APPENDIX A

CALCULATIONS

NOMENCLATURE AND DIMENSIONS

$1-B_{ws}$	Dry Mole Fraction
A	Cross-sectional area of stack, ft^2
acfm	Actual Cubic Feet Per Minute
A_n	Cross-sectional area of sampl
A_s	Cross-sectional area of stack,
B_{ws}	Moisture, % by volume
$B_{ws(sat)}$	Moisture (at saturation), % by volume
CO_2	Carbon Dioxide content, % by volume
C_{metals}	Metals concentration, µg/dscm
C_p	Pitot Tube Coefficient
C_{pm}	Particulate matter concentration, grains/dscf
C_{pmlb}	Particulate matter concentration, lb/dscf
dscf	Dry standard cubic feet
dscfm	Dry Standard Cubic Feet Per Minute
dscmm	Dry standard cubic meter per minute
DH	Avg Meter Orifice Pressure, in. H_2O
D_n	Nozzle Diameter, inches
$Dp^{1/2}$	Average Square Root Dp, $(in.\ H_2O)^{1/2}$
E_{metals}	Metals mass emission rate, lb/hr
E_{pm}	Particulate mass emission rate, lb/hr
I	Isokinetic Sampling Ratio, %
La	Maximum acceptable leakage check rate; equal to 0.020 ft^3/min or 4% of the average sampling rate, whichever is less
M_{catch}	Metal sample collected, µg
M_d	Molecular Weight (d.b.), lb/lb•mole
M_s	Molecular Weight (w.b.), lb/lb•mole
N_2	Nitrogen content, % by volume
O_2	Oxygen content, % by volume
P_{bar}	Barometric Pressure, inches Hg
P_s	Absolute Stack Pressure, inches Hg
P_{static}	Stack Static Pressure, inches H_2O
PM	Particulate matter collected during the test, mg
Q	Sample Run Duration, minutes
Q_a	Stack Gas Volumetric flow, acfm
Q_m	Average Sampling Rate, dscfm
Q_s	Stack Gas Volumetric flow, dscfm
Q_{sm}	Stack Gas Volumetric flow, dscmm
T_m	Average Meter Temperature, °F
T_s	Average Stack Temperature, °F
V_{lc}	Volume of Condensate Collected in Impingers and Silica Gel, ml
V_m	Sample Volume, ft^3
$V_{m(std)}$	Standard Meter Volume, ft^3
V_s	Stack Gas Velocity, ft/s
V_{wstd}	Standard Water Vapor Volume, ft^3
y	Meter Box Correction Factor

EXAMPLE CALCULATIONS FOR POLLUTANT EMISSIONS

1. **Cross sectional area of sampling nozzle, ft^2.**
   $A_n = (D_n / 2)^2 \times \pi / 144$

2. **Volume of dry gas sampled corrected to standard conditions, ft^3.**
   Note: V_m must be corrected for leakage if any leakage rates exceed L_a

   $V_{m(std)} = V_m \times 17.64 \times y\ [(P_{bar} + (DH/13.6))/(T_m + 460)]$

3. **Average sampling rate per minute, dscfm.**
   $Q_m = V_{m(std)} / Q$

4. **Absolute stack pressure, inches of Hg**
   $P_s = P_{bar} + (P_{static} / 13.6)$

5. **Moisture content in the gas stream, % by volume.**
   $B_{ws} = V_{lc} \times 100 \times 0.04707 / ((V_{m(std)} + (V_{lc} \times 0.04707))$

6. **Moisture (at saturation), % by volume.**
   $B_{ws(sat)} = 10\text{^}(6.691-(3144/(T_s + 390.86))) / P_s \times 100$

7. **Volume of water vapor at standard conditions, ft^3.**
   $V_{wstd} = V_{lc} \times 0.04707$

8. **Dry mole fraction**
   Note:
   If B_{ws} is $< B_{ws(sat)}$
   Then
   $1\text{-}B_{ws} = 1 - (B_{ws} / 100)$

   If $B_{ws(sat)}$ is $< B_{ws}$
   Then
   $1\text{-}B_{ws} = 1 - (B_{ws(sat)} / 100)$

9. **Dry Molecular Weight, lb/lb•mole**
   $M_d = (CO_2 \times 0.44)+(O_2 \times 0.32)+(N_2 \times 0.28)$

10. Wet Molecular Weight, lb/lb•mole

Note:

If B_{ws} is < $B_{ws(sat)}$

Then

$M_s = (M_d \times 1\text{-}B_{ws}) + (18 \times B_{ws} / 100)$

If $B_{ws(sat)}$ is < B_{ws}

Then

$M_s = (M_d \times 1\text{-}B_{ws}) + (18 \times B_{ws(sat)} / 100)$

11. Average stack gas velocity at stack conditions, ft/s

$V_s = 85.49 \times C_p \times Dp^{1/2} \times [(T_s + 460) / (P_s \times M_s)]^{1/2}$

12. Cross-sectional area of the stack, ft^2.

$A = A_s / 144$

13. Volumetric flow rate – wet basis at stack conditions, acfm

$Q_a = V_s \times A \times 60$

14. Volumetric flow rate – dry basis at standard conditions, dscfm

$Q_s = Q_a \times 1\text{-}B_{ws} \times P_s \times 17.64 / (T_s + 460)$

15. Volumetric Flow Rate – dry basis at standard conditions, dscmm

$Q_{sm} = Q_a \times 0.0283168466$

16. Percent of isokinetic sampling, %

$I = (0.0945 \times (T_s + 460) \times V_{m(std)}) / (1\text{-}B_{ws} \times Q \times V_s \times P_s \times A_n)$

17. Particulate concentration, grain/dscf

$C_{pm} = PM \times 7 / 453.6 / V_{m(std)}$

18. Particulate concentration, lb/dscf

$C_{pmlb} = C_{pm} / 7000$

19. Particulate mass emission rate, lb/hour

$E_{pm} = C_{pmlb} \times Q_s \times 60$

20. Metals concentration, µg/dscm

$C_{metals} = M_{catch} / (V_{m(std)} \times 0.0283168466)$

21. Metals mass emission rate, lb/hour

$E_{metals} = C_{metals} \times Q_{sm} \times 60 \times 2.2E\text{-}09$

EXAMPLE CALCULATIONS FOR GASEOUS POLLUTANTS MEASURED BY CONTINUOUS EMISSION MONITORS (CEMs)

1) Concentrations, parts per million, dry basis:

$$\text{ppm, dry} = \text{ppm, wet basis} \div \left(1 - \frac{\text{BWS,\%}}{100}\right)$$

2) Concentrations, parts per million, corrected to 15% Oxygen:

$$ppm, O_2 corrected = \frac{20.9 - 15}{20.9 - O_2, actual} \text{ x ppm,dry}$$

3) Pollutant Mass Emission Rate, pounds per hour.

$$\text{PMR, lb/hr} = \frac{\text{ppm,dry x Compound Molecular Weight}}{385{,}300{,}000 \text{ ft}^3\text{/mol}} \text{ x dscfm x 60}$$

Molecular Weights of Target Compounds

TGO	=	Total Gaseous Organics	16.01 (Methane); 44.01 (Propane)
SO_2	=	Sulfur Dioxide	64.05
NO_2	=	Nitrogen Oxides	46.00
CO	=	Carbon Monoxide	28.01
HCL	=	Hydrogen Chloride	36.47
HF	=	Hydrogen Fluoride	20.01
BWS	=	Proportion by Volume of Water Vapor in the Gas Stream	
PMR	=	Pollutant Mass Emission Rate, pounds per hour	
DSCFM	=	Dry standard cubic feet per minute	
SCF/mol	=	385.3×10^6	

4) CO_2 Greenhouse Gas Emission (Eq. Q-8, 40CFR98, Subpart Q)

$$CO_2\text{, lb/hr} = 5.18\text{x}10^{-7} * C_{CO2} \times Q \times \left(\frac{100 - \%H2O}{100}\right)$$

$5.18\text{x}10^{-7}$ = mass emission rate, corrected for moisture (metric tons/hr)
C_{CO2} = Hourly CO_2 concentration, dry basis (% CO_2)
Q = Hourly stack gas volumetric flow rate (scfh)

APPENDIX A-1

TOLUENE-SOLUBLE ORGANICS

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 315 - Particulate Matter
Pushing Baghouse

	RUN NUMBER	***P-315-1***	***P-315-2***	***P-315-3***	
	RUN DATE	***9/12-13/16***	***9/13-14/16***	***9/14-15/16***	***Average***
	RUN TIME	***1026-0007***	***1339-0327***	***1635-1049***	
	MEASURED DATA				
P_{static}	Stack Static Pressure, inches H_2O	-1.10	-1.10	-1.10	-1.10
y	Meter Box Correction Factor	0.993	0.993	0.993	0.993
P_{bar}	Barometric Pressure, inches Hg	30.20	30.15	30.21	30.19
V_m	Sample Volume, ft^3	82.488	80.346	81.234	81.356
$Dp^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	1.8265	1.8092	1.8195	1.8184
DH	Avg Meter Orifice Pressure, in. H_2O	2.01	1.96	2.01	1.99
T_m	Average Meter Temperature, °F	74	77	73	75
T_s	Average Stack Temperature, °F	114	120	106	113
V_{lc}	Condensate Collected, ml	25.8	30.9	28.9	28.5
CO_2	Carbon Dioxide content, % by volume	0.5	0.5	0.5	0.5
O_2	Oxygen content, % by volume	20.5	20.5	20.5	20.5
N_2	Nitrogen content, % by volume	79.0	79.0	79.0	79.0
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	
As	Diameter or Dimensions, inches:	35.50	35.50	35.50	35.50
Q	Sample Run Duration, minutes	106.3	103.3	104.3	105
D_n	Nozzle Diameter, inches	0.156	0.156	0.156	0.156
	CALCULATED DATA				
A_n	Nozzle Area, ft^2	0.000133	0.000133	0.000133	0.000133
$V_{m(std)}$	Standard Meter Volume, ft^3	82.115	79.396	81.045	80.852
Q_m	Average Sampling Rate, dscfm	0.773	0.769	0.777	0.773
P_s	Stack Pressure, inches Hg	30.12	30.07	30.13	30.11
B_{ws}	Moisture, % by volume	1.5	1.8	1.7	1.6
$B_{ws(sat)}$	Moisture (at saturation), % by volume	9.7	11.4	7.7	9.6
V_{wstd}	Standard Water Vapor Volume, ft^3	1.214	1.454	1.360	1.343
$1-B_{ws}$	Dry Mole Fraction	0.985	0.982	0.983	0.984
M_d	Molecular Weight (d.b.), lb/lb•mole	28.90	28.90	28.90	28.90
M_s	Molecular Weight (w.b.), lb/lb•mole	28.74	28.70	28.72	28.72
V_s	Stack Gas Velocity, ft/s	106.8	106.5	105.7	106.3
A	Stack Area, ft^2	6.9	6.9	6.9	6.87
Q_a	Stack Gas Volumetric flow, acfm	44,049	43,924	43,582	43,851
Q_s	Stack Gas Volumetric flow, dscfm	40,178	39,446	40,248	39,957
Q_s	Stack Gas Volumetric flow, dscmm	1,138	1,117	1,140	1,131
I	Isokinetic Sampling Ratio, %	99.6	101.0	100.0	100.2

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 315 - Particulate Matter
Pushing Baghouse

	RUN NUMBER	***P-315-1***	***P-315-2***	***P-315-3***	
	RUN DATE	***9/12-13/16***	***9/13-14/16***	***9/14-15/16***	***Average***
	RUN TIME	***1026-0007***	***1339-0327***	***1635-1049***	
	EMISSIONS DATA				
	Particulate Matter				
PM	Filter Weight Gain, mg	0.8	0.3	0.8	
PM	Filter MCEM PM, mg	0.4	0.4	0.4	
PM	Acetone PM, mg	0.4	0.4	0.4	
PM	Acetone+Toluene MCEM PM, mg	2.1	9	7.5	
PM	3W+3S MCEM PM, mg	10.5	24.8	3.4	
	Particulate Matter				
Mass	**Total mass, mg**	1.2	0.7	1.2	
C_{PM}	**Concentration, gr/dscf**	**2.26E-04**	**1.36E-04**	**2.28E-04**	**1.97E-04**
C_{PM}	**Concentration, lb/dscf**	**3.22E-08**	**1.94E-08**	**3.26E-08**	**2.81E-08**
C_{PM}	**Concentration, mg/dscm**	**0.52**	**0.31**	**0.52**	**0.45**
E_{PM}	**Emission Rate, lb/hr**	**0.08**	**0.05**	**0.08**	**0.07**
	Methylene Chloride Ext. Matter				
Mass	**Total mass, mg**	13.0	34.2	11.3	
C_{PM}	**Concentration, gr/dscf**	**2.44E-03**	**6.65E-03**	**2.15E-03**	**3.75E-03**
C_{PM}	**Concentration, lb/dscf**	**3.49E-07**	**9.50E-07**	**3.07E-07**	**5.35E-07**
C_{PM}	**Concentration, mg/dscm**	**5.59**	**15.21**	**4.92**	**8.58**
E_{PM}	**Emission Rate, lb/hr**	**0.84**	**2.25**	**0.74**	**1.28**

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 315 - Particulate Matter
Combustion Stack

	RUN NUMBER	***C-315-1***	***C-315-2***	***C-315-3***	
	RUN DATE	***9/12/2016***	***9/13/2016***	***9/14/2016***	***Average***
	RUN TIME	***1005-1215***	***0955-1155***	***0955-1155***	
	MEASURED DATA				
P_{static}	Stack Static Pressure, inches H_2O	-0.80	-0.70	-0.75	-0.75
y	Meter Box Correction Factor	1.009	1.009	1.009	1.009
P_{bar}	Barometric Pressure, inches Hg	30.20	30.15	30.21	30.19
V_m	Sample Volume, ft^3	83.816	81.601	83.787	83.068
$Dp^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	0.1960	0.2028	0.1993	0.1994
DH	Avg Meter Orifice Pressure, in. H_2O	1.44	1.63	1.66	1.58
T_m	Average Meter Temperature, °F	77	78	79	78
T_s	Average Stack Temperature, °F	362	365	358	362
V_{lc}	Condensate Collected, ml	176.3	186.5	209.3	190.7
CO_2	Carbon Dioxide content, % by volume	3.4	3.6	3.7	3.6
O_2	Oxygen content, % by volume	14.6	14.4	14.1	14.4
N_2	Nitrogen content, % by volume	81.9	82.1	82.1	82.0
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	
As	Diameter or Dimensions, inches:	168.00	168.00	168.00	168.00
Q	Sample Run Duration, minutes	130.0	120.0	120.0	123
D_n	Nozzle Diameter, inches	0.500	0.500	0.500	0.500
	CALCULATED DATA				
A_n	Nozzle Area, ft^2	0.001363	0.001363	0.001363	0.001363
$V_{m(std)}$	Standard Meter Volume, ft^3	84.192	81.717	83.923	83.277
Q_m	Average Sampling Rate, dscfm	0.648	0.681	0.699	0.676
P_s	Stack Pressure, inches Hg	30.14	30.10	30.15	30.13
B_{ws}	Moisture, % by volume	9.0	9.7	10.5	9.7
$B_{ws(sat)}$	Moisture (at saturation), % by volume	100.0	100.0	100.0	100.0
V_{wstd}	Standard Water Vapor Volume, ft^3	8.298	8.779	9.852	8.976
$1-B_{ws}$	Dry Mole Fraction	0.910	0.903	0.895	0.903
M_d	Molecular Weight (d.b.), lb/lb•mole	29.14	29.15	29.16	29.15
M_s	Molecular Weight (w.b.), lb/lb•mole	28.14	28.07	27.99	28.06
V_s	Stack Gas Velocity, ft/s	13.9	14.4	14.1	14.1
A	Stack Area, ft^2	153.9	153.9	153.9	153.94
Q_a	Stack Gas Volumetric flow, acfm	127,988	132,930	130,136	130,351
Q_s	Stack Gas Volumetric flow, dscfm	75,358	77,250	75,735	76,114
Q_s	Stack Gas Volumetric flow, dscmm	2,134	2,187	2,145	2,155
I	Isokinetic Sampling Ratio, %	97.0	99.5	104.3	100.3

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 315 - Particulate Matter
Combustion Stack

	RUN NUMBER	***C-315-1***	***C-315-2***	***C-315-3***	
	RUN DATE	***9/12/2016***	***9/13/2016***	***9/14/2016***	***Average***
	RUN TIME	***1005-1215***	***0955-1155***	***0955-1155***	
	EMISSIONS DATA				
	Particulate Matter				
PM	Filter Weight Gain, mg	37.1	9.2	49.3	
PM	Filter MCEM PM, mg	0.3	0.4	0.4	
PM	Acetone PM, mg	38.3	48.7	74.9	
PM	Acetone+Toluene MCEM PM, mg	3.2	12.1	31.2	
PM	3W+3S MCEM PM, mg	2.1	1.5	3.2	
	Particulate Matter				
Mass	**Total mass, mg**	75.4	57.9	124.2	
C_{PM}	**Concentration, gr/dscf**	**1.38E-02**	**1.09E-02**	**2.28E-02**	**1.59E-02**
C_{PM}	**Concentration, lb/dscf**	**1.97E-06**	**1.56E-06**	**3.26E-06**	**2.27E-06**
C_{PM}	**Concentration, mg/dscm**	**31.63**	**25.02**	**52.26**	**36.30**
E_{PM}	**Emission Rate, lb/hr**	**8.93**	**7.24**	**14.83**	**10.33**
	Methylene Chloride Ext. Matter				
Mass	**Total mass, mg**	5.6	14.0	34.8	
C_{PM}	**Concentration, gr/dscf**	**1.03E-03**	**2.64E-03**	**6.40E-03**	**3.36E-03**
C_{PM}	**Concentration, lb/dscf**	**1.47E-07**	**3.78E-07**	**9.14E-07**	**4.80E-07**
C_{PM}	**Concentration, mg/dscm**	**2.35**	**6.05**	**14.64**	**7.68**
E_{PM}	**Emission Rate, lb/hr**	**0.66**	**1.75**	**4.15**	**2.19**

APPENDIX A-2

FILTERABLE PM AND HAP METALS

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 29 - Multiple Metals
Pushing Baghouse

	RUN NUMBER	***P-29-1***	***P-29-2***	***P-29-3***	
	RUN DATE	***8/29-30/16***	***8/31-9/1/16***	***9/6-7/16***	***Average***
	RUN TIME	***1024-1738***	***1020-1620***	***1026-1757***	
	MEASURED DATA				
P_{static}	Stack Static Pressure, inches H_2O	-2.00	-2.00	-2.00	-2.00
y	Meter Box Correction Factor	0.989	0.989	0.989	0.989
P_{bar}	Barometric Pressure, inches Hg	30.11	30.05	30.16	30.11
V_m	Sample Volume, ft^3	126.979	115.541	110.569	117.696
$Dp^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	1.7585	1.7845	1.7697	1.7709
DH	Avg Meter Orifice Pressure, in. H_2O	1.76	1.81	1.77	1.78
T_m	Average Meter Temperature, °F	78	72	81	77
T_s	Average Stack Temperature, °F	120	111	124	118
V_{lc}	Condensate Collected, ml	66.3	53.5	59.0	59.6
CO_2	Carbon Dioxide content, % by volume	0.2	0.2	0.2	0.2
O_2	Oxygen content, % by volume	20.7	20.7	20.7	20.7
N_2	Nitrogen content, % by volume	79.2	79.2	79.1	79.2
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	
As	Diameter or Dimensions, inches:	35.50	35.50	35.50	35.50
Q	Sample Run Duration, minutes	168	152	146	155
D_n	Nozzle Diameter, inches	0.156	0.156	0.156	0.156
	CALCULATED DATA				
A_n	Nozzle Area, ft^2	0.000133	0.000133	0.000133	0.000133
$V_{m(std)}$	Standard Meter Volume, ft^3	124.514	114.362	108.002	115.626
$V_{m(std)}$	Standard Meter Volume, m^3	3.526	3.238	3.058	3.274
Q_m	Average Sampling Rate, dscfm	0.741	0.755	0.741	0.746
P_s	Stack Pressure, inches Hg	29.96	29.90	30.01	29.96
B_{ws}	Moisture, % by volume	2.4	2.2	2.5	2.4
$B_{ws(sat)}$	Moisture (at saturation), % by volume	11.5	8.9	12.8	11.1
V_{wstd}	Standard Water Vapor Volume, ft^3	3.121	2.518	2.777	2.805
$1-B_{ws}$	Dry Mole Fraction	0.976	0.978	0.975	0.976
M_d	Molecular Weight (d.b.), lb/lb•mole	28.85	28.85	28.86	28.86
M_s	Molecular Weight (w.b.), lb/lb•mole	28.59	28.62	28.59	28.60
V_s	Stack Gas Velocity, ft/s	103.9	104.7	104.8	104.5
A	Stack Area, ft^2	6.9	6.9	6.9	6.87
Q_a	Stack Gas Volumetric flow, acfm	42,855	43,170	43,240	43,088
Q_s	Stack Gas Volumetric flow, dscfm	38,098	39,021	38,217	38,445
Q_s	Stack Gas Volumetric flow, dscmm	1,079	1,105	1,082	1,089
I	Isokinetic Sampling Ratio, %	100.8	100.2	100.5	100.5

