**Vm cf**	**Vlc**	**Avg. Tm F**	**Vm std**	**Vw std**	**Bws**	**S Bws**	0.2983
0.9926	0.84	49.801	220.10	81	41.014	10.360	0.2017	0.2983	0.999
Avg. Sqrt Dlp	**Vs**	**scfm wet**	**acfm**	**Qsd dscfh**	**# Sample Points**	**Dn**	**Total Test time (minutes)**	**Time @ point (minutes)**	Avg. Dlh
0.538	36.22	5,215	7,115	2.50E+05	**24**	0.31	60	2.50	1.74
					TRUE				

Point No.	**Meter (cf)**	**dl "p"**	**dl "h"**	**ts F**	**tm F (in)**	**tm F (out)**
1	331.972	0.25	1.46	144.0	81.0	81.0
2	333.900	0.30	1.76	148.0	81.0	81.0
3	336.100	0.25	1.46	149.0	81.0	81.0
4	338.400	0.32	1.87	153.0	81.0	81.0
5	340.000	0.40	2.34	153.0	81.0	81.0
6	342.600	0.51	2.98	154.0	81.0	81.0
7	345.350	0.55	3.21	154.0	81.0	81.0
8	348.260	0.30	1.76	153.0	81.0	81.0
9	350.180	0.20	1.17	152.0	81.0	81.0
10	351.920	0.30	1.76	152.0	81.0	81.0
11	354.300	0.17	1.00	152.0	81.0	81.0
12	356.080	0.17	1.00	152.0	81.0	81.0
13	357.350	0.30	1.76	145.0	81.0	81.0
14	359.210	0.17	1.00	142.0	81.0	81.0
15	361.000	0.38	2.22	146.0	82.0	82.0
16	363.380	0.25	1.46	149.0	82.0	82.0
17	365.180	0.25	1.46	149.0	82.0	82.0
18	367.190	0.45	2.63	151.0	82.0	82.0
19	369.430	0.32	1.87	152.0	82.0	82.0
20	371.870	0.20	1.17	152.0	82.0	82.0
21	373.650	0.32	1.87	153.0	82.0	82.0
22	375.580	0.20	1.17	149.0	82.0	82.0
23	377.620	0.28	1.64	144.0	82.0	82.0
24	380.110	0.28	1.64	149.0	83.0	83.0
25	381.773					
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Imp. Liquid Collected		
Wt. (Final)	**Wt. (Initial)**	**lc**
220.10		**220.1**
		0.0
		0.0
		0.0
		0.0

Isokinetics	**102.6**
Test Date	11/8/2012
Start Time	enter
End Time	enter

Stericycle - HMIWI Stack				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.27	25.34	-0.15	25.33	150	7.70	11.30	81.00	29.68	27.29
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2965
0.9926	0.84	52.972	239.40	82	43.638	11.269	0.2052	0.2965	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.580	39.11	5,633	7,683	2.69E+05	24	0.31	60	2.50	1.97
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	381.893	0.23	1.35	144.0	81.0	81.0
2	383.770	0.23	1.35	143.0	81.0	81.0
3	385.700	0.30	1.73	144.0	81.0	81.0
4	387.690	0.27	1.55	145.0	81.0	81.0
5	389.920	0.27	1.55	150.0	81.0	81.0
6	392.020	0.38	2.19	152.0	81.0	81.0
7	394.280	0.45	2.59	152.0	81.0	81.0
8	396.640	0.45	2.59	152.0	81.0	81.0
9	398.850	0.55	3.16	152.0	82.0	82.0
10	401.920	0.50	2.88	152.0	82.0	82.0
11	404.280	0.38	2.19	152.0	82.0	82.0
12	406.600	0.38	2.19	151.0	82.0	82.0
13	409.221	0.32	1.84	143.0	82.0	82.0
14	411.350	0.32	1.84	147.0	82.0	82.0
15	413.840	0.35	2.00	150.0	82.0	82.0
16	415.900	0.30	1.73	152.0	82.0	82.0
17	417.770	0.30	1.73	153.0	82.0	82.0
18	419.520	0.23	1.35	150.0	82.0	82.0
19	421.940	0.45	2.59	152.0	82.0	82.0
20	424.600	0.28	1.61	152.0	82.0	82.0
21	426.250	0.32	1.84	151.0	82.0	82.0
22	428.380	0.35	2.00	152.0	82.0	82.0
23	430.830	0.30	1.73	150.0	82.0	82.0
24	432.370	0.28	1.61	150.0	82.0	82.0
25	434.865					
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
239.4		239.4
		0.0
		0.0
		0.0
		0.0