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 29 - Multiple Metals
Pushing Baghouse

	RUN NUMBER	***P-29-1***	***P-29-2***	***P-29-3***	
	RUN DATE	***8/29-30/16***	***8/31-9/1/16***	***9/6-7/16***	***Average***
	RUN TIME	***1024-1738***	***1020-1620***	***1026-1757***	
	EMISSIONS DATA				
	Particulate Matter				
PM	Filter Weight Gain, mg	1	1.5	0.9	
PM	Beaker Weight Gain, mg	1.8	2.7	1.9	
PM	Total Catch, g	0.0028	0.0042	0.0028	0.0033
C_{PM}	**Concentration, gr/dscf**	**3.47E-04**	**5.67E-04**	**4.00E-04**	**4.38E-04**
C_{PM}	**Concentration, mg/m^3**	**0.8**	**1.3**	**0.9**	**1.0**
C_{PM}	**Concentration, lb/dscf**	**4.96E-08**	**8.10E-08**	**5.72E-08**	**6.26E-08**
E_{PM}	**Emission Rate, lb/hr**	**0.11**	**0.19**	**0.13**	**0.14**
	Antimony	DLL	BDL	BDL	DLL
Sb	Target Catch, µg	0.79	0.015	0.015	0.3
C_{Sb}	Concentration, µg/dscm	2.23E-01	4.63E-03	4.90E-03	7.74E-02
E_{Sb}	Emission Rate, lb/hr	3.17E-05	6.76E-07	7.01E-07	1.10E-05
	Arsenic	BDL	BDL	BDL	BDL
Ar	Target Catch, µg	1.0	1.0	1.0	1.0
C_{Ar}	Concentration, µg/dscm	2.84E-01	3.09E-01	3.27E-01	3.06E-01
E_{Ar}	Emission Rate, lb/hr	4.04E-05	4.50E-05	4.67E-05	4.40E-05
	Beryllium	BDL	BDL	BDL	BDL
Be	Target Catch, µg	0.2	0.2	0.2	0.2
C_{Be}	Concentration, µg/dscm	5.67E-02	6.18E-02	6.54E-02	6.13E-02
E_{Be}	Emission Rate, lb/hr	8.08E-06	9.01E-06	9.34E-06	8.81E-06
	Cadmium	BDL	BDL	BDL	BDL
Cd	Target Catch, µg	0.1	0.1	0.1	0.1
C_{Cd}	Concentration, µg/dscm	2.84E-02	3.09E-02	3.27E-02	3.06E-02
E_{Cd}	Emission Rate, lb/hr	4.04E-06	4.50E-06	4.67E-06	4.40E-06
	Chromium	ADL	ADL	ADL	ADL
Cr	Target Catch, µg	20.8	15.7	10.1	15.5
C_{Cr}	Concentration, µg/dscm	5.90E+00	4.86E+00	3.29E+00	4.68E+00
E_{Cr}	Emission Rate, lb/hr	8.41E-04	7.09E-04	4.70E-04	6.73E-04

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 29 - Multiple Metals
Pushing Baghouse

	RUN NUMBER	***P-29-1***	***P-29-2***	***P-29-3***	
	RUN DATE	***8/29-30/16***	***8/31-9/1/16***	***9/6-7/16***	***Average***
	RUN TIME	***1024-1738***	***1020-1620***	***1026-1757***	
	EMISSIONS DATA - Continued				
	Cobalt	DLL	DLL	DLL	DLL
Co	Target Catch, µg	0.3	0.2	0.2	0.2
C_{Co}	Concentration, µg/dscm	8.71E-02	6.18E-02	6.54E-02	7.14E-02
E_{Co}	Emission Rate, lb/hr	1.24E-05	9.01E-06	9.34E-06	1.02E-05
	Lead	ADL	ADL	ADL	ADL
Pb	Target Catch, µg	1.2	1.1	1.0	1.1
C_{Pb}	Concentration, µg/dscm	3.26E-01	3.27E-01	3.33E-01	3.29E-01
E_{Pb}	Emission Rate, lb/hr	4.64E-05	4.77E-05	4.76E-05	4.73E-05
	Manganese	ADL	ADL	ADL	ADL
Mn	Target Catch, µg	10.9	6.5	7.1	8.1
C_{Mn}	Concentration, µg/dscm	3.08E+00	2.01E+00	2.31E+00	2.47E+00
E_{Mn}	Emission Rate, lb/hr	4.39E-04	2.93E-04	3.30E-04	3.54E-04
	Mercury	BDL	BDL	BDL	BDL
Hg	Target Catch, µg	0.1	0.1	0.1	0.1
C_{Hg}	Concentration, µg/dscm	3.40E-02	3.71E-02	3.92E-02	3.68E-02
E_{Hg}	Emission Rate, lb/hr	4.85E-06	5.40E-06	5.61E-06	5.29E-06
	Nickel	ADL	ADL	ADL	ADL
Ni	Target Catch, µg	18.9	11.1	6.9	12.3
C_{Ni}	Concentration, µg/dscm	5.37E+00	3.44E+00	2.26E+00	3.69E+00
E_{Ni}	Emission Rate, lb/hr	7.65E-04	5.02E-04	3.22E-04	5.30E-04
	Selenium	BDL	BDL	BDL	BDL
Se	Target Catch, µg	2.0	2.0	2.0	2.0
C_{Se}	Concentration, µg/dscm	5.67E-01	6.18E-01	6.54E-01	6.13E-01
E_{Se}	Emission Rate, lb/hr	8.08E-05	9.01E-05	9.34E-05	8.81E-05

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 5/29 - Particulate and Multiple Metals
Combustion Stack

	RUN NUMBER	*C-5/29-1*	*C-5/29-2*	*C-5/29-3*	
	RUN DATE	*9/6/2016*	*9/7/2016*	*9/7/2016*	*Average*
	RUN TIME	*1002-1302*	*0840-1140*	*1230-1530*	
	MEASURED DATA				
P_{static}	Stack Static Pressure, inches H_2O	-0.80	-0.75	-0.75	-0.77
y	Meter Box Correction Factor	1.005	1.005	1.005	1.005
P_{bar}	Barometric Pressure, inches Hg	30.20	30.16	30.16	30.17
V_m	Sample Volume, ft^3	127.648	126.213	133.030	128.964
$Dp^{1/2}$	Average Square Root Dp, $(in.\ H_2O)^{1/2}$	0.2001	0.1985	0.2000	0.1995
DH	Avg Meter Orifice Pressure, in. H_2O	1.52	1.47	1.60	1.53
T_m	Average Meter Temperature, °F	91	80	93	88
T_s	Average Stack Temperature, °F	311	302	281	298
V_{lc}	Condensate Collected, ml	300.9	303.0	351.0	318.3
CO_2	Carbon Dioxide content, % by volume	3.0	3.7	3.7	3.4
O_2	Oxygen content, % by volume	15.0	14.2	14.2	14.5
N_2	Nitrogen content, % by volume	82.0	82.1	82.1	82.1
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	
As	Diameter or Dimensions, inches:	168.00	168.00	168.00	168.00
Q	Sample Run Duration, minutes	180	180	180	180
D_n	Nozzle Diameter, inches	0.500	0.500	0.500	0.500
	CALCULATED DATA				
A_n	Nozzle Area, ft^2	0.001363	0.001363	0.001363	0.001363
$V_{m(std)}$	Standard Meter Volume, ft^3	124.490	125.418	129.125	126.344
$V_{m(std)}$	Standard Meter Volume, m^3	3.525	3.551	3.656	3.578
Q_m	Average Sampling Rate, dscfm	0.692	0.697	0.717	0.702
P_s	Stack Pressure, inches Hg	30.14	30.10	30.10	30.12
B_{ws}	Moisture, % by volume	10.2	10.2	11.3	10.6
$B_{ws(sat)}$	Moisture (at saturation), % by volume	100.0	100.0	100.0	100.0
V_{wstd}	Standard Water Vapor Volume, ft^3	14.163	14.262	16.522	14.982
$1-B_{ws}$	Dry Mole Fraction	0.898	0.898	0.887	0.894
M_d	Molecular Weight (d.b.), lb/lb•mole	29.08	29.15	29.15	29.13
M_s	Molecular Weight (w.b.), lb/lb•mole	27.95	28.02	27.89	27.95
V_s	Stack Gas Velocity, ft/s	13.7	13.5	13.5	13.6
A	Stack Area, ft^2	153.9	153.9	153.9	153.94
Q_a	Stack Gas Volumetric flow, acfm	126,975	125,146	124,623	125,581
Q_s	Stack Gas Volumetric flow, dscfm	78,619	78,311	79,182	78,704
Q_s	Stack Gas Volumetric flow, dscmm	2,226	2,218	2,242	2,229
I	Isokinetic Sampling Ratio, %	99.3	100.5	102.3	100.7

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 5/29 - Particulate and Multiple Metals
Combustion Stack

	RUN NUMBER	***C-5/29-1***	***C-5/29-2***	***C-5/29-3***	
	RUN DATE	***9/6/2016***	***9/7/2016***	***9/7/2016***	***Average***
	RUN TIME	***1002-1302***	***0840-1140***	***1230-1530***	
	EMISSIONS DATA				
	Particulate Matter				
PM	Filter Weight Gain, mg	177.7	93.8	159	
PM	Beaker Weight Gain, mg	129.8	80.5	77.6	
PM	Total Catch, g	0.3075	0.1743	0.2366	0.2395
C_{PM}	**Concentration, gr/dscf**	**3.81E-02**	**2.14E-02**	**2.83E-02**	**2.93E-02**
C_{PM}	**Concentration, mg/m^3**	**87.2**	**49.1**	**64.7**	**67.0**
C_{PM}	**Concentration, lb/dscf**	**5.45E-06**	**3.06E-06**	**4.04E-06**	**4.18E-06**
E_{PM}	**Emission Rate, lb/hr**	**25.69**	**14.40**	**19.19**	**19.76**
	Antimony	BDL	DLL	DLL	DLL
Sb	Target Catch, µg	0.2	1.7	0.2	0.7
C_{Sb}	Concentration, µg/dscm	5.67E-02	4.70E-01	6.29E-02	1.97E-01
E_{Sb}	Emission Rate, lb/hr	1.67E-05	1.38E-04	1.86E-05	5.76E-05
	Arsenic	ADL	ADL	ADL	ADL
Ar	Target Catch, µg	7.2	7.8	9.5	8.1
C_{Ar}	Concentration, µg/dscm	2.03E+00	2.19E+00	2.60E+00	2.27E+00
E_{Ar}	Emission Rate, lb/hr	5.97E-04	6.41E-04	7.70E-04	6.69E-04
	Beryllium	BDL	BDL	BDL	BDL
Be	Target Catch, µg	0.2	0.2	0.2	0.2
C_{Be}	Concentration, µg/dscm	5.67E-02	5.63E-02	5.47E-02	5.59E-02
E_{Be}	Emission Rate, lb/hr	1.67E-05	1.65E-05	1.62E-05	1.64E-05
	Cadmium	DLL	DLL	DLL	DLL
Cd	Target Catch, µg	0.10	0.10	0.11	0.1
C_{Cd}	Concentration, µg/dscm	2.84E-02	2.87E-02	2.98E-02	2.90E-02
E_{Cd}	Emission Rate, lb/hr	8.34E-06	8.41E-06	8.82E-06	8.52E-06
	Chromium	ADL	ADL	ADL	ADL
Cr	Target Catch, µg	19.2	18.7	18.7	18.9
C_{Cr}	Concentration, µg/dscm	5.46E+00	5.27E+00	5.12E+00	5.28E+00
E_{Cr}	Emission Rate, lb/hr	1.60E-03	1.54E-03	1.52E-03	1.55E-03

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 5/29 - Particulate and Multiple Metals
Combustion Stack

	RUN NUMBER	***C-5/29-1***	***C-5/29-2***	***C-5/29-3***	
	RUN DATE	***9/6/2016***	***9/7/2016***	***9/7/2016***	***Average***
	RUN TIME	***1002-1302***	***0840-1140***	***1230-1530***	
	EMISSIONS DATA - Continued				
	Cobalt	DLL	DLL	DLL	DLL
Co	Target Catch, µg	0.22	0.14	0.23	0.2
C_{Co}	Concentration, µg/dscm	6.27E-02	3.80E-02	6.26E-02	5.44E-02
E_{Co}	Emission Rate, lb/hr	1.84E-05	1.11E-05	1.85E-05	1.60E-05
	Lead	ADL	ADL	ADL	ADL
Pb	Target Catch, µg	10.5	7.3	12.8	10.2
C_{Pb}	Concentration, µg/dscm	2.97E+00	2.07E+00	3.49E+00	2.84E+00
E_{Pb}	Emission Rate, lb/hr	8.72E-04	6.05E-04	1.03E-03	8.37E-04
	Manganese	ADL	ADL	ADL	ADL
Mn	Target Catch, µg	13.0	12.6	5.7	10.4
C_{Mn}	Concentration, µg/dscm	3.69E+00	3.55E+00	1.57E+00	2.94E+00
E_{Mn}	Emission Rate, lb/hr	1.08E-03	1.04E-03	4.65E-04	8.62E-04
	Mercury	DLL	DLL	DLL	DLL
Hg	Target Catch, µg	0.5	0.4	1.0	0.6
C_{Hg}	Concentration, µg/dscm	1.46E-01	1.24E-01	2.65E-01	1.78E-01
E_{Hg}	Emission Rate, lb/hr	4.28E-05	3.64E-05	7.84E-05	5.26E-05
	Nickel	ADL	ADL	ADL	ADL
Ni	Target Catch, µg	16.9	15.6	9.9	14.1
C_{Ni}	Concentration, µg/dscm	4.78E+00	4.38E+00	2.72E+00	3.96E+00
E_{Ni}	Emission Rate, lb/hr	1.40E-03	1.28E-03	8.04E-04	1.16E-03
	Selenium	DLL	DLL	DLL	DLL
Se	Target Catch, µg	17.0	11.8	12.7	13.8
C_{Se}	Concentration, µg/dscm	4.82E+00	3.32E+00	3.47E+00	3.87E+00
E_{Se}	Emission Rate, lb/hr	1.42E-03	9.73E-04	1.03E-03	1.14E-03

APPENDIX A-3

$PM_{2.5}$ FILTERABLE AND CONDENSABLE

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 5/202 - Particulate Matter
Pushing Baghouse

	RUN NUMBER	*P-202-1*	*P-202-2*	*P-202-3*	
	RUN DATE	*8/29-30/2016*	*8/31-9/1/16*	*9/6-7/16*	*Average*
	RUN TIME	*1024-1351*	*1020-1349*	*1026-1619*	
	MEASURED DATA				
P_{static}	Stack Static Pressure, inches H_2O	-0.85	-0.86	-1.10	-0.94
y	Meter Box Correction Factor	0.993	0.993	0.993	0.993
P_{bar}	Barometric Pressure, inches Hg	30.11	30.05	30.16	30.11
V_m	Sample Volume, ft^3	82.138	82.845	81.623	82.202
$Dp^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	1.6794	1.7058	1.7508	1.7120
DH	Avg Meter Orifice Pressure, in. H_2O	1.36	1.41	1.47	1.41
T_m	Average Meter Temperature, °F	79	78	81	79
T_s	Average Stack Temperature, °F	123	121	134	126
V_{lc}	Condensate Collected, ml	40.6	43.2	42.5	42.1
CO_2	Carbon Dioxide content, % by volume	0.2	0.2	0.2	0.2
O_2	Oxygen content, % by volume	20.7	20.7	20.7	20.7
N_2	Nitrogen content, % by volume	79.2	79.2	79.1	79.2
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	
As	Diameter or Dimensions, inches:	35.50	35.50	35.50	35.50
Q	Sample Run Duration, minutes	128.4	127.2	122.2	126
D_n	Nozzle Diameter, inches	0.148	0.148	0.148	0.148
	CALCULATED DATA				
A_n	Nozzle Area, ft^2	0.000119	0.000119	0.000119	0.000119
$V_{m(std)}$	Standard Meter Volume, ft^3	80.641	81.334	79.992	80.656
Q_m	Average Sampling Rate, dscfm	0.628	0.639	0.654	0.641
P_s	Stack Pressure, inches Hg	30.05	29.99	30.08	30.04
B_{ws}	Moisture, % by volume	2.3	2.4	2.4	2.4
$B_{ws(sat)}$	Moisture (at saturation), % by volume	12.4	11.8	16.7	13.6
V_{wstd}	Standard Water Vapor Volume, ft^3	1.911	2.033	2.000	1.982
$1-B_{ws}$	Dry Mole Fraction	0.977	0.976	0.976	0.976
M_d	Molecular Weight (d.b.), lb/lb•mole	28.85	28.85	28.86	28.86
M_s	Molecular Weight (w.b.), lb/lb•mole	28.60	28.59	28.60	28.60
V_s	Stack Gas Velocity, ft/s	99.3	100.8	104.5	101.6
A	Stack Area, ft^2	6.9	6.9	6.9	6.87
Q_a	Stack Gas Volumetric flow, acfm	40,965	41,591	43,090	41,882
Q_s	Stack Gas Volumetric flow, dscfm	36,381	36,942	37,551	36,958
Q_s	Stack Gas Volumetric flow, dscmm	1,030	1,046	1,063	1,047
I	Isokinetic Sampling Ratio, %	99.3	99.6	100.3	99.7

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 5/202 - Particulate Matter
Pushing Baghouse

	RUN NUMBER	***P-202-1***	***P-202-2***	***P-202-3***	
	RUN DATE	***8/29-30/2016***	***8/31-9/1/16***	***9/6-7/16***	***Average***
	RUN TIME	***1024-1351***	***1020-1349***	***1026-1619***	
	EMISSIONS DATA				
	Particulate Matter				
PM	Filter Weight Gain, mg	0.6	0	0.3	
PM	Beaker Weight Gain, mg	1.45	1.85	2.85	
PM	Total Catch, g	0.0021	0.0019	0.0032	0.0024
C_{PM}	**Concentration, gr/dscf**	**3.92E-04**	**3.51E-04**	**6.08E-04**	**4.50E-04**
C_{PM}	**Concentration, lb/dscf**	**5.60E-08**	**5.01E-08**	**8.68E-08**	**6.43E-08**
C_{PM}	**Concentration, mg/dscm**	**0.90**	**0.80**	**1.39**	**1.03**
E_{PM}	**Emission Rate, lb/hr**	**0.12**	**0.11**	**0.20**	**0.14**
	Inorganic Condensible Particulate				
IC PM	Weight gain, mg	1.10	1.10	5.60	
PM	Total Catch, g	0.001	0.001	0.006	
C_{PM}	**Concentration, gr/dscf**	**2.11E-04**	**2.09E-04**	**1.08E-03**	**5.00E-04**
C_{PM}	**Concentration, lb/dscf**	**3.01E-08**	**2.98E-08**	**1.54E-07**	**7.14E-08**
C_{PM}	**Concentration, mg/dscm**	**0.48**	**0.48**	**2.47**	**1.14**
E_{PM}	**Emission Rate, lb/hr**	**0.07**	**0.07**	**0.35**	**0.16**
	Organic Condensible Particulate				
PM	Weight gain, mg	3.50	3.70	3.80	
PM	Total Catch, g	0.004	0.004	0.004	
C_{PM}	**Concentration, gr/dscf**	**6.70E-04**	**7.02E-04**	**7.33E-04**	**7.02E-04**
C_{PM}	**Concentration, lb/dscf**	**9.57E-08**	**1.00E-07**	**1.05E-07**	**1.00E-07**
C_{PM}	**Concentration, mg/dscm**	**1.53**	**1.61**	**1.68**	**1.61**
E_{PM}	**Emission Rate, lb/hr**	**0.21**	**0.22**	**0.24**	**0.22**
	Total Condensible Particulate				
C_{PM}	**Concentration, gr/dscf**	**8.80E-04**	**9.11E-04**	**1.81E-03**	**1.20E-03**
C_{PM}	**Concentration, mg/dscm**	**2.01**	**2.08**	**4.15**	**2.75**
E_{PM}	**Emission Rate, lb/hr**	**0.27**	**0.29**	**0.58**	**0.38**
	Total Particulate				
C_{PM}	**Concentration, gr/dscf**	**1.27E-03**	**1.26E-03**	**2.42E-03**	**1.65E-03**
C_{PM}	**Concentration, mg/dscm**	**2.91**	**2.89**	**5.54**	**3.78**
E_{PM}	**Emission Rate, lb/hr**	**0.40**	**0.40**	**0.78**	**0.53**

PRELIMINARY TEST DATA SHEET

Location:	Combustion Stack	Start Time:		RUN No.	prelim
Date:	6-Sep-2016	End Time:		JOB No.	050074.0172

STACK DATA

% Moisture:	10	% est.	$\%CO_2$:	2.99	%
Barometric:	30.11	in Hg	$\%O_2$:	15.01	%
Static Press:	-0.82	in H_2O	$\%N_2/CO$:	82.00	%
Stack Press:	30.05	in Hg	M_d:	29.08	lb/lb-mole
Stack Area:	153.93	ft^2	Est. M_w:	27.97	lb/lb-mole
Stack Area:	22165.9	in^2			
STANDARD CONDITIONS			T_{std}:	68	°F
			P_{std}:	29.92	inches Hg

PRE-TEST CALCULATIONS

Viscocity μ_s:	238.58	mpoise
Cunningham:	1.1086	
D_{50LL}:	9.88	µm
$[N_{re}>3162]$ D_{50LL}:	-	µm
D_{50T}:	10.44	µm
Estimated Q_s:	0.6303	acfm
Estimated N_{re}:	2367	
Estimated ΔH:	0.477	in H_2O

EQUIPMENT

METER BOX:	MB-3	
Y:	1.009	
ΔH@:	1.890	in H_2O
Estimated T_m:	85	°F
Cp':	0.840	S/N
Cp:	0.840	S/N
Nozzle Dia:	0.342	inches
Nozzle Area:	0.00064	ft^2

PRELIMINARY TRAVERSE

Sample Point	Cyclonic Flow Check Null Angle °	Preliminary ΔP (in. H_2O) ΔP_m	ΔP_s	ΔP_{s2}	Stack Temperature (°F)
1		0.040	0.040	-	357.0
2		0.040	0.040	-	350.0
3		0.050	0.050	-	352.0
4		0.050	0.050	-	350.0
5		0.060	0.060	-	350.0
6		0.060	0.060	-	350.0
7		0.050	0.050	-	350.0
8		0.050	0.050	-	350.0
9		0.050	0.050	-	350.0
10		0.050	0.050	-	350.0
11		0.060	0.060	-	350.0
12		0.030	0.030	-	350.0
13		0.040	0.040	-	350.0
14		0.040	0.040	-	350.0
15		0.050	0.050	-	350.0
16		0.060	0.060	-	350.0
17		0.050	0.050	-	350.0
18		0.050	0.050	-	350.0
19		0.020	0.020	-	350.0
20		0.020	0.020	-	350.0
21		0.040	0.040	-	350.0
22		0.040	0.040	-	350.0
23		0.050	0.050	-	350.0
24		0.050	0.050	-	350.0
	-	0.046	0.046	-	350.375
	(absolute °)				

NOZZLE SELECTION

Nozzle S/N	Diam. Dn (in)	Vn (fps)	V_{min} (fps)	V_{max} (fps)	ΔP_{min} (inches H_2O)	ΔP_{max}
1	0.125	123.26	94.47	150.81	1.80	4.58
2	0.138	101.13	76.29	124.54	1.17	3.12
3	0.151	84.47	62.45	104.82	0.78	2.21
4	0.164	71.61	51.62	89.66	0.54	1.62
5	0.181	58.79	40.59	74.62	0.33	1.12
6	0.198	49.13	31.97	63.35	0.21	0.81
7	0.214	42.06	25.29	55.16	0.13	0.61
8	0.233	35.48	18.36	47.59	0.07	0.46
9	0.265	27.43	13.71	38.42	0.04	0.30
10	0.299	21.54	10.77	31.80	0.02	0.20
11	***0.342***	16.47	8.23	24.70	***0.01***	***0.12***
12	***0.391***	12.60	6.30	18.90	***0.01***	***0.07***

NOTE: This spreadsheet contains circular references, therefore, iterative calculation must be turned on in Excel. In the 2010 version of Excel, the iterative calculation selection is located in File/Options/Formulas.

Test Personnel (signature/date)

Project Leader (signature/date)

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Spreadsheet for U.S. EPA Method 201A - Determination of Filterable PM10 and PM2.5 Emissions

TEST DATA SHEET

Location:	Combustion Stack	Start Time:	10:02:00	RUN No.	C-202-1
Date:	6-Sep-2016	End Time:	14:09:00	JOB No.	050074.0172

STACK DATA		EQUIPMENT		ESTIMATES		+/- 50°F ΔH			
% Moisture:	10 % est.	METER BOX:	MB-3	Ts (°F): 350.4	Tm (°F): 85	Ts-50°	300.38	Ts+50°	400.38
Barometric:	30.20 in Hg	Y:	1.009	Est. Qs:	0.6303 cfm	Est. Qs:	0.6565	Est. Qs:	0.6809
Static Press:	-0.80 in H_2O	ΔH@:	1.890 in H_2O	Est. μ_s:	238.58 mpoise	Est. μ_s:	219.34	Est. μ_s:	241.78
Stack Press:	30.14 in Hg	Cp':	0.840 S/N -	Est. ΔH:	0.477 in H_2O	Est. ΔH:	0.543	Est. ΔH:	0.424
$\%CO_2$:	2.99 %	Cp:	0.840 S/N -	LEAK CHECKS					
$\%O_2$:	15.01 %	Nozzle Dia:	0.3420 inches	DGM initial			cf		
$\%N_2/CO$:	82.00 %	Stack Area:	153.9 ft^2	DGM final			cf		
M_d:	29.08 lb/lb-mole	# of Points:	48 points	Time			min.		
Est. M_w:	27.97 lb/lb-mole	Run Time:	240.00 min	Leak Rate	-	-	cfm		
T_{std}:	528 °R	P_{std}:	29.92 in Hg	Vacuum			in. Hg		

Sample Point	Clock Time (min)	Dry Gas Meter Reading (ft^3)	Pitot ΔP ("H_2O)	Gas Temperatures (°F) DGM Inlet	DGM Outlet	Stack	Orifice Press. ΔH (in H_2O) Ideal	Actual	Pump Vac. (in Hg)	Gas Temps (°F) Probe	Filter	Imp. Exit	Qs (acfm)	D_{50} [10 µm]	D_{50} [2.5 µm]
1	5.25	822.4000	0.050	78.0	77.0	350	0.472	0.450	1	249	250	68	0.6133	10.63	2.56
2	10.50	824.3000	0.050	77.0	77.0	350	0.472	0.450	1	249	250	68	0.6462	10.25	2.40
3	15.75	826.3000	0.050	76.0	77.0	325	0.502	0.450	1	247	250	66	0.5798	10.81	2.61
4	20.50	828.1500	0.040	77.0	76.0	349	0.472	0.450	1	251	250	63	0.6247	10.48	2.49
5	25.75	829.9000	0.050	77.0	76.0	337	0.486	0.450	1	250	250	62	0.6046	10.61	2.54
6	31.00	831.8000	0.050	77.0	76.0	305	0.528	0.450	1	247	249	63	0.5803	10.59	2.50
7	36.25	833.7000	0.050	78.0	77.0	319	0.510	0.460	1	252	250	60	0.6209	10.24	2.37
8	41.00	835.7000	0.040	79.0	77.0	307	0.526	0.500	1	247	249	56	0.6076	10.27	2.37
9	45.75	837.5000	0.040	80.0	77.0	323	0.505	0.500	2	251	250	57	0.6369	10.09	2.31
10	50.50	839.3500	0.040	80.0	78.0	339	0.486	0.500	2	249	250	56	0.6318	10.30	2.41
11	55.25	841.1500	0.040	80.0	79.0	341	0.484	0.480	2	250	251	58	0.6679	9.92	2.26
12	60.00	843.0500	0.040	82.0	79.0	348	0.476	0.480	2	251	250	58	0.5840	10.99	2.71
13	65.25	844.7000	0.050	82.0	79.0	361	0.461	0.480	2	251	250	59	0.6508	10.30	2.43
14	70.00	846.7000	0.040	83.0	80.0	364	0.458	0.480	2	249	250	59	0.6485	10.35	2.45
15	75.25	848.5000	0.050	84.0	80.0	357	0.466	0.480	2	249	250	60	0.5974	10.90	2.68
16	80.50	850.3500	0.050	85.0	81.0	369	0.454	0.450	2	250	251	61	0.6704	10.16	2.38
17	85.25	852.4000	0.040	86.0	81.0	371	0.451	0.450	2	250	250	61	0.6878	9.99	2.31
18	90.50	854.3000	0.050	87.0	82.0	371	0.452	0.450	2	248	250	62	0.6211	10.74	2.62
19	95.75	856.2000	0.050	88.0	83.0	365	0.460	0.450	2	250	249	62	0.6155	10.75	2.62
20	101.00	858.1000	0.050	87.0	84.0	357	0.470	0.480	2	250	250	62	0.6320	10.47	2.50
21	106.25	860.0700	0.050	88.0	84.0	342	0.487	0.480	2	251	250	62	0.6387	10.25	2.39
22	111.50	862.1000	0.050	88.0	85.0	353	0.475	0.480	2	250	250	63	0.6294	10.47	2.49
23	116.75	864.0750	0.050	89.0	85.0	331	0.502	0.480	2	252	252	60	0.6118	10.46	2.47
24	122.00	866.0500	0.050	89.0	85.0	332	0.501	0.480	2	250	254	61	0.6154	10.43	2.46
25	127.25	868.0340	0.050	89.0	87.0	318	0.521	0.500	2	253	252	65	0.6283	10.14	2.33
26	132.50	870.1000	0.050	90.0	87.0	315	0.525	0.500	2	252	251	60	0.5751	10.77	2.58
27	137.75	872.0000	0.050	91.0	87.0	300	0.546	0.520	3	251	251	57	0.6228	10.03	2.27
28	142.50	874.1000	0.040	91.0	88.0	300	0.547	0.530	3	250	251	57	0.6222	10.03	2.27
29	147.25	876.0000	0.040	92.0	88.0	297	0.551	0.540	3	251	249	58	0.6192	10.04	2.27
30	152.50	877.9000	0.050	92.0	88.0	305	0.539	0.540	3	250	251	60	0.6258	10.04	2.28
31	157.75	880.0000	0.050	94.0	89.0	301	0.546	0.540	3	248	251	61	0.6208	10.06	2.28
32	162.50	882.1000	0.040	94.0	90.0	304	0.543	0.530	3	248	249	60	0.5899	10.46	2.44
33	167.25	883.9000	0.040	94.0	90.0	307	0.539	0.520	3	251	251	61	0.6251	10.07	2.29
34	172.50	885.8000	0.050	94.0	90.0	316	0.526	0.500	3	254	249	61	0.5722	10.81	2.60
35	178.25	887.7000	0.060	95.0	91.0	327	0.513	0.500	3	254	253	62	0.6402	10.09	2.32
36	183.75	890.0000	0.055	95.0	91.0	318	0.524	0.500	3	247	248	62	0.6185	10.25	2.37
37	189.00	892.1500	0.050	95.0	92.0	312	0.534	0.500	4	246	249	63	0.6275	10.09	2.30
38	194.25	894.2500	0.050	95.0	92.0	304	0.545	0.500	4	252	250	63	0.6062	10.26	2.36
39	199.50	896.3000	0.050	95.0	92.0	295	0.558	0.500	4	247	248	64	0.5844	10.44	2.43
40	204.75	898.3000	0.050	95.0	92.0	285	0.573	0.500	4	247	251	65	0.5767	10.43	2.41
41	210.00	900.3000	0.050	95.0	92.0	297	0.555	0.520	4	248	250	66	0.6153	10.08	2.29
42	215.25	902.4000	0.050	96.0	92.0	301	0.549	0.520	4	252	252	60	0.6180	10.09	2.29
43	220.25	904.5000	0.045	96.0	93.0	302	0.549	0.520	4	248	252	61	0.5564	10.88	2.61
44	225.00	906.3000	0.040	96.0	93.0	305	0.544	0.520	5	251	250	61	0.6207	10.10	2.30
45	230.25	908.2000	0.050	97.0	93.0	331	0.509	0.480	5	250	249	61	0.5801	10.87	2.64
46	235.50	910.1000	0.050	97.0	93.0	319	0.525	0.480	6	250	249	62	0.5713	10.86	2.62
47	240.75	912.0000	0.050	97.0	94.0	323	0.521	0.480	6	249	251	62	0.6341	10.12	2.32
48	246.00	914.1000	0.050	97.0	94.0	325	0.518	0.490	6	251	250	63	0.6057	10.48	2.47
		916.1010													

Actual Run Time	V_m	ΔP (avg)	$T_{m\ (avg)}$	$T_{s\ (avg)}$	Max Vac.	ΔH (avg)	$V_{s\ (avg)}$
			546.5 °R	786.2 °R			
246.00 min	93.701 cf	0.048 in H_2O	86.8 °F	326.5 °F	6	0.489 in H_2O	14.961 fps

Test Personnel (signature/date)

Project Leader (signature/date)

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Spreadsheet for U.S. EPA Method 201A - Determination of Filterable PM10 and PM2.5 Emissions

TEST RESULTS and DATA ANALYSIS SHEET

Location:	Combustion Stack	Start Time:	10:02:00	RUN No.	C-202-1
Date:	6-Sep-2016	End Time:	14:09:00	JOB No.	050074.0172

STACK DATA			Molecular Weight			EQUIPMENT			AVERAGE TEST DATA		
% Moisture:	10	% est.	%CO2:	2.99	%	METER BOX:	MB-3		Average ΔP:	0.05	in H_2O
Barometric:	30.20	in Hg	%O2:	15.01	%	Y:	1.009		Average T_m:	546.5	°R
Static Press:	-0.80	in H_2O	%N2/CO:	82.00	%	ΔH@:	1.890	in H_2O	Average T_s:	786.2	°R
Stack Press:	30.14	in Hg	Md:	29.08	lb/lb-mole	Cp': 0.840	S/N	-	Average ΔH:	0.49	in H_2O
Stack Area:	153.9	ft^2	Actual Mw:	28.17	lb/lb-mole	Cp: 0.840	S/N	-	T_{std}:	528.00	°R
# of Points:	48	points	Run Time:	246.00	min	Nozzle Dia:	0.3420	inches	P_{std}:	29.92	in Hg

$<PM_{2.5}$ Filter Analysis			$<PM_{2.5}$ Recovery Analysis			Moisture Analysis		
Container 1:	64.4	mg	Container 4:	1.65	mg	Container 6:	970.9	g
C1 + Filter Tare:		mg	Cont. 4 Tare:		mg	Silica Gel Tare:	947.4	g
Acetone V_{aw1}:		ml	Acetone V_{aw4}:		ml	M_{sg}:	23.5	g
Acetone W_{a1}:		mg	Acetone W_{a4}:		mg	$V_{wsg(std)}$:	1.106	scf
(Filter) M_1:	64.400	mg	($PM_{2.5}$) M_4:	1.650	mg	Container 5:	152.8	ml
$>PM_{10}$ Recovery Analysis			$PM_{2.5-10}$ Recovery Analysis			$V_{wc(std)}$:	7.192	scf
Container 2:	3.30	mg	Container 3:	6.95	mg			
Cont. 2 Tare:		mg	Cont. 3 Tare:		mg	V_{ws}:	8.298	scf
Acetone V_{aw2}:		ml	Acetone V_{aw3}:		ml	B_{ws}:	0.082	H_20
Acetone W_{a2}:		mg	Acetone W_{a3}:		mg	Actual % H_2O:	8.2	%
($PM_{2.5}$) M_2:	3.300	mg	($PM_{10-2.5}$) M_3:	6.950	mg	Condensable		
						Organic:	4.90	mg
						Inorganci:	29.70	mg
						Total Condensable:	34.60	mg

CALCULATIONS AND DATA ANALYSIS

V_m:	93.7010	acf - [Actual Sample Volume]	μ:	234.728	mpoise - [Actual Gas Viscosity]
V_{ms}:	92.3150	dscf - [Corrected Sample Volume (std)]	C:	1.0945	[Cunningham Correction Factor]
V_{ws}:	8.2984	scf - [Volume of Water Vapor]	D_{50}:	10.539	μmeter - D50 for Cyclone 1
Q_{Sst}:	0.37526	dscfm - [Corrected Dry Sampling Rate (std)]	D_{50IV}:	2.490	μmeter - D50 for Cyclone IV
Q_s:	0.60453	acfm - [Actual Final Sampling Rate]	$Q_{sd(stack)}$:	5,128,570.01	dscf/hr - [Dry Stack Flow Rate (std)]
I:	105.934	% - [Percent Isokinetic Sampling]	$Q_{sw(stack)}$:	5,589,590.98	scf/hr - [Wet Stack Flow Rate (std)]
N_{re}:	2403	[Actual Reynolds Number]	$Q_{sd(stack)}$:	137,696.92	acfm
$V_{s(avg)}$:	14.91	fps - [Avgerage Stack Velocity]			
$Q_{sd(stack)}$:	85,476.17	dscfm			

Concentrations			Emission Rates		
$PM_{2.5}$:	25.26768	mg/dscm	$PM_{2.5}$:	8.0897	lb/hr
PM_{10}:	27.92642	mg/dscm	PM_{10}:	8.9409	lb/hr
Total Filterable PM:	29.18885	mg/dscm	Total Filterable PM:	9.3451	lb/hr
CPM:	13.23636	mg/dscm	CPM:	4.2377	lb/hr
Total PM:	42.42521	mg/dscm	Total PM:	13.5828	lb/hr

Test Personnel (signature/date)

Project Leader (signature/date)

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Spreadsheet for U.S. EPA Method 201A - Determination of Filterable PM10 and PM2.5 Emissions

TEST DATA SHEET

Location:	Combustion Stack	Start Time:	8:35:00	RUN No.	C-202-2
Date:	7-Sep-2016	End Time:	11:54:00	JOB No.	050074.0172

STACK DATA		EQUIPMENT		ESTIMATES		+/- 50°F ΔH			
% Moisture:	10 % est.	METER BOX:	3	Ts (°F): 270.5	Tm (°F): 70	Ts-50°	220.5	Ts+50°	320.5
Barometric:	30.16 in Hg	Y:	1.000	Est. Qs:	0.5562 cfm	Est. Qs:	0.5856	Est. Qs:	0.6097
Static Press:	-0.75 in H_2O	ΔH@:	1.800 in H_2O	Est. μ_s:	219.95 mpoise	Est. μ_s:	200.78	Est. μ_s:	223.92
Stack Press:	30.10 in Hg	Cp':	0.840 S/N -	Est. ΔH:	0.425 in H_2O	Est. ΔH:	0.490	Est. ΔH:	0.372
$\%CO_2$:	3.66 %	Cp:	0.840 S/N -	LEAK CHECKS					
$\%O_2$:	14.21 %	Nozzle Dia:	0.3420 inches	DGM initial			cf		
$\%N_2/CO$:	82.13 %	Stack Area:	153.9 ft^2	DGM final			cf		
M_d:	29.15 lb/lb-mole	# of Points:	48 points	Time			min.		
Est. M_w:	28.04 lb/lb-mole	Run Time:	240.00 min	Leak Rate	-	-	cfm		
T_{std}:	528 °R	P_{std}:	29.92 in Hg	Vacuum			in. Hg		