Isokinetics	101.5
Test Date	11/8/2012
Start Time	enter
End Time	enter

Division of Air Quality
Compliance Demonstration
Method 26A - HCl

Source Information

Company Name	**Stericycle - HMIWI Stack**
Company Contact:	**Jay Vance**
Contact Phone No.	**801-936-1260**
Source Designation:	**HMIWI Stack**

Test & Review Dates

Test Date:	10/1/2014
Review Date:	12/23/2014
Observer:	**Rob Leishman**
Reviewer:	**Rob Leishman**

Tabs Are Shown

Particulate Emission Limits

ppm@7%O2	lbs/hr	gr/dscf		
100.000	50.000	50.000		

Emission Rates - "Front Half"

ppm@7%O2	lbs/hr	gr/dscf		
0.1119	**0.0022**	**0.0001**		

Test Information

Stack_I.D._inches	As ft^2	Y	Dl H @	Cp	Pbar	Pq (static)	Dn
25.75	3.62	0.9820	1.664	0.84	25.34	-0.15	0.306

Round

Contractor Information

Contracting Company:	TRC Environmental Corp.
Contact:	Ralph B. Johnson, III
Phone No.:	801-363-7566
Project No.:	

F factors for Coal, Oil, and Gas

	Fd scf/MMBtu	Fw scf/MMBtu	Fc scf/MMBtu
COAL			
Anthrocite 2	10100	10540	1970
Bituminous 2	9780	10640	1800
Lignite	9860	11950	1910
OIL	9190	320	1420
GAS			
Natural	8710	10610	1040
Propane	8710	10200	1190
Butane	8710	10390	1250

☐ F factor used

lbs/MMBtu
- O2
- CO2

Summary

Division of Air Quality

Reference Methods 26A - HCl

Compliance Demonstration of

Stericycle - HMIWI Stack

Testing Results				
Test Date	10/1/2014	10/1/2014	10/1/2014	10/1/2014
Round	Run 1	Run 2	Run 3	Run 4
As ft^2	3.62	3.62	3.62	
Pbar	25.34	25.34	25.34	
Pq (static)	-0.15	-0.15	-0.15	
Ps	25.33	25.33	25.33	
Avg. Ts F	146.50	147.88	146.38	
CO2 - F_{CO2}	7.90	7.90	7.70	
O2	10.90	10.90	11.30	
N2+C	81.20	81.20	81.00	
Md	29.70	29.70	29.68	
Ms	27.52	27.24	27.26	
Y	0.98	0.98	0.98	
Cp	0.84	0.84	0.84	
Vm cf	53.01	47.71	51.48	
Vlc	211.20	220.00	234.00	
$A_{VG.}$ Tm F	80.13	80.83	81.38	
Vm std	43.35	38.92	41.98	
Vw std	9.94	10.36	11.01	
Bws	0.19	0.21	0.21	
S Bws	0.27	0.28	0.27	
Avg. Sqrt Dlp	0.60	0.54	0.58	
Vs	40.00	36.24	39.15	
scfm wet	6397.45	5782.48	6262.75	
acfm	8680.54	7863.89	8496.03	
Qsd dscfh	312239.57	274035.02	297663.29	
# Sample Points	24.00	24.00	24.00	
Dn	0.306	0.306	0.306	
An	5.11E-04	5.11E-04	5.11E-04	
Start Time				
End Time				
Total Test time	60.00	60.00	60.00	
Time @ point	2.50	2.50	2.50	