Sample Point	Clock Time (min)	Dry Gas Meter Reading (ft^3)	Pitot ΔP ("H_2O)	Gas Temperatures (°F) DGM Inlet	DGM Outlet	Stack	Orifice Press. ΔH (in H_2O) Ideal	Actual	Pump Vac. (in Hg)	Gas Temps (°F) Probe	Filter	Imp. Exit	Qs (acfm)	D_{50} [10 µm]	D_{50} [2.5 µm]
1	4.75	950.7500	0.040	70.0	70.0	357	0.340	0.350	1	251	252	68	0.5966	10.90	2.67
2	9.50	952.4000	0.040	71.0	70.0	356	0.341	0.350	1	250	251	64	0.6133	10.67	2.58
3	14.00	954.1000	0.035	71.0	70.0	356	0.341	0.360	1	249	251	61	0.6093	10.72	2.60
4	18.50	955.7000	0.035	71.0	70.0	358	0.339	0.400	1	251	251	57	0.6109	10.72	2.60
5	23.25	957.3000	0.040	73.0	71.0	362	0.336	0.450	1	251	251	55	0.5981	10.93	2.69
6	28.00	958.9500	0.040	73.0	71.0	363	0.336	0.450	1	251	250	54	0.6351	10.48	2.50
7	32.75	960.7000	0.040	74.0	71.0	365	0.334	0.450	1	260	250	55	0.6542	10.28	2.42
8	37.50	962.5000	0.040	75.0	72.0	366	0.334	0.480	1	247	244	55	0.6539	10.29	2.43
9	42.00	964.3000	0.035	76.0	72.0	345	0.351	0.480	1	248	246	54	0.6720	9.90	2.25
10	46.75	966.1000	0.040	76.0	73.0	350	0.348	0.480	1	250	248	54	0.6400	10.30	2.42
11	51.50	967.9000	0.040	77.0	74.0	335	0.362	0.480	1	253	251	54	0.6270	10.31	2.41
12	56.25	969.7000	0.040	78.0	74.0	330	0.366	0.480	1	250	249	54	0.6224	10.31	2.41
13	61.50	971.5000	0.050	79.0	75.0	317	0.379	0.480	1	249	250	54	0.5836	10.66	2.54
14	66.25	973.4000	0.040	80.0	76.0	297	0.400	0.480	1	249	250	55	0.5942	10.32	2.38
15	71.00	975.2000	0.040	81.0	77.0	297	0.401	0.480	1	250	250	55	0.5931	10.33	2.38
16	75.75	977.0000	0.040	82.0	77.0	350	0.350	0.480	1	250	251	56	0.6341	10.37	2.45
17	80.25	978.8000	0.035	82.0	78.0	352	0.349	0.480	1	249	251	57	0.6145	10.62	2.55
18	84.75	980.4500	0.035	82.0	78.0	353	0.348	0.480	1	250	251	57	0.6152	10.62	2.55
19	89.50	982.1000	0.040	82.0	78.0	358	0.344	0.480	1	251	252	57	0.6397	10.38	2.46
20	94.25	983.9000	0.040	82.0	78.0	358	0.344	0.480	1	251	250	57	0.6753	9.99	2.30
21	99.00	985.8000	0.040	82.0	79.0	353	0.349	0.480	1	241	251	58	0.6705	9.99	2.30
22	104.25	987.7000	0.050	83.0	79.0	336	0.364	0.480	1	253	249	58	0.5934	10.73	2.58
23	109.00	989.6000	0.040	83.0	79.0	241	0.469	0.480	1	252	245	58	0.5776	9.93	**2.18**
24	113.75	991.5000	0.040	83.0	80.0	288	0.413	0.480	1	251	248	59	0.5665	10.58	2.48
25	118.50	993.2480	0.040	84.0	80.0	307	0.393	0.480	2	250	251	60	0.6149	10.17	2.33
26	123.25	995.1000	0.040	83.0	80.0	266	0.438	0.480	2	249	249	62	0.5662	10.35	2.36
27	128.00	996.9000	0.040	84.0	81.0	261	0.445	0.480	2	250	248	63	0.5301	10.78	2.53
28	133.25	998.6000	0.050	84.0	81.0	304	0.397	0.480	2	250	249	58	0.5680	10.73	2.55
29	138.00	1000.5000	0.040	85.0	81.0	307	0.394	0.460	2	248	251	56	0.6296	10.00	2.26
30	142.75	1002.4000	0.040	85.0	82.0	298	0.404	0.460	2	246	248	56	0.5890	10.39	2.41
31	147.50	1004.2000	0.040	85.0	82.0	292	0.410	0.450	2	250	250	57	0.5843	10.39	2.40
32	152.25	1006.0000	0.040	86.0	83.0	315	0.387	0.450	2	254	251	58	0.5677	10.85	2.61
33	157.00	1007.7000	0.040	87.0	83.0	294	0.409	0.450	2	247	250	58	0.5680	10.62	2.50
34	161.75	1009.4500	0.040	87.0	83.0	293	0.410	0.450	2	254	250	59	0.5997	10.21	2.33
35	167.00	1011.3000	0.050	87.0	84.0	258	0.452	0.450	2	248	251	59	0.5308	10.74	2.51
36	171.75	1013.2000	0.040	88.0	84.0	288	0.416	0.450	2	253	250	59	0.4821	**11.86**	**3.02**
37	176.25	1014.7000	0.035	87.0	84.0	289	0.415	0.450	2	252	251	61	0.5780	10.44	2.42
38	181.00	1016.4000	0.040	87.0	84.0	245	0.468	0.450	10	250	251	62	0.5385	10.49	2.40
39	185.75	1018.1760	0.040	87.0	85.0	217	0.509	0.450	11	253	250	60	0.5306	10.28	2.29
40	190.50	1020.0000	0.040	87.0	85.0	214	0.513	0.450	12	251	252	62	0.5213	10.37	2.32
41	195.25	1021.8000	0.040	87.0	85.0	214	0.513						-	-	-
42													-	-	-
43													-	-	-
44													-	-	-
45													-	-	-
46													-	-	-
47													-	-	-
48													-	-	-

Actual Run Time	V_m	ΔP (avg)	$T_{m\ (avg)}$	$T_{s\ (avg)}$	Max Vac.	ΔH (avg)	$V_{s\ (avg)}$
195.25 min	71.050 cf	0.040 in H_2O	539.2 °R / 79.6 °F	772.0 °R / 312.3 °F	12	0.458 in H_2O	13.763 fps

Test Personnel (signature/date)

Project Leader (signature/date)

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Spreadsheet for U.S. EPA Method 201A - Determination of Filterable PM10 and PM2.5 Emissions

TEST RESULTS and DATA ANALYSIS SHEET

Location:	AK Steel-Middletown	Start Time:	8:35:00	RUN No.	C-202-2
Date:	7-Sep-2016	End Time:	11:54:00	JOB No.	050074.0172

STACK DATA			Molecular Weight			EQUIPMENT			AVERAGE TEST DATA		
% Moisture:	10	% est.	%CO2:	3.66	%	METER BOX:	3		Average ΔP:	0.04	in H_2O
Barometric:	30.16	in Hg	%O2:	14.21	%	Y:	1.000		Average T_m:	539.2	°R
Static Press:	-0.75	in H_2O	%N2/CO:	82.13	%	ΔH@:	1.800	in H_2O	Average T_s:	772.0	°R
Stack Press:	30.10	in Hg	Md:	29.15	lb/lb-mole	Cp':	0.840	S/N -	Average ΔH:	0.46	in H_2O
Stack Area:	153.9	ft^2	Actual Mw:	28.17	lb/lb-mole	Cp:	0.840	S/N -	T_{std}:	528.00	°R
# of Points:	48	points	Run Time:	195.25	min	Nozzle Dia:	0.3420	inches	P_{std}:	29.92	in Hg

<$PM_{2.5}$ Filter Analysis			<$PM_{2.5}$ Recovery Analysis			Moisture Analysis		
Container 1:	51.75	mg	Container 4:	0.65	mg	Container 6:	955.8	g
C1 + Filter Tare:		mg	Cont. 4 Tare:		mg	Silica Gel Tare:	936.9	g
Acetone V_{aw1}:		ml	Acetone V_{aw4}:		ml	M_{sg}:	18.9	g
Acetone W_{a1}:		mg	Acetone W_{a4}:		mg	$V_{wsg(std)}$:	0.890	scf
(Filter) M_1:	51.750	mg	($PM_{2.5}$) M_4:	0.650	mg	Container 5:	125.9	ml
>PM_{10} Recovery Analysis			$PM_{2.5-10}$ Recovery Analysis			$V_{wc(std)}$:	5.926	scf
Container 2:	6.25	mg	Container 3:	7.75	mg			
Cont. 2 Tare:		mg	Cont. 3 Tare:		mg	V_{ws}:	6.816	scf
Acetone V_{aw2}:		ml	Acetone V_{aw3}:		ml	B_{ws}:	0.088	H_20
Acetone W_{a2}:		mg	Acetone W_{a3}:		mg	Actual % H_2O:	8.8	%
($PM_{2.5}$) M_2:	6.250	mg	($PM_{10-2.5}$) M_3:	7.750	mg			

Condensable		
Organic:	4.40	mg
Inorganci:	25.50	mg
Total Condensable:	29.90	mg

CALCULATIONS AND DATA ANALYSIS

V_m:	71.0500	acf - [Actual Sample Volume]			
V_{ms}:	70.2049	dscf - [Corrected Sample Volume (std)]			
V_{ws}:	6.8157	scf - [Volume of Water Vapor]	μ:	230.524	mpoise - [Actual Gas Viscosity]
Q_{Sst}:	0.35956	dscfm - [Corrected Dry Sampling Rate (std)]	C:	1.0891	[Cunningham Correction Factor]
Q_s:	0.57321	acfm - [Actual Final Sampling Rate]	D_{50}:	10.767	μmeter - D50 for Cyclone 1
I:	109.056	% - [Percent Isokinetic Sampling]	D_{50IV}:	2.572	μmeter - D50 for Cyclone IV
N_{re}:	2360	[Actual Reynolds Number]	$Q_{sd(stack)}$:	4,773,333.20	dscf/hr - [Dry Stack Flow Rate (std)]
$V_{s(avg)}$:	13.73	fps - [Avgerage Stack Velocity]	$Q_{sw(stack)}$:	5,236,744.92	scf/hr - [Wet Stack Flow Rate (std)]
$Q_{sd(stack)}$:	79,555.55	dscfm	$Q_{sd(stack)}$:	126,826.89	acfm

Concentrations			Emission Rates		
$PM_{2.5}$:	26.35897	mg/dscm	$PM_{2.5}$:	7.8545	lb/hr
PM_{10}:	30.25748	mg/dscm	PM_{10}:	9.0162	lb/hr
Total Filterable PM:	33.40144	mg/dscm	Total Filterable PM:	9.9531	lb/hr
CPM:	15.04071	mg/dscm	CPM:	4.4819	lb/hr
Total PM:	48.44215	mg/dscm	Total PM:	14.4349	lb/hr

Test Personnel (signature/date)

Project Leader (signature/date)

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Spreadsheet for U.S. EPA Method 201A - Determination of Filterable PM10 and PM2.5 Emissions

TEST DATA SHEET

Location:	Combustion Stack	Start Time:	12:25:00	RUN No.	C-202-3
Date:	7-Sep-2016	End Time:	16:11:00	JOB No.	050074.0172

STACK DATA		EQUIPMENT		ESTIMATES		+/- 50°F ΔH			
% Moisture:	10 % est.	METER BOX:	MB-3	Ts (°F): 350.4	Tm (°F): 95	Ts-50°	300.38	Ts+50°	400.38
Barometric:	30.16 in Hg	Y:	1.009	Est. Qs: 0.6273	cfm	Est. Qs:	0.6543	Est. Qs:	0.6786
Static Press:	-0.75 in H_2O	ΔH@:	1.890 in H_2O	Est. μ_s: 237.85	mpoise	Est. μ_s:	219.33	Est. μ_s:	241.77
Stack Press:	30.10 in Hg	Cp':	0.840 S/N -	Est. ΔH: 0.483	in H_2O	Est. ΔH:	0.549	Est. ΔH:	0.429
$\%CO_2$:	3.78 %	Cp:	0.840 S/N -	LEAK CHECKS					
$\%O_2$:	13.65 %	Nozzle Dia:	0.3420 inches	DGM initial			cf		
$\%N_2$/CO:	82.57 %	Stack Area:	153.9 ft^2	DGM final			cf		
M_d:	29.15 lb/lb-mole	# of Points:	24 points	Time			min.		
Est. M_w:	28.04 lb/lb-mole	Run Time:	120.00 min	Leak Rate	-	-	cfm		
T_{std}:	528 °R	P_{std}:	29.92 in Hg	Vacuum			in. Hg		

Sample Point	Clock Time (min)	Dry Gas Meter Reading (ft^3)	Pitot ΔP ("H_2O)	Gas Temperatures (°F) DGM Inlet	DGM Outlet	Stack	Orifice Press. ΔH (in H_20) Ideal	Actual	Pump Vac. (in Hg)	Gas Temps (°F) Probe	Filter	Imp. Exit	Qs (acfm)	D_{50} [10 μm]	D_{50} [2.5 μm]
1	4.50	1021.9800	0.035	86.0	85.0	331	0.498	0.500	1	233	249	68	0.6595	9.90	2.24
2	9.25	1023.8000	0.040	85.0	86.0	304	0.535	0.530	1	252	250	67	0.5969	10.35	2.40
3	14.00	1025.6000	0.040	86.0	85.0	322	0.509	0.520	1	249	248	59	0.6449	9.97	2.26
4	18.75	1027.5000	0.040	86.0	86.0	308	0.529	0.530	1	250	250	57	0.5994	10.36	2.41
5	23.25	1029.3000	0.035	87.0	86.0	325	0.506	0.530	1	250	250	56	0.6462	9.98	2.27
6	28.00	1031.1000	0.040	88.0	86.0	333	0.496	0.530	1	246	248	56	0.6522	9.99	2.28
7	32.75	1033.0000	0.040	89.0	86.0	332	0.497	0.530	1	252	250	56	0.6165	10.39	2.44
8	37.50	1034.8000	0.040	89.0	86.0	326	0.505	0.520	1	248	249	57	0.6118	10.39	2.43
9	42.25	1036.6000	0.040	90.0	87.0	339	0.490	0.520	1	249	248	58	0.6553	10.02	2.30
10	46.75	1038.5000	0.035	90.0	87.0	333	0.497	0.500	1	251	249	58	0.6503	10.01	2.29
11	51.50	1040.3000	0.040	91.0	87.0	319	0.515	0.500	1	244	251	59	0.5711	10.83	2.61
12	56.25	1042.0000	0.040	92.0	88.0	322	0.512	0.510	1	254	251	59	0.6059	10.42	2.44
13	60.75	1043.8000	0.035	92.0	88.0	320	0.515	0.500	2	250	250	59	0.6025	10.44	2.45
14	65.25	1045.5000	0.035	92.0	88.0	309	0.530	0.500	2	249	249	59	0.6289	10.02	2.27
15	70.00	1047.3000	0.040	92.0	89.0	322	0.513	0.500	2	251	249	57	0.5885	10.64	2.53
16	74.75	1049.0500	0.040	92.0	89.0	324	0.510	0.500	2	251	250	53	0.5900	10.64	2.53
17	79.25	1050.8000	0.035	93.0	90.0	319	0.518	0.500	2	252	250	55	0.6354	10.04	2.29
18	83.75	1052.6000	0.035	93.0	90.0	331	0.502	0.500	2	250	251	55	0.6093	10.47	2.47
19	88.25	1054.3000	0.035	93.0	90.0	318	0.519	0.500	2	247	250	57	0.5993	10.46	2.46
20	93.00	1056.0000	0.040	94.0	90.0	337	0.495	0.500	2	252	249	58	0.6153	10.45	2.47
21	97.50	1057.8000	0.035	94.0	90.0	326	0.509	0.500	2	250	248	58	0.5693	10.93	2.66
22	102.00	1059.4000	0.035	94.0	91.0	344	0.487	0.500	2	252	251	58	0.6546	10.07	2.32
23	106.50	1061.2000	0.035	94.0	91.0	337	0.496	0.500	2	249	251	59	0.5768	10.94	2.68
24	111.00	1062.8000	0.035	94.0	91.0	345	0.486	0.500	2	249	251	59	0.6623	10.00	2.29
25	115.75	1064.6190	0.040	95.0	92.0	297	0.551	0.500	2	249	250	59	0.6090	10.13	2.30
26	120.50	1066.5000	0.040	94.0	92.0	308	0.535	0.500	2	250	251	63	0.5918	10.45	2.44
27	125.25	1068.3000	0.040	94.0	92.0	308	0.535	0.500	2	251	249	60	0.5918	10.45	2.44
28	130.00	1070.1000	0.040	94.0	92.0	330	0.506	0.500	2	254	251	60	0.6257	10.26	2.39
29	134.75	1071.9500	0.040	95.0	92.0	320	0.519	0.500	2	251	249	60	0.5838	10.68	2.55
30	139.50	1073.7000	0.040	95.0	92.0	320	0.519	0.500	2	250	251	61	0.6339	10.07	2.30
31	144.00	1075.6000	0.035	95.0	92.0	339	0.494	0.500	2	250	251	61	0.6133	10.50	2.49
32	148.50	1077.3000	0.035	95.0	92.0	340	0.493	0.500	2	250	250	59	0.6140	10.50	2.49
33	153.25	1079.0000	0.040	95.0	92.0	342	0.490	0.500	3	250	248	59	0.6518	10.08	2.32
34	158.00	1080.9000	0.040	95.0	92.0	351	0.480	0.500	3	249	252	59	0.5897	10.92	2.68
35	162.50	1082.6000	0.035	95.0	93.0	343	0.490	0.500	3	251	251	59	0.6520	10.09	2.33
36	167.25	1084.4000	0.040	96.0	93.0	345	0.488	0.500	3	250	251	60	0.6187	10.49	2.49
37	172.00	1086.2000	0.040	95.0	93.0	322	0.517	0.500	3	250	247	60	0.6015	10.47	2.46
38	176.75	1088.0000	0.040	96.0	93.0	331	0.505	0.500	3	250	252	60	0.6417	10.09	2.32
39	181.25	1089.9000	0.035	96.0	93.0	324	0.514	0.500	3	251	249	60	0.5653	10.97	2.67
40	185.75	1091.5000	0.035	96.0	93.0	325	0.513	0.500	3	250	252	61	0.6014	10.50	2.48
41	190.50	1093.2000	0.040	96.0	93.0	331	0.505	0.500	3	249	251	61	0.6417	10.09	2.32
42	195.25	1095.1000	0.040	97.0	94.0	332	0.505	0.500	3	250	251	62	0.6076	10.50	2.48
43	200.00	1096.9000	0.040	98.0	94.0	338	0.497	0.500	3	250	250	62	0.6116	10.51	2.49
44	204.75	1098.7000	0.040	98.0	94.0	330	0.507	0.500	3	251	249	63	0.6055	10.50	2.49
45	209.25	1100.5000	0.035	97.0	94.0	345	0.489	0.500	3	250	250	63	0.6518	10.11	2.34
46	213.75	1102.3000	0.035	97.0	95.0	343	0.492	0.500	3	248	250	61	0.6135	10.53	2.51
47	217.75	1104.0000	0.030	97.0	94.0	339	0.496	0.500	5	249	247	60	0.6065	10.58	2.53
48	222.25	1105.5000	0.035	97.0	94.0	330	0.507	0.500	5	250	252	59	0.5978	10.60	2.52
		1107.1820													

Actual Run Time	V_m	ΔP (avg)	$T_{m\ (avg)}$	$T_{s\ (avg)}$	Max Vac.	ΔH (avg)	$V_{s\ (avg)}$
222.25 min	85.202 cf	0.038 in H_2O	551.5 °R 91.8 °F	788.0 °R 328.3 °F	5	0.505 in H_2O	13.429 fps

Test Personnel (signature/date)

Project Leader (signature/date)

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Spreadsheet for U.S. EPA Method 201A - Determination of Filterable PM10 and PM2.5 Emissions

TEST RESULTS and DATA ANALYSIS SHEET

Location:	AK Steel	Start Time:	12:25:00	RUN No.	C-202-3
Date:	7-Sep-2016	End Time:	16:11:00	JOB No.	050074.0172

STACK DATA			Molecular Weight			EQUIPMENT			AVERAGE TEST DATA		
% Moisture:	10	% est.	%CO2:	3.78	%	METER BOX:	MB-3		Average ΔP:	0.04	in H_2O
Barometric:	30.16	in Hg	%O2:	13.65	%	Y:	1.009		Average T_m:	551.5	°R
Static Press:	-0.75	in H_2O	%N2/CO:	82.57	%	ΔH@:	1.890	in H_2O	Average T_s:	788.0	°R
Stack Press:	30.10	in Hg	Md:	29.15	lb/lb-mole	Cp': 0.840	S/N	-	Average ΔH:	0.50	in H_2O
Stack Area:	153.9	ft^2	Actual Mw:	27.92	lb/lb-mole	Cp: 0.840	S/N	-	T_{std}:	528.00	°R
# of Points:	24	points	Run Time:	222.25	min	Nozzle Dia:	0.3420	inches	P_{std}:	29.92	in Hg

$<PM_{2.5}$ Filter Analysis			$<PM_{2.5}$ Recovery Analysis			Moisture Analysis		
Container 1:	7.55	mg	Container 4:	3.6	mg	Container 6:	932	g
C1 + Filter Tare:		mg	Cont. 4 Tare:		mg	Silica Gel Tare:	913.7	g
Acetone V_{aw1}:		ml	Acetone V_{aw4}:		ml	M_{sg}:	18.3	g
Acetone W_{a1}:		mg	Acetone W_{a4}:		mg	$V_{wsg(std)}$:	0.861	scf
(Filter) M_1:	7.550	mg	($PM_{2.5}$) M_4:	3.600	mg	Container 5:	201.1	ml
$>PM_{10}$ Recovery Analysis			$PM_{2.5-10}$ Recovery Analysis			$V_{wc(std)}$:	9.466	scf
Container 2:	8.70	mg	Container 3:	6.70	mg			
Cont. 2 Tare:		mg	Cont. 3 Tare:		mg	V_{ws}:	10.327	scf
Acetone V_{aw2}:		ml	Acetone V_{aw3}:		ml	B_{ws}:	0.111	H_20
Acetone W_{a2}:		mg	Acetone W_{a3}:		mg	Actual % H_2O:	11.1	%
($PM_{2.5}$) M_2:	8.700	mg	($PM_{10-2.5}$) M_3:	6.700	mg	Condensable		
						Organic:	13.20	mg
						Inorganci:	65.00	mg
						Total Condensable:	78.20	mg