	Lab Data - grams collected		
Lab Data	Probe	Filter	Back
Run 1	0	0	0.000171
Run 2	0	0	0.0000846
Run 3	0	0	0.000171
Run 4			

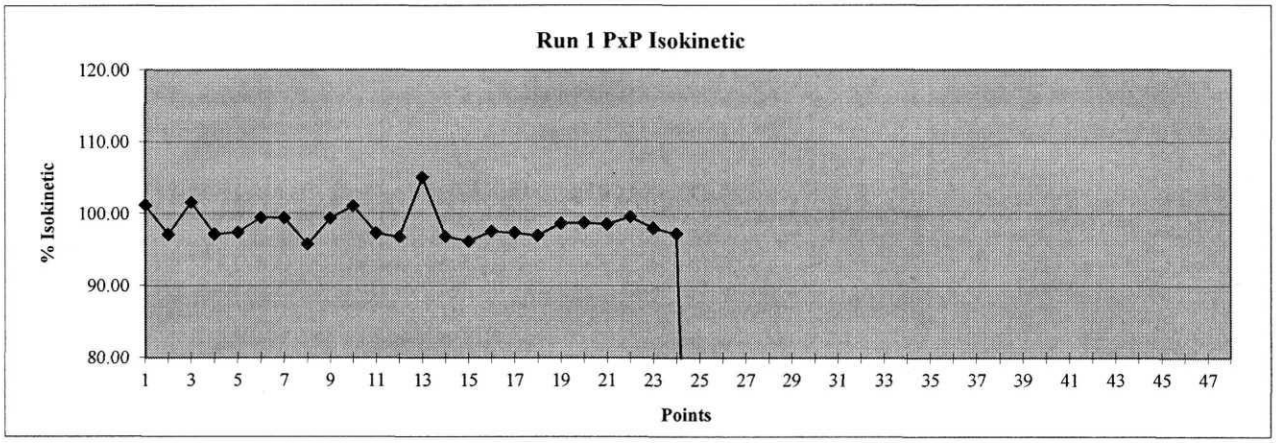
Front Half Emissions Summary					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.0000	0.0000	0.0000		0.0000
lbs/hr					#DIV/0!
lbs/MMBtu					

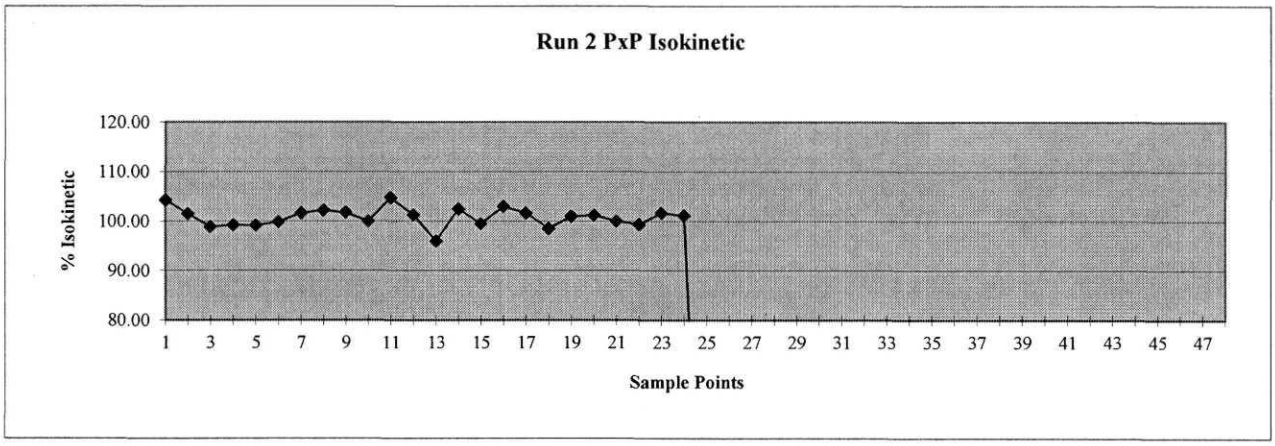
Total Emissions Summary w/back half condensable					
	Run 1	Run 2	Run 3	Run 4	Avg.
gr./dscf	0.0001	0.0000	0.0001		0.0001
lbs/hr	0.0027	0.0013	0.0027		0.0022
ppmdv	0.091912078	0.050646925	0.094911526		7.916E-02
at 7% O2	0.127757788	0.070399226	0.137423981		0.111860332