CALCULATIONS AND DATA ANALYSIS

V_m:	85.2020	acf - [Actual Sample Volume]			
V_{ms}:	83.0674	dscf - [Corrected Sample Volume (std)]			
V_{ws}:	10.3272	scf - [Volume of Water Vapor]	μ:	231.849	mpoise - [Actual Gas Viscosity]
Q_{Sst}:	0.37376	dscfm - [Corrected Dry Sampling Rate (std)]	C:	1.0982	[Cunningham Correction Factor]
Q_s:	0.62329	acfm - [Actual Final Sampling Rate]	D_{50}:	10.250	μmeter - D50 for Cyclone 1
I:	121.001	% - [Percent Isokinetic Sampling]	D_{50IV}:	2.383	μmeter - D50 for Cyclone IV
N_{re}:	2477	[Actual Reynolds Number]	$Q_{sd(stack)}$:	4,471,931.18	dscf/hr - [Dry Stack Flow Rate (std)]
$V_{s(avg)}$:	13.46	fps - [Avgerage Stack Velocity]	$Q_{sw(stack)}$:	5,027,893.71	scf/hr - [Wet Stack Flow Rate (std)]
$Q_{sd(stack)}$:	74,532.19	dscfm	$Q_{sd(stack)}$:	124,291.83	acfm

Concentrations			Emission Rates		
$PM_{2.5}$:	4.74034	mg/dscm	$PM_{2.5}$:	1.3233	lb/hr
PM_{10}:	7.58879	mg/dscm	PM_{10}:	2.1185	lb/hr
Total Filterable PM:	11.28752	mg/dscm	Total Filterable PM:	3.1511	lb/hr
CPM:	33.24612	mg/dscm	CPM:	9.2812	lb/hr
Total PM:	44.53364	mg/dscm	Total PM:	12.4324	lb/hr

Test Personnel (signature/date)

Project Leader (signature/date)

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APPENDIX A-4

HYDROGEN SULFIDE, SULFUR DIOXIDE, AND CARBON MONOXIDE

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 6C, 10, and 15 - SO_2, Carbon Monoxide, and H_2S
Pushing Baghouse

	RUN NUMBER	*P-15-1*	*P-15-2*	*P-15-3*	
	RUN DATE	*8/23/2016*	*8/24/2016*	*8/25/2016*	*Average*
	RUN TIME	*1022-1509*	*1027-1509*	*1028-1510*	
	MEASURED DATA				
P_{static}	Stack Static Pressure, inches H_2O	-1.10	-1.10	-0.80	-1.00
P_{bar}	Barometric Pressure, inches Hg	29.95	29.97	30.30	30.07
$Dp^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	1.8459	1.8655	1.6444	1.7853
T_s	Average Stack Temperature, °F	123	117	124	121
CO_2	Carbon Dioxide content, % by volume	0.3	0.2	0.3	0.2
O_2	Oxygen content, % by volume	20.7	20.8	20.7	20.7
N_2	Nitrogen content, % by volume	79.0	79.0	79.1	79.0
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	
As	Diameter or Dimensions, inches:	35.50	35.50	35.50	35.50
	CALCULATED DATA				
P_s	Stack Pressure, inches Hg	29.87	29.89	30.24	30.00
B_{ws}	Moisture, % by volume	1.5	1.5	1.5	1.5
$B_{ws(sat)}$	Moisture (at saturation), % by volume	12.5	10.6	12.7	11.9
$1-B_{ws}$	Dry Mole Fraction	0.985	0.985	0.985	0.985
M_d	Molecular Weight (d.b.), lb/lb•mole	28.87	28.86	28.87	28.87
M_s	Molecular Weight (w.b.), lb/lb•mole	28.71	28.70	28.70	28.70
V_s	Stack Gas Velocity, ft/s	109.3	109.9	96.9	105.3
A	Stack Area, ft^2	6.9	6.9	6.9	6.87
Q_a	Stack Gas Volumetric flow, acfm	45,079	45,311	39,946	43,445
Q_s	Stack Gas Volumetric flow, dscfm	40,130	40,782	35,941	38,951
Q_s	Stack Gas Volumetric flow, dscmm	1,136	1,155	1,018	1,103

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 6C, 10, and 15 - SO2, Carbon Monoxide, and H2S
Pushing Baghouse

	RUN NUMBER	***P-15-1***	***P-15-2***	***P-15-3***	
	RUN DATE	***8/23/2016***	***8/24/2016***	***8/25/2016***	***Average***
	RUN TIME	***1022-1509***	***1027-1509***	***1028-1510***	
	EMISSIONS DATA				
	Sulfur Dioxide (SO_2)				
C_{SO2}	Concentration, ppm (uncorrected)	4.96	3.95	5.92	
Cm1	PreTest Calibration span value	44.93	44.97	45.14	
Cm2	PostTest Calibration span value	43.78	44.04	43.86	
Cm	Average calibration span value	44.355	44.505	44.5	
Cma	Calibration gas cylinder value	44.8800	44.8800	44.8800	44.8800
Co1	PreTest Calibration zero value	0.5500	0.8100	0.0600	
Co2	PostTest Calibration zero value	0.3400	1.2600	0.9900	
Co	Zero gas calibration average	0.4450	1.0350	0.5250	0.6683
C_{SO2}	**Concentration, ppm (corrected)**	**4.6**	**3.0**	**5.5**	**4.4**
MW	Molecular weight	64.0	64.0	64.0	64.0
E_{SO2}	**Emission Rate, lb/hr**	**1.84**	**1.22**	**1.97**	**1.68**
	Carbon Monoxide (CO)				
C_{CO}	Concentration, ppm (uncorrected)	29.39	20.89	20.80	
Cm1	PreTest Calibration span value	185.5	186.87	184.33	
Cm2	PostTest Calibration span value	182.47	183.35	179.14	
Cm	Average calibration span value	183.985	185.11	181.735	
Cma	Calibration gas cylinder value	190.9000	190.9000	190.9000	190.9000
Co1	PreTest Calibration zero value	0.3300	1.0100	(0.7800)	
Co2	PostTest Calibration zero value	(2.9400)	(1.2000)	(3.8700)	
Co	Zero gas calibration average	(1.3050)	(0.0950)	(2.3250)	(1.2417)
C_{CO}	**Concentration, ppm (corrected)**	**31.6**	**21.6**	**24.0**	**25.7**
MW	Molecular weight	28.0	28.0	28.0	28.0
E_{CO}	**Emission Rate, lb/hr**	**5.53**	**3.84**	**3.76**	**4.38**
	Hydrogen Sulfide (H_2S)				
C_{H2S}	**Concentration, ppm (corrected)**	**0.005**	**0.012**	**0.005**	**0.007**
MW	Molecular weight	34.1	34.1	34.1	34.1
E_{H2S}	**Emission Rate, lb/hr**	**1.06E-03**	**2.60E-03**	**9.53E-04**	**1.54E-03**

CEM Data

Plant Name:	AK Steel Middletown
Sampling Location:	Pushing Baghouse
Project Number:	50074.0172
CEM Operator:	Doug Allen

Run 1		O2	CO2	CO	SO2
Date	Time	%	%	ppm	ppm
8/23/2016	10:22:25	20.695	0.463	20.73	-0.27
8/23/2016	10:23:25	20.54	0.62	53.68	3.64
8/23/2016	10:24:25	20.881	0.254	20.27	5.78
8/23/2016	10:34:25	20.573	0.61	34.24	1.26
8/23/2016	10:35:25	20.571	0.574	48.56	8.8
8/23/2016	10:36:25	20.905	0.229	6.5	6.86
8/23/2016	10:46:25	20.766	0.377	11.85	0.01
8/23/2016	10:47:25	20.499	0.67	44.94	5.15
8/23/2016	10:48:25	20.741	0.391	35	10.1
8/23/2016	11:14:25	20.7	0.406	20.47	0.21
8/23/2016	11:15:25	20.515	0.588	43.62	5.6
8/23/2016	11:16:25	20.746	0.336	27.46	8.82
8/23/2016	11:26:25	20.892	0.193	0.75	-0.15
8/23/2016	11:27:25	20.675	0.431	20.49	0.27
8/23/2016	11:28:25	20.406	0.708	54.81	9.28
8/23/2016	11:29:24	20.693	0.41	34	13.16
8/23/2016	11:43:25	20.804	0.283	5.59	-0.24
8/23/2016	11:44:25	20.461	0.659	47.88	3.64
8/23/2016	11:45:25	20.644	0.446	37.08	10.62
8/23/2016	12:01:25	20.687	0.424	21.9	0.28
8/23/2016	12:02:25	20.479	0.637	45.92	6.6
8/23/2016	12:03:25	20.763	0.33	29.06	9.33
8/23/2016	12:20:25	20.76	0.358	12.73	0
8/23/2016	12:21:25	20.505	0.621	58.49	5.75
8/23/2016	12:22:25	20.748	0.36	36.47	9.52
8/23/2016	12:39:25	20.892	0.199	0.28	-0.31
8/23/2016	12:40:25	20.615	0.506	31.29	0.76
8/23/2016	12:41:25	20.571	0.556	45.41	7.44
8/23/2016	12:42:25	20.541	0.582	42.54	8.63
8/23/2016	12:43:25	20.54	0.595	45.63	8.95
8/23/2016	12:56:25	20.863	0.239	3.21	0.85
8/23/2016	12:57:25	20.695	0.42	22.56	0.96
8/23/2016	12:58:25	20.508	0.577	55.06	7.18
8/23/2016	12:59:25	20.542	0.568	42.68	10.21
8/23/2016	13:00:24	20.523	0.571	42.28	9.17
8/23/2016	13:17:25	20.626	0.489	36.36	2.08
8/23/2016	13:18:24	20.515	0.589	52.36	8.87
8/23/2016	13:19:25	20.503	0.612	46.4	10.5
8/23/2016	13:20:25	20.462	0.645	51.97	10.84
8/23/2016	13:34:25	20.858	0.233	3.6	0.93
8/23/2016	13:35:25	20.678	0.436	29.33	1.4
8/23/2016	13:36:24	20.574	0.555	39.22	6.26
8/23/2016	13:37:25	20.548	0.577	39.84	8.43
8/23/2016	13:38:25	20.541	0.564	41.59	8.89
8/23/2016	13:52:25	20.863	0.219	2.94	1.03
8/23/2016	13:53:25	20.618	0.507	26.53	1.65
8/23/2016	13:54:25	20.578	0.54	38.75	8.48
8/23/2016	13:55:25	20.826	0.272	18.4	7.03
8/23/2016	14:43:25	20.658	0.447	16.37	0.11
8/23/2016	14:44:25	20.443	0.652	49.21	5.82
8/23/2016	14:45:25	20.66	0.416	35.61	9.81
8/23/2016	14:46:25	20.862	0.21	1.52	4.55
8/23/2016	14:52:25	20.868	0.21	-0.5	0
8/23/2016	14:53:25	20.802	0.296	3.99	-0.04
8/23/2016	14:54:25	20.586	0.528	36.79	2.65
8/23/2016	14:55:25	20.636	0.469	29.01	7.03
8/23/2016	14:56:25	20.866	0.213	1.83	5.04
8/23/2016	15:05:25	20.873	0.214	-1.46	-0.3
8/23/2016	15:06:25	20.705	0.407	14.51	-0.07
8/23/2016	15:07:25	20.488	0.627	45.53	4.82
8/23/2016	15:08:25	20.715	0.35	29.69	8.71
	Average	20.7	0.5	29.4	5.0

CEM Data

Plant Name:	AK Steel Middletown
Sampling Location:	Pushing Baghouse
Project Number:	AK Steel Middletown
CEM Operator:	Doug Allen

Run 2		O2	CO2	CO	SO2
Date	Time	%	%	ppm	ppm
8/24/2016	10:28:42	20.557	0.511	22.32	-0.07
8/24/2016	10:29:42	20.5	0.574	43.97	3.96
8/24/2016	10:30:42	20.57	0.502	36.61	6.46
8/24/2016	10:40:42	20.692	0.366	23.17	3.22
8/24/2016	10:41:42	20.602	0.477	22.38	2.89
8/24/2016	10:42:42	20.351	0.725	46.64	8.94
8/24/2016	10:43:42	20.398	0.685	41.11	13.5
8/24/2016	10:54:42	20.71	0.357	16.92	4.32
8/24/2016	10:55:42	20.606	0.468	26.64	3.51
8/24/2016	10:56:42	20.421	0.658	41.93	8.41
8/24/2016	10:57:42	20.466	0.619	39.48	10.86
8/24/2016	11:07:42	20.657	0.414	25.54	6.41
8/24/2016	11:08:42	20.793	0.254	6.05	3.86
8/24/2016	11:09:42	20.49	0.588	40.1	3.47
8/24/2016	11:10:42	20.442	0.617	51.4	10.98
8/24/2016	11:24:42	20.73	0.336	17.97	5.29
8/24/2016	11:25:42	20.476	0.616	42.11	5.42
8/24/2016	11:26:42	20.672	0.384	30.72	10.9
8/24/2016	11:27:42	20.8	0.25	3.32	4.51
8/24/2016	11:39:42	20.792	0.269	1.83	0.32
8/24/2016	11:40:42	20.456	0.637	34.51	2.53
8/24/2016	11:41:42	20.721	0.34	23.08	8.4
8/24/2016	11:58:42	20.801	0.244	1.44	-0.17
8/24/2016	11:59:42	20.643	0.445	14.26	-0.01
8/24/2016	12:00:42	20.462	0.608	41.65	6.14
8/24/2016	12:17:42	20.802	0.248	1.8	-0.15
8/24/2016	12:18:42	20.54	0.559	28.15	1.04
8/24/2016	12:19:42	20.625	0.435	28.63	7.49
8/24/2016	12:20:42	20.796	0.262	3.98	4.39
8/24/2016	12:36:42	20.8	0.249	1.75	-0.05
8/24/2016	12:37:42	20.622	0.45	18.73	0.26
8/24/2016	12:38:42	20.538	0.53	44.8	6.17
8/24/2016	12:39:42	20.796	0.26	6.18	6.06
8/24/2016	12:55:42	20.784	0.249	0.8	-0.14
8/24/2016	12:56:42	20.776	0.245	1.22	-0.12
8/24/2016	12:57:42	20.483	0.584	31.73	0.98
8/24/2016	12:58:42	20.738	0.284	17.45	5.56
8/24/2016	13:14:42	20.778	0.238	1.2	-0.12
8/24/2016	13:15:42	20.543	0.51	31.32	1.17
8/24/2016	13:16:42	20.754	0.291	18	5.39
8/24/2016	13:17:42	20.782	0.24	2.99	1.96
8/24/2016	13:33:42	20.715	0.311	2.88	-0.06
8/24/2016	13:34:41	20.451	0.59	37.43	3.85
8/24/2016	13:35:42	20.747	0.26	12.47	7.07
8/24/2016	13:36:42	20.773	0.23	0.67	2.06
8/24/2016	13:50:42	20.776	0.233	0.85	-0.13
8/24/2016	13:51:42	20.656	0.387	8.59	-0.02
8/24/2016	13:52:43	20.43	0.628	42.84	4.64
8/24/2016	13:53:42	20.758	0.265	16.54	7.19
8/24/2016	14:38:42	20.764	0.226	-0.2	0.08
8/24/2016	14:39:42	20.634	0.389	9.94	0.18
8/24/2016	14:40:42	20.521	0.501	39.73	3.97
8/24/2016	14:41:42	20.753	0.237	8.42	5.03
8/24/2016	14:55:42	20.768	0.241	-0.25	-0.07
8/24/2016	14:56:42	20.504	0.518	25.11	0.6
8/24/2016	14:57:42	20.531	0.475	44.49	7.6
8/24/2016	14:58:42	20.761	0.234	3.63	5.07
8/24/2016	15:06:42	20.641	0.386	7.22	0.02
8/24/2016	15:07:42	20.306	0.694	45.33	6.47
8/24/2016	15:08:42	20.735	0.255	13.62	9.27
	Average	20.6	0.4	20.9	3.9

CEM Data

Plant Name:	AK Steel Middletown
Sampling Location:	Pushing Baghouse
Project Number:	AK Steel Middletown
CEM Operator:	Doug Allen

Run 3		O2	CO2	CO	SO2
Date	Time	%	%	ppm	ppm
8/25/2016	10:29:03	20.644	0.338	2.88	0.04
8/25/2016	10:30:03	20.377	0.642	41.53	0.62
8/25/2016	10:31:03	20.332	0.684	39.79	4.78
8/25/2016	10:43:03	20.665	0.298	14.77	5.75
8/25/2016	10:44:03	20.551	0.441	15.18	3.27
8/25/2016	10:45:03	20.262	0.721	47.39	8.09
8/25/2016	10:46:03	20.282	0.717	42.41	13.69
8/25/2016	10:55:03	20.672	0.281	12.45	7.68
8/25/2016	10:56:03	20.368	0.636	26.92	4.73
8/25/2016	10:57:03	20.217	0.766	34.35	12.36
8/25/2016	10:58:03	20.187	0.81	43.81	15.31
8/25/2016	11:24:03	20.485	0.529	19.1	3.48
8/25/2016	11:25:04	20.203	0.788	37.82	12.42
8/25/2016	11:26:03	20.203	0.785	40.47	17.56
8/25/2016	11:34:03	20.518	0.474	25.25	10.67
8/25/2016	11:35:04	20.405	0.579	26.64	7.63
8/25/2016	11:36:03	20.182	0.79	34.5	15.93
8/25/2016	11:37:03	20.661	0.31	14.07	15.55
8/25/2016	11:46:03	20.73	0.229	-1.75	0.64
8/25/2016	11:47:03	20.447	0.546	19.65	1.37
8/25/2016	11:48:03	20.18	0.785	31.64	11.41
8/25/2016	11:49:03	20.582	0.375	19.19	15
8/25/2016	12:00:04	20.726	0.228	-1.72	0.47
8/25/2016	12:01:04	20.342	0.652	33.28	2.76
8/25/2016	12:02:03	20.42	0.551	32.39	10.99
8/25/2016	12:03:03	20.717	0.235	6.21	7.25
8/25/2016	12:19:03	20.722	0.221	-2.13	0.33
8/25/2016	12:20:03	20.651	0.287	0.43	0.28
8/25/2016	12:21:03	20.265	0.676	42.84	3.8
8/25/2016	12:22:03	20.507	0.406	33.06	10.52
8/25/2016	12:38:03	20.729	0.23	-1.64	0.49
8/25/2016	12:39:03	20.665	0.287	0.24	0.46
8/25/2016	12:40:03	20.341	0.63	38.71	4.3
8/25/2016	12:41:03	20.521	0.441	23.14	10.1
8/25/2016	12:57:03	20.715	0.209	-2.06	0.3
8/25/2016	12:58:03	20.595	0.348	4.78	0.47
8/25/2016	12:59:03	20.345	0.61	33.21	6.34
8/25/2016	13:00:03	20.532	0.411	17.39	9.5
8/25/2016	13:17:04	20.674	0.295	-0.05	0.26
8/25/2016	13:18:03	20.353	0.615	37.55	3.68
8/25/2016	13:19:03	20.438	0.526	36.85	9.63
8/25/2016	13:35:03	20.708	0.209	-1.75	0.3
8/25/2016	13:36:03	20.481	0.445	23.02	0.82
8/25/2016	13:37:03	20.44	0.507	48.44	7.5
8/25/2016	13:38:03	20.683	0.221	15.12	6.82
8/25/2016	13:50:03	20.703	0.193	-1.87	0.37
8/25/2016	13:51:03	20.549	0.367	9.14	0.52
8/25/2016	13:52:03	20.274	0.646	47.46	7.41
8/25/2016	13:53:03	20.621	0.28	20.94	11.09
8/25/2016	13:54:03	20.702	0.2	-1	3.89
8/25/2016	14:35:03	20.715	0.205	-2.83	0.38
8/25/2016	14:36:03	20.613	0.298	1.45	0.44
8/25/2016	14:37:03	20.284	0.668	42.92	6.38
8/25/2016	14:38:03	20.547	0.363	26.9	10.28
8/25/2016	14:39:03	20.697	0.189	-0.36	4.49
8/25/2016	14:50:03	20.517	0.387	11.81	0.6
8/25/2016	14:51:03	20.307	0.608	41.85	8.09
8/25/2016	14:52:03	20.667	0.227	12.9	9.04
8/25/2016	15:06:03	20.723	0.208	-3.01	0.41
8/25/2016	15:07:03	20.503	0.463	16.43	0.91
8/25/2016	15:08:03	20.348	0.621	43.27	8.36
8/25/2016	15:09:03	20.67	0.303	18.28	9.1
	Average	20.5	0.5	20.8	5.9