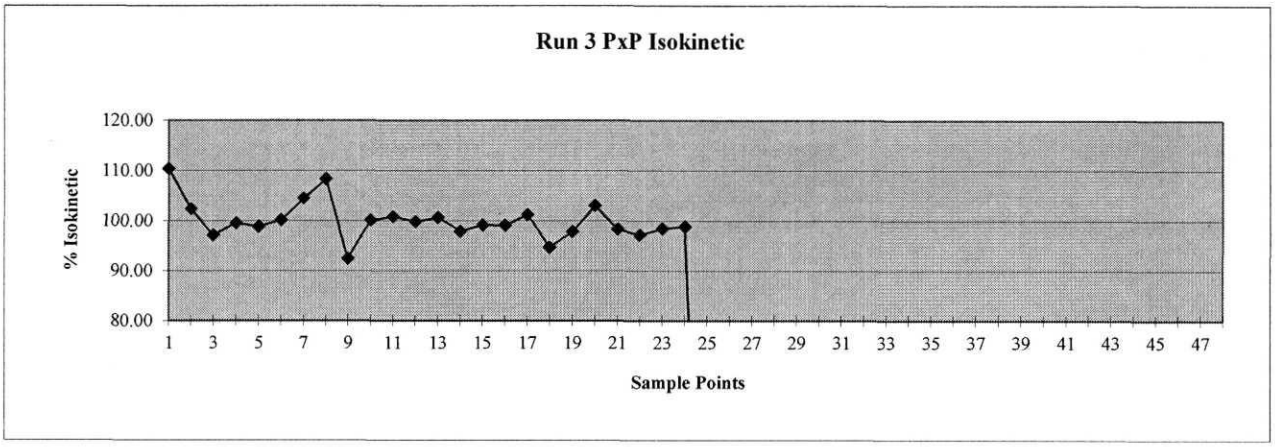
O2

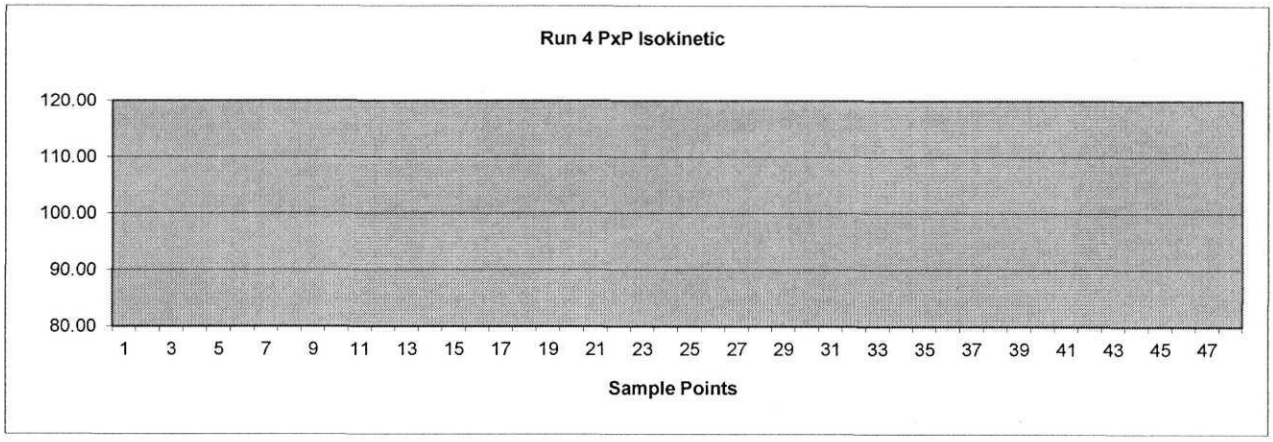
CO2

F factor used


Run 1 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Points


Run 2 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 3 PxP Isokinetic
% Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points


Run 4 PxP Isokinetic
120.00
110.00
100.00
90.00
80.00
1 3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47
Sample Points

Stericycle - HMIWI Stack				Flow & Moisture			Test Date	10/1/2014	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.62	25.34	-0.15	25.33	147	7.90	10.90	81.20	29.70	27.52
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2743
0.9820	0.84	53.014	211.20	80.13	43.348	9.941	0.1866	0.2743	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.597	40.00	6,397	8,681	3.12E+05	24	0.306	60	2.50	2.114583
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	63.398	0.24	1.38	148	78	78
2	65.255	0.31	1.79	148	77	77
3	67.275	0.18	1.04	151	77	77
4	68.885	0.19	1.09	147	78	78
5	70.475	0.24	1.38	147	78	78
6	72.265	0.30	1.73	147	79	79
7	74.310	0.43	2.48	148	79	79
8	76.750	0.42	2.42	147	79	79
9	79.075	0.40	2.30	147	79	79
10	81.430	0.34	1.96	147	80	80
11	83.645	0.22	1.27	146	80	80
12	85.365	0.40	2.30	147	80	80
13	87.663	0.22	1.27	142	81	81
14	89.530	0.27	1.56	145	81	81
15	91.430	0.37	2.13	147	83	83
16	93.640	0.44	2.53	146	81	81
17	96.075	0.54	3.11	147	81	81
18	98.760	0.58	3.34	147	81	81
19	101.530	0.63	3.63	147	81	81
20	104.465	0.55	3.17	146	81	81
21	107.215	0.47	2.71	146	82	82
22	109.760	0.40	2.30	146	82	82
23	112.135	0.35	2.02	144	83	83
24	114.330	0.32	1.84	143	82	82
25	116.412					
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
748.7	692.6	56.1
709.2	635.9	73.3
729.1	684.0	45.1
773.4	753.4	20.0
852.3	835.6	16.7

Isokinetics	98.4	
Test Date	10/1/2014	
Start Time	enter	enter
End Time	enter	

Stericycle - HMIWI Stack				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.62	25.34	-0.15	25.33	148	7.90	10.90	81.20	29.70	27.24
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2839
0.9820	0.84	47.712	220.00	81	38.919	10.355	0.2102	0.2839	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.538	36.24	5,782	7,864	2.74E+05	24	0.306	60	2.50	1.74
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	118.306	0.22	1.27	147.0	79.0	79.0
2	120.100	0.22	1.27	148.0	79.0	79.0
3	121.845	0.24	1.38	148.0	82.0	82.0
4	123.630	0.27	1.56	149.0	80.0	80.0
5	125.520	0.43	2.48	150.0	81.0	81.0
6	127.900	0.59	3.40	150.0	81.0	81.0
7	130.700	0.55	3.17	150.0	80.0	80.0
8	133.450	0.33	1.90	149.0	80.0	80.0
9	135.600	0.26	1.50	149.0	82.0	82.0
10	137.510	0.42	2.42	149.0	81.0	81.0
11	139.885	0.17	0.98	148.0	81.0	81.0
12	141.475	0.17	0.98	147.0	80.0	80.0
13	143.011	0.25	1.44	145.0	81.0	81.0
14	144.780	0.18	1.04	146.0	80.0	80.0
15	146.380	0.30	1.73	147.0	81.0	81.0
16	148.385	0.17	0.98	147.0	81.0	81.0
17	149.950	0.18	1.04	147.0	81.0	81.0
18	151.540	0.48	2.76	146.0	82.0	82.0
19	154.050	0.50	2.88	148.0	82.0	82.0
20	156.670	0.34	1.96	149.0	81.0	81.0
21	158.835	0.34	1.96	149.0	81.0	81.0
22	160.975	0.25	1.44	149.0	81.0	81.0
23	162.800	0.20	1.15	147.0	81.0	81.0
24	164.475	0.17	0.98	145.0	82.0	82.0
25	166.018					
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
871.80	724.10	147.7
762.50	713.40	49.1
727.50	717.90	9.6
696.50	692.30	4.2
821.7	812.3	9.4