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 6C, 10, and 15 - SO_2, Carbon Monoxide, and H_2S
Combustion Stack

	RUN NUMBER	***C-15-1***	***C-15-2***	***C-15-3***	
	RUN DATE	***8/29/2016***	***8/29/2016***	***8/29/2016***	***Average***
	RUN TIME	***1024-1109***	***1135-1220***	***1245-1330***	
	MEASURED DATA				
P_{static}	Stack Static Pressure, inches H_2O	-0.85	-0.82	-0.85	-0.84
y	Meter Box Correction Factor	1.005	1.005	1.005	1.005
P_{bar}	Barometric Pressure, inches Hg	30.11	30.11	30.11	30.11
V_m	Sample Volume, ft^3	31.010	30.780	31.060	30.950
$Dp^{1/2}$	Average Square Root Dp, $(in.\ H_2O)^{1/2}$	0.2123	0.1998	0.2000	0.2040
DH	Avg Meter Orifice Pressure, in. H_2O	1.50	1.50	1.50	1.50
T_m	Average Meter Temperature, °F	78	86	92	85
T_s	Average Stack Temperature, °F	270	272	276	273
V_{lc}	Condensate Collected, ml	56.1	64.1	74.8	65.0
V_{sg}	Silica Gel weight gain, g	16.0	6.7	7.1	
CO_2	Carbon Dioxide content, % by volume	2.8	2.8	2.8	2.8
O_2	Oxygen content, % by volume	15.3	15.3	15.3	15.3
N_2	Nitrogen content, % by volume	81.9	81.9	81.9	81.9
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	
As	Diameter or Dimensions, inches:	168.00	168.00	168.00	168.00
Q	Sample Run Duration, minutes	45	45	45	45
	CALCULATED DATA				
$V_{m(std)}$	Standard Meter Volume, ft^3	30.880	30.202	30.146	30.409
$V_{m(std)}$	Standard Meter Volume, m^3	0.874	0.855	0.854	0.861
Q_m	Average Sampling Rate, dscfm	0.686	0.671	0.670	0.676
P_s	Stack Pressure, inches Hg	30.05	30.05	30.05	30.05
$V_{wc,std}$	Volume of water vapor, std, scf	2.64	3.02	3.52	
$V_{wsg,std}$	Volume of water vapor in SG, std, scf	0.75	0.32	0.33	
B_{ws}	Moisture, % by volume	9.9	9.9	11.3	10.4
$B_{ws(sat)}$	Moisture (at saturation), % by volume	100.0	100.0	100.0	100.0
$1-B_{ws}$	Dry Mole Fraction	0.901	0.901	0.887	0.896
M_d	Molecular Weight (d.b.), lb/lb•mole	29.07	29.07	29.07	29.07
M_s	Molecular Weight (w.b.), lb/lb•mole	27.97	27.97	27.81	27.92
V_s	Stack Gas Velocity, ft/s	14.2	13.4	13.5	13.7
A	Stack Area, ft^2	153.9	153.9	153.9	153.94
Q_a	Stack Gas Volumetric flow, acfm	131,238	123,684	124,495	126,472
Q_s	Stack Gas Volumetric flow, dscfm	85,852	80,665	79,492	82,003
Q_s	Stack Gas Volumetric flow, dscmm	2,431	2,284	2,251	2,322

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 6C, 10, and 15 - SO2, Carbon Monoxide, and H2S
Combustion Stack

	RUN NUMBER	***C-15-1***	***C-15-2***	***C-15-3***	
	RUN DATE	***8/29/2016***	***8/29/2016***	***8/29/2016***	***Average***
	RUN TIME	***1024-1109***	***1135-1220***	***1245-1330***	
	EMISSIONS DATA				
	Sulfur Dioxide (SO_2)				
C_{SO2}	Concentration, ppm (uncorrected)	253.97	230.63	230.11	238.2362
Cm1	PreTest Calibration span value	191.55	188.26	191.56	190.46
Cm2	PostTest Calibration span value	188.26	191.56	195.52	191.78
Cm	Average calibration span value	189.91	189.91	193.54	191.12
Cma	Calibration gas cylinder value	189.40	189.40	189.40	189.40
Co1	PreTest Calibration zero value	0.66	0.79	0.55	0.67
Co2	PostTest Calibration zero value	0.79	0.55	0.65	0.66
Co	Zero gas calibration average	0.73	0.67	0.60	0.67
C_{SO2}	**Concentration, ppm (corrected)**	**253.5**	**230.2**	**225.3**	**236.3**
MW	Molecular weight	64.0	64.0	64.0	64.0
E_{SO2}	**Emission Rate, lb/hr**	**216.82**	**184.93**	**178.40**	**193.38**
	Carbon Monoxide (CO)				
C_{CO}	Concentration, ppm (uncorrected)	54.97	63.99	85.74	68.2339
Cm1	PreTest Calibration span value	186.74	186.73	186.31	186.59
Cm2	PostTest Calibration span value	186.73	186.31	186.18	186.41
Cm	Average calibration span value	186.74	186.52	186.25	186.50
Cma	Calibration gas cylinder value	190.90	190.90	190.90	190.90
Co1	PreTest Calibration zero value	0.19	0.17	1.08	0.48
Co2	PostTest Calibration zero value	0.17	1.08	0.99	0.75
Co	Zero gas calibration average	0.18	0.63	1.04	0.61
C_{CO}	**Concentration, ppm (corrected)**	**56.1**	**65.1**	**87.3**	**69.5**
MW	Molecular weight	28.0	28.0	28.0	28.0
E_{CO}	**Emission Rate, lb/hr**	**20.98**	**22.87**	**30.25**	**24.70**
	Hydrogen Sulfide (H_2S)				
C_{H2S}	**Concentration, ppm (corrected)**	**0.006**	**0.016**	**0.049**	**0.024**
MW	Molecular weight	34.1	34.1	34.1	34.1
E_{H2S}	**Emission Rate, lb/hr**	**2.78E-03**	**6.85E-03**	**2.07E-02**	**1.01E-02**

CEM Data

Plant Name:	AK Steel Middletown
Sampling Location:	Combustion Stack
Project Number:	50074.0172
CEM Operator:	Doug Allen

Run 1		O2	CO2	CO	SO2
Date	Time	%	%	ppm	ppm
8/29/2016	10:24:32	14.677	3.214	28.65	255.22
8/29/2016	10:25:32	14.668	3.224	28.45	254.22
8/29/2016	10:26:32	14.63	3.246	28.12	255.42
8/29/2016	10:27:32	14.605	3.254	28.16	259.19
8/29/2016	10:28:32	14.605	3.23	28.08	261.53
8/29/2016	10:29:32	14.672	3.248	27.9	258.44
8/29/2016	10:30:32	14.656	3.252	28.1	257.52
8/29/2016	10:31:32	14.7	3.235	27.79	256.19
8/29/2016	10:32:32	14.621	3.262	28.17	256.8
8/29/2016	10:33:32	14.631	3.246	27.97	257.69
8/29/2016	10:34:32	15.729	2.664	25.91	247.74
8/29/2016	10:35:32	16.523	2.318	78.84	224.47
8/29/2016	10:36:32	15.152	3.041	98.16	277.74
8/29/2016	10:37:32	15.119	3.064	83.34	261.77
8/29/2016	10:38:32	15.026	3.062	76.28	253.74
8/29/2016	10:39:32	15.062	3.04	73.2	255.11
8/29/2016	10:40:32	15.161	3.008	70.05	254.61
8/29/2016	10:41:32	15.372	2.913	67.28	257.88
8/29/2016	10:42:32	15.595	2.856	66.02	253.2
8/29/2016	10:43:32	15.72	2.745	65.22	248.84
8/29/2016	10:44:32	15.728	2.752	63.26	242.73
8/29/2016	10:45:32	15.725	2.756	62.69	240.57
8/29/2016	10:46:32	15.668	2.728	62.2	237.53
8/29/2016	10:47:32	15.504	2.836	63.68	232.76
8/29/2016	10:48:32	15.116	3.014	70.81	237.39
8/29/2016	10:49:32	15.145	2.998	72.12	246.84
8/29/2016	10:50:32	15.366	2.911	65.04	238.43
8/29/2016	10:51:32	15.302	2.914	63.61	235.7
8/29/2016	10:52:32	15.163	3.004	64.51	239.33
8/29/2016	10:53:32	15.072	3.04	65.01	240.12
8/29/2016	10:54:32	15.068	3.036	66.02	243.02
8/29/2016	10:55:32	15.296	2.941	64.88	242.68
8/29/2016	10:56:32	15.448	2.911	66.39	248.52
8/29/2016	10:57:32	15.628	2.799	65.68	249.06
8/29/2016	10:58:32	15.687	2.783	65.64	245.72
8/29/2016	10:59:32	15.644	2.755	67.31	242.53
8/29/2016	11:00:32	15.69	2.761	73.68	240.45
8/29/2016	11:01:32	15.591	2.798	77.48	237.92
8/29/2016	11:02:32	15.698	2.684	81.22	242.37
8/29/2016	11:03:32	17.206	1.965	63.86	210.34
8/29/2016	11:04:32	15.343	3.039	78.63	253.61
8/29/2016	11:05:32	14.84	3.281	59.58	290.92
8/29/2016	11:06:32	14.808	3.266	49.92	272.52
8/29/2016	11:07:32	14.754	3.235	54.7	270.45
8/29/2016	11:08:32	14.868	3.197	61.26	271.52
8/29/2016	11:09:32	14.936	3.167	53	268.94
8/29/2016	11:10:32	14.982	3.102	67.47	271.19
8/29/2016	11:11:32	14.97	3.117	71.14	274.5
8/29/2016	11:12:32	15.022	3.071	53.79	273.56
8/29/2016	11:13:32	14.98	3.093	45.64	268.1
8/29/2016	11:14:32	14.857	3.138	45.45	264.58
8/29/2016	11:15:32	14.748	3.174	47.36	263.96
8/29/2016	11:16:32	14.813	3.202	43.58	261.14
8/29/2016	11:17:31	14.73	3.187	41.73	261.93
8/29/2016	11:18:32	14.721	3.133	39.01	266.17
8/29/2016	11:19:32	14.885	2.982	34.73	261.94
8/29/2016	11:20:32	15.023	2.997	32.31	262.88
8/29/2016	11:21:32	15.116	2.958	30.23	262.26
8/29/2016	11:22:32	15.126	2.958	28.67	258.52
8/29/2016	11:23:32	15.126	2.971	29.27	257.94
	Average	15.2	3.0	55.0	254.0

CEM Data

Plant Name:	AK Steel Middletown
Sampling Location:	Combustion Stack
Project Number:	AK Steel Middletown
CEM Operator:	Doug Allen

Run 2		O2	CO2	CO	SO2
Date	Time	%	%	ppm	ppm
8/29/2016	11:35:32	16.976	2.128	104.06	189.97
8/29/2016	11:36:32	15.605	2.832	112.29	247.26
8/29/2016	11:37:32	15.501	2.899	95.17	256.82
8/29/2016	11:38:32	15.425	2.891	87.51	254.93
8/29/2016	11:39:32	15.524	2.832	81.23	252.55
8/29/2016	11:40:32	15.475	2.854	82.05	256.14
8/29/2016	11:41:32	15.715	2.773	80.04	255.23
8/29/2016	11:42:32	15.895	2.667	68.23	240.97
8/29/2016	11:43:32	15.632	2.748	66.47	236.56
8/29/2016	11:44:32	15.3	2.927	83.21	251.22
8/29/2016	11:45:32	15.193	2.949	94.55	258.26
8/29/2016	11:46:32	15.251	2.942	97.09	259.51
8/29/2016	11:47:31	15.534	2.868	96.21	253.64
8/29/2016	11:48:32	15.634	2.841	90.92	246.01
8/29/2016	11:49:32	15.686	2.739	85.53	241.17
8/29/2016	11:50:32	15.723	2.811	78.53	237.17
8/29/2016	11:51:32	15.626	2.822	86.43	234.84
8/29/2016	11:52:32	15.544	2.861	96.4	232.54
8/29/2016	11:53:32	15.504	2.833	97.57	236.46
8/29/2016	11:54:32	15.594	2.777	94.09	241.66
8/29/2016	11:55:32	15.637	2.734	87.58	239.82
8/29/2016	11:56:32	15.7	2.736	80.89	240.18
8/29/2016	11:57:32	15.708	2.691	67.56	235.23
8/29/2016	11:58:31	15.857	2.662	65.2	233.9
8/29/2016	11:59:32	15.824	2.659	63.48	228.71
8/29/2016	12:00:32	15.852	2.638	63.27	225.24
8/29/2016	12:01:32	15.8	2.611	59.31	224.33
8/29/2016	12:02:32	16.002	2.549	59.48	224.22
8/29/2016	12:03:32	17.522	1.835	51.54	189.36
8/29/2016	12:04:32	15.772	2.806	74.86	190.46
8/29/2016	12:05:32	15.521	2.862	51.18	244.13
8/29/2016	12:06:32	15.557	2.926	45.15	243.7
8/29/2016	12:07:31	15.576	2.823	37.98	237.33
8/29/2016	12:08:32	15.498	2.819	34.45	230.24
8/29/2016	12:09:32	15.367	2.857	32.48	228.66
8/29/2016	12:10:32	15.295	2.855	30.85	230.61
8/29/2016	12:11:32	15.349	2.816	29.48	231.29
8/29/2016	12:12:32	15.531	2.748	28.41	226.7
8/29/2016	12:13:32	15.635	2.669	27.44	221.53
8/29/2016	12:14:32	15.693	2.653	26.72	216.95
8/29/2016	12:15:32	15.638	2.671	26.47	216.98
8/29/2016	12:16:32	15.689	2.632	25.89	216.34
8/29/2016	12:17:32	15.711	2.603	24.95	214.2
8/29/2016	12:18:32	15.68	2.652	24.63	213.17
8/29/2016	12:19:32	15.602	2.68	30.52	214.86
8/29/2016	12:20:32	15.606	2.724	74.18	221.49
8/29/2016	12:21:32	15.596	2.781	113.59	225.13
8/29/2016	12:22:32	15.567	2.768	88.41	225.54
8/29/2016	12:23:32	15.418	2.78	84.8	225.01
8/29/2016	12:24:32	15.5	2.706	92.96	232.39
8/29/2016	12:25:32	15.521	2.761	79.32	230.23
8/29/2016	12:26:32	15.448	2.769	61.45	227.82
8/29/2016	12:27:32	15.269	2.866	69.09	229.15
8/29/2016	12:28:32	15.325	2.808	58.45	232.58
8/29/2016	12:29:32	15.528	2.717	40.35	220.16
8/29/2016	12:30:32	15.401	2.753	34.94	220.16
8/29/2016	12:31:32	15.38	2.794	31.55	216.14
8/29/2016	12:32:32	15.395	2.835	30.48	216.34
8/29/2016	12:33:32	15.446	2.839	29.32	216.73
8/29/2016	12:34:32	16.748	2.225	23.16	197.97
	Average	15.6	2.7	64.0	230.6

CEM Data

Plant Name:	AK Steel Middletown
Sampling Location:	Combustion Stack
Project Number:	AK Steel Middletown
CEM Operator:	Doug Allen

Run 3		O2	CO2	CO	SO2
Date	Time	%	%	ppm	ppm
8/29/2016	12:45:32	15.955	2.557	152.84	206.34
8/29/2016	12:46:32	15.819	2.567	270.18	217.28
8/29/2016	12:47:32	15.945	2.602	309.18	226.15
8/29/2016	12:48:32	15.834	2.703	226.78	227.36
8/29/2016	12:49:32	15.72	2.657	150.74	229.99
8/29/2016	12:50:32	15.801	2.571	140	225.07
8/29/2016	12:51:32	15.619	2.648	239.05	218.53
8/29/2016	12:52:32	15.054	2.911	285.18	240.81
8/29/2016	12:53:32	15.121	2.889	244.18	249.76
8/29/2016	12:54:32	15.155	2.864	194.13	251.78
8/29/2016	12:55:32	15.089	2.892	168.97	249.68
8/29/2016	12:56:32	15.197	2.862	145.04	246.59
8/29/2016	12:57:32	15.122	2.888	128.76	240.89
8/29/2016	12:58:32	15.169	2.929	116.91	239.19
8/29/2016	12:59:32	15.042	2.986	125.56	240.44
8/29/2016	13:00:31	15.126	3.02	122.46	240.2
8/29/2016	13:01:31	15.101	2.912	106.04	239.41
8/29/2016	13:02:32	15.478	2.7	85.74	235.94
8/29/2016	13:03:32	17.031	1.962	68.54	194.65
8/29/2016	13:04:32	15.346	3.026	107.11	202.19
8/29/2016	13:05:32	15.125	3.061	55.34	243.16
8/29/2016	13:06:32	15.051	3.08	44.53	236.07
8/29/2016	13:07:32	14.906	3.165	38.93	232.02
8/29/2016	13:08:32	14.799	3.174	34.88	229.39
8/29/2016	13:09:32	14.799	3.145	32.32	232.88
8/29/2016	13:10:32	14.932	3.173	30.7	231.05
8/29/2016	13:11:32	15.081	3.016	29.53	223.78
8/29/2016	13:12:32	15.014	3.062	28.27	218.98
8/29/2016	13:13:32	14.968	3.233	27.84	224.69
8/29/2016	13:14:32	14.834	3.246	27.53	229.48
8/29/2016	13:15:32	14.866	3.142	27	228.81
8/29/2016	13:16:32	14.895	3.065	26.15	227.96
8/29/2016	13:17:32	15.046	3.004	25.6	227.77
8/29/2016	13:18:32	15.129	2.963	25.56	224.18
8/29/2016	13:19:32	15.214	2.955	26.08	221.25
8/29/2016	13:20:32	15.092	3.003	25.53	217.83
8/29/2016	13:21:32	14.977	3.1	25.97	219.53
8/29/2016	13:22:32	14.841	3.165	26.31	221.49
8/29/2016	13:23:32	14.742	3.111	26.64	224.42
8/29/2016	13:24:32	14.745	3.115	39.8	226.82
8/29/2016	13:25:32	14.796	3.168	40.91	228.92
8/29/2016	13:26:32	14.898	3.008	31.31	229.34
8/29/2016	13:27:32	14.998	2.977	25.69	226.8
8/29/2016	13:28:32	15.013	2.97	24.66	224.29
8/29/2016	13:29:32	15.103	3.011	24.39	222.87
8/29/2016	13:30:32	14.975	3.032	24.77	222
8/29/2016	13:31:32	14.844	3.071	24.94	225.02
8/29/2016	13:32:32	14.846	3.092	24.85	223.02
8/29/2016	13:33:32	14.677	3.155	25.21	223.3
8/29/2016	13:34:32	16.083	2.414	22.41	214.42
8/29/2016	13:35:32	16.38	2.332	72.76	181.52
8/29/2016	13:36:32	14.789	3.193	126.32	249.78
8/29/2016	13:37:32	14.762	3.216	129.76	263.07
8/29/2016	13:38:32	14.884	3.237	127.22	261.08
8/29/2016	13:39:32	14.99	3.112	87.01	256.36
8/29/2016	13:40:32	15.035	3.019	68.95	249.57
8/29/2016	13:41:32	15.132	2.983	63.47	242.41
8/29/2016	13:42:32	15.094	2.989	61.27	234.7
8/29/2016	13:43:32	15.035	3.094	65.43	233.77
8/29/2016	13:44:32	14.965	3.161	61.23	230.62
	Average	15.2	3.0	85.7	230.1

APPENDIX A-5

SPECIATED VOLATILE ORGANIC HAP (VOHAP)

Summary of Stack Gas Parameters and Test Results
050074.0172
AK Steel-Middletown
EPA Method 0031-Run 1
Pushing Baghouse
Page 1 of 2