Isokinetics	100.6
Test Date	10/1/2014
Start Time	enter
End Time	enter

Stericycle - HMIWI Stack				Flow & Moisture			Test Date	5/13/2009	
As ft^2	Pbar	Pq (static)	Ps	Avg. Ts F	CO2 - F_{CO2}	O2	N2+C	Md	Ms
3.62	25.34	-0.15	25.33	146	7.70	11.30	81.00	29.68	27.26
Y	Cp	Vm cf	Vlc	Avg. Tm F	Vm std	Vw std	Bws	S Bws	0.2734
0.9820	0.84	51.475	234.00	81	41.978	11.014	0.2078	0.2734	0.999
Avg. Sqrt Dlp	Vs	scfm wet	acfm	Qsd dscfh	# Sample Points	Dn	Total Test time (minutes)	Time @ point (minutes)	Avg. Dlh
0.582	39.15	6,263	8,496	2.98E+05	24	0.306	60	2.50	2.00
					TRUE				

Point No.	Meter (cf)	dl "p"	dl "h"	ts F	tm F (in)	tm F (out)
1	166.263	0.21	1.21	145.0	80.0	80.0
2	168.130	0.16	0.92	145.0	81.0	81.0
3	169.645	0.28	1.58	144.0	81.0	81.0
4	171.545	0.19	1.08	145.0	81.0	81.0
5	173.150	0.23	1.30	147.0	81.0	81.0
6	174.900	0.34	1.92	148.0	81.0	81.0
7	177.050	0.50	3.11	150.0	80.0	80.0
8	179.750	0.74	4.19	149.0	81.0	81.0
9	183.155	0.63	3.57	149.0	80.0	80.0
10	185.835	0.48	2.72	149.0	81.0	81.0
11	188.380	0.40	2.26	148.0	81.0	81.0
12	190.725	0.40	2.26	148.0	82.0	82.0
13	193.051	0.30	1.70	146.0	81.0	81.0
14	195.085	0.25	1.42	147.0	82.0	82.0
15	196.895	0.28	1.58	147.0	81.0	81.0
16	198.830	0.25	1.42	148.0	82.0	82.0
17	200.660	0.22	1.25	149.0	81.0	81.0
18	202.410	0.28	1.58	138.0	82.0	82.0
19	204.275	0.47	2.66	138.0	81.0	81.0
20	206.760	0.34	1.92	148.0	83.0	83.0
21	208.980	0.38	2.15	148.0	81.0	81.0
22	211.210	0.41	2.32	146.0	83.0	83.0
23	213.510	0.35	1.98	146.0	84.0	84.0
24	215.670	0.32	1.81	145.0	82.0	82.0
25	217.738					
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Imp. Liquid Collected		
Wt. (Final)	Wt. (Initial)	lc
855.9	701.2	154.7
696.8	641.9	54.9
683.5	670.9	12.6
739.0	737.0	2.0
808.3	798.5	9.8

Isokinetics	99.9
Test Date	10/1/2014
Start Time	enter
End Time	enter