	RUN NUMBER	*P-0031-1A*	*P-0031-1B*	*P-0031-1C*	*Average*
	RUN DATE	*8/30/2016*	*8/30/2016*	*8/30/2016*	
	RUN TIME	*1026-1214*	*1231-1350*	*1442-1602*	
	MEASURED DATA				
P_{static}	Stack Static Pressure, inches H_2O	-1.10	-1.10	-1.10	-1.10
y	Meter Box Correction Factor	0.956	0.956	0.956	0.956
P_{bar}	Barometric Pressure, inches Hg	30.23	30.23	30.23	30.23
V_m	Sample Volume, L^3	19.440	19.500	16.050	18.330
$Dp^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	1.9118	1.9118	1.9118	1.9118
T_m	Average Meter Temperature, °F	87	92	93	91
T_s	Average Stack Temperature, °F	117	117	117	117
CO_2	Carbon Dioxide content, % by volume	0.2	0.2	0.2	0.2
O_2	Oxygen content, % by volume	20.7	20.7	20.7	20.7
N_2	Nitrogen content, % by volume	79.1	79.1	79.1	79.1
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	
As	Diameter or Dimensions, inches:	35.50	35.50	35.50	35.50
Q	Sample Run Duration, minutes	20	20	20	20
	CALCULATED DATA				
$V_{m(std)}$	Standard Meter Volume,L	18.125	18.016	14.802	16.981
$V_{m(std)}$	Standard Meter Volume,ft^3	0.640	0.636	0.523	0.600
$V_{m(std)}$	Standard Meter Volume, m^3	0.018	0.018	0.015	0.017
Q_m	Average Sampling Rate, dscfm	0.906	0.901	0.740	0.849
P_s	Stack Pressure, inches Hg	30.15	30.15	30.15	30.15
B_{ws}	Moisture, % by volume	2.0	2.0	2.0	2.0
$B_{ws(sat)}$	Moisture (at saturation), % by volume	10.5	10.5	10.5	10.5
V_{wstd}	Standard Water Vapor Volume, ft^3	0.000	0.000	0.000	0.000
$1-B_{ws}$	Dry Mole Fraction	0.980	0.980	0.980	0.980
M_d	Molecular Weight (d.b.), lb/lb•mole	28.86	28.86	28.86	28.86
M_s	Molecular Weight (w.b.), lb/lb•mole	28.65	28.65	28.65	28.65
V_s	Stack Gas Velocity, ft/s	112.2	112.2	112.2	112.2
A	Stack Area, ft^2	6.9	6.9	6.9	6.87
Q_a	Stack Gas Volumetric flow, acfm	46,279	46,279	46,279	46,279
Q_s	Stack Gas Volumetric flow, dscfm	41,821	41,821	41,821	41,821
Q_s	Stack Gas Volumetric flow, dscmm	1,184	1,184	1,184	1,184

Summary of Stack Gas Parameters and Test Results
050074.0172
AK Steel-Middletown
EPA Method 0031-Run 1
Pushing Baghouse

	RUN NUMBER	P-0031-1A	P-0031-1B	P-0031-1C	Sum
	RUN DATE	8/30/2016	8/30/2016	8/30/2016	
	RUN TIME	1026-1214	1231-1350	1442-1602	
	Chloromethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.4
	Molecular Weight, MW	50.49	50.49	50.49	50.49
	Concentration, mg/dscm	6.62E-03	6.66E-03	8.11E-03	2.14E-02
ppmdv	Parts Per Billion, Dry Basis	3.15E+00	3.17E+00	3.85E+00	1.02E+01
	Emission Rate, lb/hr	1.04E-03	1.04E-03	1.27E-03	3.34E-03
	Vinyl Chloride	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.1
	Molecular Weight, MW	62.50	62.50	62.50	62.50
	Concentration, mg/dscm	2.21E-03	2.22E-03	2.70E-03	7.13E-03
ppmdv	Parts Per Billion, Dry Basis	8.48E-01	8.53E-01	1.04E+00	2.74E+00
	Emission Rate, lb/hr	3.45E-04	3.47E-04	4.22E-04	1.11E-03
	Bromomethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.18	0.18	0.18	0.5
	Molecular Weight, MW	94.95	94.95	94.95	94.95
	Concentration, mg/dscm	9.93E-03	9.99E-03	1.22E-02	3.21E-02
ppmdv	Parts Per Billion, Dry Basis	2.51	2.53	3.07	8.11E+00
	Emission Rate, lb/hr	1.55E-03	1.56E-03	1.90E-03	5.02E-03
	Chloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.1
	Molecular Weight, MW	64.51	64.51	64.51	64.51
	Concentration, mg/dscm	2.21E-03	2.22E-03	2.70E-03	7.13E-03
ppmdv	Parts Per Billion, Dry Basis	0.821	0.826	1.006	2.65E+00
	Emission Rate, lb/hr	3.45E-04	3.47E-04	4.22E-04	1.11E-03
	1,1-Dichloroethene	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	96.94	96.94	96.94	96.94
	Concentration, mg/dscm	1.10E-03	1.11E-03	1.35E-03	3.57E-03
ppmdv	Parts Per Billion, Dry Basis	0.273	0.275	0.335	8.83E-01
	Emission Rate, lb/hr	1.73E-04	1.74E-04	2.11E-04	5.57E-04
	Iodomethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.06	0.06	0.06	0.2
	Molecular Weight, MW	142.93	142.93	142.93	142.93
	Concentration, mg/dscm	3.31E-03	3.33E-03	4.05E-03	1.07E-02
ppmdv	Parts Per Billion, Dry Basis	0.556	0.559	0.681	1.80E+00
	Emission Rate, lb/hr	5.18E-04	5.21E-04	6.34E-04	1.67E-03
	Carbon Disulfide	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.1
	Molecular Weight, MW	76.14	76.14	76.14	76.14
	Concentration, mg/dscm	2.21E-03	2.22E-03	2.70E-03	7.13E-03
ppmdv	Parts Per Billion, Dry Basis	0.696	0.700	0.852	2.25E+00
	Emission Rate, lb/hr	3.45E-04	3.47E-04	4.22E-04	1.11E-03
	Methylene Chloride	BDL	DDL	DDL	
	Analysis, ug/sample	0.20	0.23	0.27	0.7
	Molecular Weight, MW	84.93	84.93	84.93	84.93
	Concentration, mg/dscm	1.10E-02	1.26E-02	1.85E-02	4.22E-02
ppmdv	Parts Per Billion, Dry Basis	3.1	3.6	5.2	1.19E+01
	Emission Rate, lb/hr	1.73E-03	1.97E-03	2.89E-03	6.59E-03
	Chloroform	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	119.37	119.37	119.37	119.37
	Concentration, mg/dscm	1.10E-03	1.11E-03	1.35E-03	3.57E-03
ppmdv	Parts Per Billion, Dry Basis	0.222	0.223	0.272	7.17E-01
	Emission Rate, lb/hr	1.73E-04	1.74E-04	2.11E-04	5.57E-04
	1,1,1 Trichloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	133.50	133.50	133.50	133.50
	Concentration, mg/dscm	1.10E-03	1.11E-03	1.35E-03	3.57E-03
ppmdv	Parts Per Billion, Dry Basis	0.198	0.200	0.243	6.41E-01
	Emission Rate, lb/hr	1.73E-04	1.74E-04	2.11E-04	5.57E-04
	Carbon Tetrachloride	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	153.81	153.81	153.81	153.81
	Concentration, mg/dscm	1.10E-03	1.11E-03	1.35E-03	3.57E-03
ppmdv	Parts Per Billion, Dry Basis	0.172	0.173	0.211	5.56E-01
	Emission Rate, lb/hr	1.73E-04	1.74E-04	2.11E-04	5.57E-04
	Benzene	ADL	ADL	ADL	
	Analysis, ug/sample	2.071	0.889	0.768	3.7
	Molecular Weight, MW	78.11	78.11	78.11	78.11
	Concentration, mg/dscm	1.14E-01	4.94E-02	5.19E-02	2.16E-01
ppmdv	Parts Per Billion, Dry Basis	35.117	15.165	15.946	6.62E+01
	Emission Rate, lb/hr	1.79E-02	7.71E-03	8.11E-03	3.37E-02
	1,2-Dichloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	98.95	98.95	98.95	98.95
	Concentration, mg/dscm	1.10E-03	1.11E-03	1.35E-03	3.57E-03
ppmdv	Parts Per Billion, Dry Basis	0.268	0.269	0.328	8.65E-01
	Emission Rate, lb/hr	1.73E-04	1.74E-04	2.11E-04	5.57E-04

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EPA Method 0031-Run 1
Pushing Baghouse

	RUN NUMBER	*P-0031-1A*	*P-0031-1B*	*P-0031-1C*	*SUM*
	RUN DATE	*8/30/2016*	*8/30/2016*	*8/30/2016*	
	RUN TIME	*1026-1214*	*1231-1350*	*1442-1602*	
	Trichloroethene	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	**0.1**
	Molecular Weight, MW	131.39	131.39	131.39	**131.39**
	Concentration, mg/dscm	1.10E-03	1.11E-03	1.35E-03	**3.57E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.202	0.203	0.247	**6.51E-01**
	Emission Rate, lb/hr	**1.73E-04**	**1.74E-04**	**2.11E-04**	**5.57E-04**
	1,2-Dichloropropane	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	**0.1**
	Molecular Weight, MW	112.98	112.98	112.98	**112.98**
	Concentration, mg/dscm	1.10E-03	1.11E-03	1.35E-03	**3.57E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.234	0.236	0.287	**7.57E-01**
	Emission Rate, lb/hr	**1.73E-04**	**1.74E-04**	**2.11E-04**	**5.57E-04**
	Toluene	DDL	DDL	DDL	
	Analysis, ug/sample	0.55	0.29	0.29	**1.1**
	Molecular Weight, MW	92.14	92.14	92.14	**92.14**
	Concentration, mg/dscm	3.04E-02	1.60E-02	1.97E-02	**6.61E-02**
ppmdv	**Parts Per Billion, Dry Basis**	7.920	4.165	5.140	**1.72E+01**
	Emission Rate, lb/hr	**4.75E-03**	**2.50E-03**	**3.08E-03**	**1.03E-02**
	1,1,2-Trichloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	**0.1**
	Molecular Weight, MW	133.40	133.40	133.40	**133.40**
	Concentration, mg/dscm	2.21E-03	2.22E-03	2.70E-03	**7.13E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.397	0.400	0.486	**1.28E+00**
	Emission Rate, lb/hr	**3.45E-04**	**3.47E-04**	**4.22E-04**	**1.11E-03**
	Tetrachloroethene	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	**0.1**
	Molecular Weight, MW	165.82	165.82	165.82	**165.82**
	Concentration, mg/dscm	1.10E-03	1.11E-03	1.35E-03	**3.57E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.160	0.161	0.196	**5.16E-01**
	Emission Rate, lb/hr	**1.73E-04**	**1.74E-04**	**2.11E-04**	**5.57E-04**
	Chlorobenzene	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	**0.1**
	Molecular Weight, MW	112.56	112.56	112.56	**112.56**
	Concentration, mg/dscm	1.10E-03	1.11E-03	1.35E-03	**3.57E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.235	0.237	0.288	**7.60E-01**
	Emission Rate, lb/hr	**1.73E-04**	**1.74E-04**	**2.11E-04**	**5.57E-04**
	Ethylbenzene	DDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.02	0.02	**0.1**
	Molecular Weight, MW	106.17	106.17	106.17	**106.17**
	Concentration, mg/dscm	2.15E-03	1.11E-03	1.35E-03	**4.61E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.487	0.251	0.306	**1.04E+00**
	Emission Rate, lb/hr	**3.36E-04**	**1.74E-04**	**2.11E-04**	**7.21E-04**
	M&P Xylene	DDL	DDL	DDL	
	Analysis, ug/sample	0.11	0.10	0.11	**0.3**
	Molecular Weight, MW	106.16	106.16	106.16	**106.16**
	Concentration, mg/dscm	6.07E-03	5.55E-03	7.23E-03	**1.89E-02**
ppmdv	**Parts Per Billion, Dry Basis**	1.372	1.255	1.635	**4.26E+00**
	Emission Rate, lb/hr	**9.49E-04**	**8.68E-04**	**1.13E-03**	**2.95E-03**
	O-xylene	DDL	DDL	DDL	
	Analysis, ug/sample	0.03	0.03	0.03	**0.1**
	Molecular Weight, MW	106.16	106.16	106.16	**106.16**
	Concentration, mg/dscm	1.55E-03	1.50E-03	1.89E-03	**4.94E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.349	0.339	0.428	**1.12E+00**
	Emission Rate, lb/hr	**2.42E-04**	**2.34E-04**	**2.96E-04**	**7.72E-04**
	Styrene	DDL	DDL	DDL	
	Analysis, ug/sample	1.24	0.04	0.04	**1.3**
	Molecular Weight, MW	104.15	104.15	104.15	**104.15**
	Concentration, mg/dscm	6.84E-02	2.44E-03	2.91E-03	**7.37E-02**
ppmdv	**Parts Per Billion, Dry Basis**	15.756	0.563	0.670	**1.70E+01**
	Emission Rate, lb/hr	**1.07E-02**	**3.82E-04**	**4.54E-04**	**1.15E-02**
	Bromoform	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	**0.1**
	Molecular Weight, MW	252.73	252.73	252.73	**252.73**
	Concentration, mg/dscm	1.10E-03	1.11E-03	1.35E-03	**3.57E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.105	0.105	0.128	**3.39E-01**
	Emission Rate, lb/hr	**1.73E-04**	**1.74E-04**	**2.11E-04**	**5.57E-04**
	1,1,2,2-Tetrachloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	**0.1**
	Molecular Weight, MW	167.85	167.85	167.85	**167.85**
	Concentration, mg/dscm	2.21E-03	2.22E-03	2.70E-03	**7.13E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.316	0.318	0.386	**1.02E+00**
	Emission Rate, lb/hr	**3.45E-04**	**3.47E-04**	**4.22E-04**	**1.11E-03**
	Acrylonitrile	BDL	BDL	BDL	
	Analysis, ug/sample	0.10	0.10	0.10	**0.3**
	Molecular Weight, MW	53.06	53.06	53.06	**53.06**
	Concentration, mg/dscm	5.52E-03	5.55E-03	6.76E-03	**1.78E-02**
ppmdv	**Parts Per Billion, Dry Basis**	2.496	2.511	3.057	**8.06E+00**
	Emission Rate, lb/hr	**8.63E-04**	**8.68E-04**	**1.06E-03**	**2.79E-03**

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	RUN NUMBER	*P-0031-2A*	*P-0031-2B*	*P-0031-2C*	
	RUN DATE	*8/31/2016*	*8/31/2016*	*8/31/2016*	*Average*
	RUN TIME	*1020-1145*	*1200-1339*	*1448-1603*	
	MEASURED DATA				
P_{static}	Stack Static Pressure, inches H_2O	-1.10	-1.10	-1.10	-1.10
y	Meter Box Correction Factor	0.956	0.956	0.956	0.956
P_{bar}	Barometric Pressure, inches Hg	30.05	30.05	30.05	30.05
V_m	Sample Volume, L^3	19.670	19.420	15.920	18.337
$Dp^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	1.9372	1.9372	1.9372	1.9372
T_m	Average Meter Temperature, °F	86	93	86	88
T_s	Average Stack Temperature, °F	114	114	114	114
CO_2	Carbon Dioxide content, % by volume	0.2	0.2	0.2	0.2
O_2	Oxygen content, % by volume	20.5	20.5	20.5	20.5
N_2	Nitrogen content, % by volume	79.3	79.3	79.3	79.3
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	
As	Diameter or Dimensions, inches:	35.50	35.50	35.50	35.50
Q	Sample Run Duration, minutes	20	20	20	20
	CALCULATED DATA				
$V_{m(std)}$	Standard Meter Volume,L	18.264	17.803	14.782	16.949
$V_{m(std)}$	Standard Meter Volume,ft^3	0.645	0.629	0.522	0.598
$V_{m(std)}$	Standard Meter Volume, m^3	0.018	0.018	0.015	0.017
Q_m	Average Sampling Rate, dscfm	0.913	0.890	0.739	0.847
P_s	Stack Pressure, inches Hg	29.97	29.97	29.97	29.97
B_{ws}	Moisture, % by volume	2.3	2.3	2.3	2.3
$B_{ws(sat)}$	Moisture (at saturation), % by volume	9.7	9.7	9.7	9.7
V_{wstd}	Standard Water Vapor Volume, ft^3	0.000	0.000	0.000	0.000
$1-B_{ws}$	Dry Mole Fraction	0.977	0.977	0.977	0.977
M_d	Molecular Weight (d.b.), lb/lb•mole	28.85	28.85	28.85	28.85
M_s	Molecular Weight (w.b.), lb/lb•mole	28.60	28.60	28.60	28.60
V_s	Stack Gas Velocity, ft/s	113.8	113.8	113.8	113.8
A	Stack Area, ft^2	6.9	6.9	6.9	6.87
Q_a	Stack Gas Volumetric flow, acfm	46,953	46,953	46,953	46,953
Q_s	Stack Gas Volumetric flow, dscfm	42,243	42,243	42,243	42,243
Q_s	Stack Gas Volumetric flow, dscmm	1,196	1,196	1,196	1,196

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	RUN NUMBER	*P-0031-2A*	*P-0031-2B*	*P-0031-2C*	*Sum*
	RUN DATE	*8/31/2016*	*8/31/2016*	*8/31/2016*	
	RUN TIME	*1020-1145*	*1200-1339*	*1448-1603*	
	Chloromethane	BDL	DDL	BDL	
	Analysis, ug/sample	0.12	0.17	0.12	0.4
	Molecular Weight, MW	50.49	50.49	50.49	50.49
	Concentration, mg/dscm	**6.57E-03**	**9.77E-03**	**8.12E-03**	**2.45E-02**
ppmdv	**Parts Per Billion, Dry Basis**	**3.12E+00**	**4.65E+00**	**3.86E+00**	**1.16E+01**
	Emission Rate, lb/hr	**1.04E-03**	**1.54E-03**	**1.28E-03**	**3.86E-03**
	Vinyl Chloride	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.1
	Molecular Weight, MW	62.50	62.50	62.50	62.50
	Concentration, mg/dscm	**2.19E-03**	**2.25E-03**	**2.71E-03**	**7.14E-03**
ppmdv	**Parts Per Billion, Dry Basis**	**8.41E-01**	**8.63E-01**	**1.04E+00**	**2.74E+00**
	Emission Rate, lb/hr	**3.46E-04**	**3.55E-04**	**4.27E-04**	**1.13E-03**
	Bromomethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.18	0.18	0.18	0.5
	Molecular Weight, MW	94.95	94.95	94.95	94.95
	Concentration, mg/dscm	9.86E-03	1.01E-02	1.22E-02	**3.21E-02**
ppmdv	**Parts Per Billion, Dry Basis**	2.49	2.56	3.08	**8.13E+00**
	Emission Rate, lb/hr	**1.56E-03**	**1.60E-03**	**1.92E-03**	**5.08E-03**
	Chloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.1
	Molecular Weight, MW	64.51	64.51	64.51	64.51
	Concentration, mg/dscm	2.19E-03	2.25E-03	2.71E-03	**7.14E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.815	0.836	1.007	**2.66E+00**
	Emission Rate, lb/hr	**3.46E-04**	**3.55E-04**	**4.27E-04**	**1.13E-03**
	1,1-Dichloroethene	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	96.94	96.94	96.94	96.94
	Concentration, mg/dscm	1.10E-03	1.12E-03	1.35E-03	**3.57E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.271	0.278	0.335	**8.84E-01**
	Emission Rate, lb/hr	**1.73E-04**	**1.77E-04**	**2.14E-04**	**5.64E-04**
	Iodomethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.06	0.06	0.06	0.2
	Molecular Weight, MW	142.93	142.93	142.93	142.93
	Concentration, mg/dscm	3.29E-03	3.37E-03	4.06E-03	**1.07E-02**
ppmdv	**Parts Per Billion, Dry Basis**	0.552	0.566	0.682	**1.80E+00**
	Emission Rate, lb/hr	**5.19E-04**	**5.32E-04**	**6.41E-04**	**1.69E-03**
	Carbon Disulfide	ADL	ADL	DDL	
	Analysis, ug/sample	0.07	0.05	0.04	0.2
	Molecular Weight, MW	76.14	76.14	76.14	76.14
	Concentration, mg/dscm	3.89E-03	2.58E-03	2.84E-03	**9.31E-03**
ppmdv	**Parts Per Billion, Dry Basis**	1.226	0.815	0.896	**2.94E+00**
	Emission Rate, lb/hr	**6.14E-04**	**4.08E-04**	**4.49E-04**	**1.47E-03**
	Methylene Chloride	BDL	ADL	BDL	
	Analysis, ug/sample	0.20	0.36	0.20	0.8
	Molecular Weight, MW	84.93	84.93	84.93	84.93
	Concentration, mg/dscm	1.10E-02	2.01E-02	1.35E-02	**4.46E-02**
ppmdv	**Parts Per Billion, Dry Basis**	3.1	5.7	3.8	**1.26E+01**
	Emission Rate, lb/hr	**1.73E-03**	**3.18E-03**	**2.14E-03**	**7.04E-03**
	Chloroform	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	119.37	119.37	119.37	119.37
	Concentration, mg/dscm	1.10E-03	1.12E-03	1.35E-03	**3.57E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.220	0.226	0.272	**7.18E-01**
	Emission Rate, lb/hr	**1.73E-04**	**1.77E-04**	**2.14E-04**	**5.64E-04**
	1,1,1 Trichloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	133.50	133.50	133.50	133.50
	Concentration, mg/dscm	1.10E-03	1.12E-03	1.35E-03	**3.57E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.197	0.202	0.243	**6.42E-01**
	Emission Rate, lb/hr	**1.73E-04**	**1.77E-04**	**2.14E-04**	**5.64E-04**
	Carbon Tetrachloride	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	153.81	153.81	153.81	153.81
	Concentration, mg/dscm	1.10E-03	1.12E-03	1.35E-03	**3.57E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.171	0.175	0.211	**5.57E-01**
	Emission Rate, lb/hr	**1.73E-04**	**1.77E-04**	**2.14E-04**	**5.64E-04**
	Benzene	ADL	ADL	ADL	
	Analysis, ug/sample	0.934	1.687	0.387	3.0
	Molecular Weight, MW	78.11	78.11	78.11	78.11
	Concentration, mg/dscm	5.11E-02	9.48E-02	2.62E-02	**1.72E-01**
ppmdv	**Parts Per Billion, Dry Basis**	15.717	29.122	8.046	**5.29E+01**
	Emission Rate, lb/hr	**8.08E-03**	**1.50E-02**	**4.13E-03**	**2.72E-02**
	1,2-Dichloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	98.95	98.95	98.95	98.95
	Concentration, mg/dscm	1.10E-03	1.12E-03	1.35E-03	**3.57E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.266	0.273	0.328	**8.66E-01**
	Emission Rate, lb/hr	**1.73E-04**	**1.77E-04**	**2.14E-04**	**5.64E-04**

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	RUN NUMBER	*P-0031-2A*	*P-0031-2B*	*P-0031-2C*	*SUM*
	RUN DATE	*8/31/2016*	*8/31/2016*	*8/31/2016*	
	RUN TIME	*1020-1145*	*1200-1339*	*1448-1603*	
	Trichloroethene	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	131.39	131.39	131.39	131.39
	Concentration, mg/dscm	1.10E-03	1.12E-03	1.35E-03	3.57E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.200	0.205	0.247	6.53E-01
	Emission Rate, lb/hr	1.73E-04	1.77E-04	2.14E-04	5.64E-04
	1,2-Dichloropropane	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	112.98	112.98	112.98	112.98
	Concentration, mg/dscm	1.10E-03	1.12E-03	1.35E-03	3.57E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.233	0.239	0.287	7.59E-01
	Emission Rate, lb/hr	1.73E-04	1.77E-04	2.14E-04	5.64E-04
	Toluene	DDL	DDL	DDL	
	Analysis, ug/sample	0.30	0.38	0.16	0.8
	Molecular Weight, MW	92.14	92.14	92.14	92.14
	Concentration, mg/dscm	1.66E-02	2.11E-02	1.08E-02	4.85E-02
ppmdv	**Parts Per Billion, Dry Basis**	4.322	5.502	2.802	1.26E+01
	Emission Rate, lb/hr	2.62E-03	3.34E-03	1.70E-03	7.65E-03
	1,1,2-Trichloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.1
	Molecular Weight, MW	133.40	133.40	133.40	133.40
	Concentration, mg/dscm	2.19E-03	2.25E-03	2.71E-03	7.14E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.394	0.404	0.487	1.29E+00
	Emission Rate, lb/hr	3.46E-04	3.55E-04	4.27E-04	1.13E-03
	Tetrachloroethene	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	165.82	165.82	165.82	165.82
	Concentration, mg/dscm	1.10E-03	1.12E-03	1.35E-03	3.57E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.159	0.163	0.196	5.17E-01
	Emission Rate, lb/hr	1.73E-04	1.77E-04	2.14E-04	5.64E-04
	Chlorobenzene	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	112.56	112.56	112.56	112.56
	Concentration, mg/dscm	1.10E-03	1.12E-03	1.35E-03	3.57E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.234	0.240	0.289	7.62E-01
	Emission Rate, lb/hr	1.73E-04	1.77E-04	2.14E-04	5.64E-04
	Ethylbenzene	DDL	DDL	BDL	
	Analysis, ug/sample	0.04	0.03	0.02	0.1
	Molecular Weight, MW	106.17	106.17	106.17	106.17
	Concentration, mg/dscm	2.14E-03	1.40E-03	1.35E-03	4.89E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.483	0.318	0.306	1.11E+00
	Emission Rate, lb/hr	3.37E-04	2.22E-04	2.14E-04	7.73E-04
	M&P Xylene	DDL	DDL	DDL	
	Analysis, ug/sample	0.11	0.14	0.07	0.3
	Molecular Weight, MW	106.16	106.16	106.16	106.16
	Concentration, mg/dscm	6.02E-03	7.75E-03	4.53E-03	1.83E-02
ppmdv	**Parts Per Billion, Dry Basis**	1.362	1.753	1.025	4.14E+00
	Emission Rate, lb/hr	9.51E-04	1.22E-03	7.16E-04	2.89E-03
	O-xylene	DDL	DDL	BDL	
	Analysis, ug/sample	0.03	0.04	0.02	0.1
	Molecular Weight, MW	106.16	106.16	106.16	106.16
	Concentration, mg/dscm	1.53E-03	2.02E-03	1.35E-03	4.91E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.347	0.457	0.306	1.11E+00
	Emission Rate, lb/hr	2.42E-04	3.19E-04	2.14E-04	7.75E-04
	Styrene	DDL	DDL	DDL	
	Analysis, ug/sample	1.24	0.08	0.04	1.4
	Molecular Weight, MW	104.15	104.15	104.15	104.15
	Concentration, mg/dscm	6.78E-02	4.44E-03	2.91E-03	7.52E-02
ppmdv	**Parts Per Billion, Dry Basis**	15.637	1.023	0.671	1.73E+01
	Emission Rate, lb/hr	1.07E-02	7.01E-04	4.59E-04	1.19E-02
	Bromoform	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	252.73	252.73	252.73	252.73
	Concentration, mg/dscm	1.10E-03	1.12E-03	1.35E-03	3.57E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.104	0.107	0.129	3.39E-01
	Emission Rate, lb/hr	1.73E-04	1.77E-04	2.14E-04	5.64E-04
	1,1,2,2-Tetrachloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.1
	Molecular Weight, MW	167.85	167.85	167.85	167.85
	Concentration, mg/dscm	2.19E-03	2.25E-03	2.71E-03	7.14E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.313	0.321	0.387	1.02E+00
	Emission Rate, lb/hr	3.46E-04	3.55E-04	4.27E-04	1.13E-03
	Acrylonitrile	BDL	BDL	BDL	
	Analysis, ug/sample	0.10	0.10	0.10	0.3
	Molecular Weight, MW	53.06	53.06	53.06	53.06
	Concentration, mg/dscm	5.48E-03	5.62E-03	6.77E-03	1.79E-02
ppmdv	**Parts Per Billion, Dry Basis**	2.477	2.541	3.061	8.08E+00
	Emission Rate, lb/hr	8.65E-04	8.87E-04	1.07E-03	2.82E-03

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	RUN NUMBER *RUN DATE* *RUN TIME*	*P-0031-3A* *9/1/2016* *1020-1145*	*P-0031-3B* *9/1/2016* *1200-1338*	*P-0031-3C* *9/1/2016* *1441-1604*	*Average*
	MEASURED DATA				
P_{static}	Stack Static Pressure, inches H_2O	-1.10	-1.10	-1.10	-1.10
y	Meter Box Correction Factor	0.956	0.956	0.956	0.956
P_{bar}	Barometric Pressure, inches Hg	30.08	30.08	30.08	30.08
V_m	Sample Volume, L^3	19.380	16.360	16.030	17.257
$Dp^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	1.9699	1.9699	1.9699	1.9699
T_m	Average Meter Temperature, °F	72	76	78	75
T_s	Average Stack Temperature, °F	109	109	109	109
CO_2	Carbon Dioxide content, % by volume	0.1	0.1	0.1	0.1
O_2	Oxygen content, % by volume	20.8	20.8	20.8	20.8
N_2	Nitrogen content, % by volume	79.1	79.1	79.1	79.1
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	
As	Diameter or Dimensions, inches:	35.50	35.50	35.50	35.50
Q	Sample Run Duration, minutes	20	20	20	20
	CALCULATED DATA				
$V_{m(std)}$	Standard Meter Volume,L	18.486	15.489	15.120	16.365
$V_{m(std)}$	Standard Meter Volume,ft^3	0.653	0.547	0.534	0.578
$V_{m(std)}$	Standard Meter Volume, m^3	0.018	0.015	0.015	0.016
Q_m	Average Sampling Rate, dscfm	0.924	0.774	0.756	0.818
P_s	Stack Pressure, inches Hg	30.00	30.00	30.00	30.00
B_{ws}	Moisture, % by volume	1.5	1.5	1.5	1.5
$B_{ws(sat)}$	Moisture (at saturation), % by volume	8.4	8.4	8.4	8.4
V_{wstd}	Standard Water Vapor Volume, ft^3	0.000	0.000	0.000	0.000
$1-B_{ws}$	Dry Mole Fraction	0.985	0.985	0.985	0.985
M_d	Molecular Weight (d.b.), lb/lb•mole	28.85	28.85	28.85	28.85
M_s	Molecular Weight (w.b.), lb/lb•mole	28.70	28.70	28.70	28.70
V_s	Stack Gas Velocity, ft/s	115.0	115.0	115.0	115.0
A	Stack Area, ft^2	6.9	6.9	6.9	6.87
Q_a	Stack Gas Volumetric flow, acfm	47,431	47,431	47,431	47,431
Q_s	Stack Gas Volumetric flow, dscfm	43,470	43,470	43,470	43,470
Q_s	Stack Gas Volumetric flow, dscmm	1,231	1,231	1,231	1,231

Summary of Stack Gas Parameters and Test Results
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	RUN NUMBER	*P-0031-3A*	*P-0031-3B*	*P-0031-3C*	*Sum*
	RUN DATE	*9/1/2016*	*9/1/2016*	*9/1/2016*	
	RUN TIME	*1020-1145*	*1200-1338*	*1441-1604*	
	Chloromethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.4
	Molecular Weight, MW	50.49	50.49	50.49	50.49
	Concentration, mg/dscm	**6.49E-03**	**7.75E-03**	**7.94E-03**	**2.22E-02**
ppmdv	**Parts Per Billion, Dry Basis**	**3.09E+00**	**3.68E+00**	**3.77E+00**	**1.05E+01**
	Emission Rate, lb/hr	**1.05E-03**	**1.26E-03**	**1.29E-03**	**3.60E-03**
	Vinyl Chloride	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.1
	Molecular Weight, MW	62.50	62.50	62.50	62.50
	Concentration, mg/dscm	**2.16E-03**	**2.58E-03**	**2.65E-03**	**7.39E-03**
ppmdv	**Parts Per Billion, Dry Basis**	**8.31E-01**	**9.92E-01**	**1.02E+00**	**2.84E+00**
	Emission Rate, lb/hr	**3.52E-04**	**4.20E-04**	**4.30E-04**	**1.20E-03**
	Bromomethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.18	0.18	0.18	0.5
	Molecular Weight, MW	94.95	94.95	94.95	94.95
	Concentration, mg/dscm	9.74E-03	1.16E-02	1.19E-02	**3.33E-02**
ppmdv	**Parts Per Billion, Dry Basis**	2.46	2.94	3.01	**8.41E+00**
	Emission Rate, lb/hr	**1.58E-03**	**1.89E-03**	**1.93E-03**	**5.41E-03**
	Chloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.1
	Molecular Weight, MW	64.51	64.51	64.51	64.51
	Concentration, mg/dscm	2.16E-03	2.58E-03	2.65E-03	**7.39E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.805	0.961	0.984	**2.75E+00**
	Emission Rate, lb/hr	**3.52E-04**	**4.20E-04**	**4.30E-04**	**1.20E-03**
	1,1-Dichloroethene	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	96.94	96.94	96.94	96.94
	Concentration, mg/dscm	1.08E-03	1.29E-03	1.32E-03	**3.70E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.268	0.320	0.328	**9.15E-01**
	Emission Rate, lb/hr	**1.76E-04**	**2.10E-04**	**2.15E-04**	**6.01E-04**
	Iodomethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.06	0.06	0.06	0.2
	Molecular Weight, MW	142.93	142.93	142.93	142.93
	Concentration, mg/dscm	3.25E-03	3.87E-03	3.97E-03	**1.11E-02**
ppmdv	**Parts Per Billion, Dry Basis**	0.545	0.651	0.666	**1.86E+00**
	Emission Rate, lb/hr	**5.27E-04**	**6.29E-04**	**6.45E-04**	**1.80E-03**
	Carbon Disulfide	DDL	BDL	BDL	
	Analysis, ug/sample	0.05	0.04	0.04	0.1
	Molecular Weight, MW	76.14	76.14	76.14	76.14
	Concentration, mg/dscm	2.54E-03	2.58E-03	2.65E-03	**7.77E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.802	0.814	0.834	**2.45E+00**
	Emission Rate, lb/hr	**4.13E-04**	**4.20E-04**	**4.30E-04**	**1.26E-03**
	Methylene Chloride	BDL	BDL	DDL	
	Analysis, ug/sample	0.20	0.20	0.23	0.6
	Molecular Weight, MW	84.93	84.93	84.93	84.93
	Concentration, mg/dscm	1.08E-02	1.29E-02	1.53E-02	**3.90E-02**
ppmdv	**Parts Per Billion, Dry Basis**	3.1	3.6	4.3	**1.10E+01**
	Emission Rate, lb/hr	**1.76E-03**	**2.10E-03**	**2.48E-03**	**6.34E-03**
	Chloroform	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	119.37	119.37	119.37	119.37
	Concentration, mg/dscm	1.08E-03	1.29E-03	1.32E-03	**3.70E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.218	0.260	0.266	**7.43E-01**
	Emission Rate, lb/hr	**1.76E-04**	**2.10E-04**	**2.15E-04**	**6.01E-04**
	1,1,1 Trichloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	133.50	133.50	133.50	133.50
	Concentration, mg/dscm	1.08E-03	1.29E-03	1.32E-03	**3.70E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.195	0.232	0.238	**6.65E-01**
	Emission Rate, lb/hr	**1.76E-04**	**2.10E-04**	**2.15E-04**	**6.01E-04**
	Carbon Tetrachloride	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	153.81	153.81	153.81	153.81
	Concentration, mg/dscm	1.08E-03	1.29E-03	1.32E-03	**3.70E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.169	0.202	0.206	**5.77E-01**
	Emission Rate, lb/hr	**1.76E-04**	**2.10E-04**	**2.15E-04**	**6.01E-04**
	Benzene	DDL	DDL	DDL	
	Analysis, ug/sample	0.368	0.223	0.201	0.8
	Molecular Weight, MW	78.11	78.11	78.11	78.11
	Concentration, mg/dscm	1.99E-02	1.44E-02	1.33E-02	**4.76E-02**
ppmdv	**Parts Per Billion, Dry Basis**	6.118	4.425	4.086	**1.46E+01**
	Emission Rate, lb/hr	**3.23E-03**	**2.34E-03**	**2.16E-03**	**7.73E-03**
	1,2-Dichloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	98.95	98.95	98.95	98.95
	Concentration, mg/dscm	1.08E-03	1.29E-03	1.32E-03	**3.70E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.262	0.313	0.321	**8.97E-01**
	Emission Rate, lb/hr	**1.76E-04**	**2.10E-04**	**2.15E-04**	**6.01E-04**

Summary of Stack Gas Parameters and Test Results
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	RUN NUMBER	P-0031-3A	P-0031-3B	P-0031-3C	SUM
	RUN DATE	9/1/2016	9/1/2016	9/1/2016	
	RUN TIME	1020-1145	1200-1338	1441-1604	
	Trichloroethene	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	131.39	131.39	131.39	131.39
	Concentration, mg/dscm	1.08E-03	1.29E-03	1.32E-03	3.70E-03
ppmdv	Parts Per Billion, Dry Basis	0.198	0.236	0.242	6.75E-01
	Emission Rate, lb/hr	1.76E-04	2.10E-04	2.15E-04	6.01E-04
	1,2-Dichloropropane	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	112.98	112.98	112.98	112.98
	Concentration, mg/dscm	1.08E-03	1.29E-03	1.32E-03	3.70E-03
ppmdv	Parts Per Billion, Dry Basis	0.230	0.274	0.281	7.85E-01
	Emission Rate, lb/hr	1.76E-04	2.10E-04	2.15E-04	6.01E-04
	Toluene	DDL	DDL	DDL	
	Analysis, ug/sample	0.14	0.11	0.12	0.4
	Molecular Weight, MW	92.14	92.14	92.14	92.14
	Concentration, mg/dscm	7.52E-03	7.30E-03	7.67E-03	2.25E-02
ppmdv	Parts Per Billion, Dry Basis	1.959	1.901	1.999	5.86E+00
	Emission Rate, lb/hr	1.22E-03	1.19E-03	1.25E-03	3.65E-03
	1,1,2-Trichloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.1
	Molecular Weight, MW	133.40	133.40	133.40	133.40
	Concentration, mg/dscm	2.16E-03	2.58E-03	2.65E-03	7.39E-03
ppmdv	Parts Per Billion, Dry Basis	0.389	0.465	0.476	1.33E+00
	Emission Rate, lb/hr	3.52E-04	4.20E-04	4.30E-04	1.20E-03
	Tetrachloroethene	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	165.82	165.82	165.82	165.82
	Concentration, mg/dscm	1.08E-03	1.29E-03	1.32E-03	3.70E-03
ppmdv	Parts Per Billion, Dry Basis	0.157	0.187	0.191	5.35E-01
	Emission Rate, lb/hr	1.76E-04	2.10E-04	2.15E-04	6.01E-04
	Chlorobenzene	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	112.56	112.56	112.56	112.56
	Concentration, mg/dscm	1.08E-03	1.29E-03	1.32E-03	3.70E-03
ppmdv	Parts Per Billion, Dry Basis	0.231	0.275	0.282	7.88E-01
	Emission Rate, lb/hr	1.76E-04	2.10E-04	2.15E-04	6.01E-04
	Ethylbenzene	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	106.17	106.17	106.17	106.17
	Concentration, mg/dscm	1.08E-03	1.29E-03	1.32E-03	3.70E-03
ppmdv	Parts Per Billion, Dry Basis	0.245	0.292	0.299	8.36E-01
	Emission Rate, lb/hr	1.76E-04	2.10E-04	2.15E-04	6.01E-04
	M&P Xylene	BDL	BDL	BDL	
	Analysis, ug/sample	0.06	0.06	0.06	0.2
	Molecular Weight, MW	106.16	106.16	106.16	106.16
	Concentration, mg/dscm	3.25E-03	3.87E-03	3.97E-03	1.11E-02
ppmdv	Parts Per Billion, Dry Basis	0.734	0.876	0.897	2.51E+00
	Emission Rate, lb/hr	5.27E-04	6.29E-04	6.45E-04	1.80E-03
	O-xylene	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	106.16	106.16	106.16	106.16
	Concentration, mg/dscm	1.08E-03	1.29E-03	1.32E-03	3.70E-03
ppmdv	Parts Per Billion, Dry Basis	0.245	0.292	0.299	8.36E-01
	Emission Rate, lb/hr	1.76E-04	2.10E-04	2.15E-04	6.01E-04
	Styrene	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.1
	Molecular Weight, MW	104.15	104.15	104.15	104.15
	Concentration, mg/dscm	2.16E-03	2.58E-03	2.65E-03	7.39E-03
ppmdv	Parts Per Billion, Dry Basis	0.499	0.595	0.610	1.70E+00
	Emission Rate, lb/hr	3.52E-04	4.20E-04	4.30E-04	1.20E-03
	Bromoform	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.1
	Molecular Weight, MW	252.73	252.73	252.73	252.73
	Concentration, mg/dscm	1.08E-03	1.29E-03	1.32E-03	3.70E-03
ppmdv	Parts Per Billion, Dry Basis	0.103	0.123	0.126	3.51E-01
	Emission Rate, lb/hr	1.76E-04	2.10E-04	2.15E-04	6.01E-04
	1,1,2,2-Tetrachloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.1
	Molecular Weight, MW	167.85	167.85	167.85	167.85
	Concentration, mg/dscm	2.16E-03	2.58E-03	2.65E-03	7.39E-03
ppmdv	Parts Per Billion, Dry Basis	0.309	0.369	0.378	1.06E+00
	Emission Rate, lb/hr	3.52E-04	4.20E-04	4.30E-04	1.20E-03
	Acrylonitrile	BDL	BDL	BDL	
	Analysis, ug/sample	0.10	0.10	0.10	0.3
	Molecular Weight, MW	53.06	53.06	53.06	53.06
	Concentration, mg/dscm	5.41E-03	6.46E-03	6.61E-03	1.85E-02
ppmdv	Parts Per Billion, Dry Basis	2.447	2.921	2.992	8.36E+00
	Emission Rate, lb/hr	8.79E-04	1.05E-03	1.07E-03	3.00E-03

Summary of Stack Gas Parameters and Test Results
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	RUN NUMBER	*P-0031-1*	*P-0031-2*	*P-0031-3*	*Average*
	RUN DATE	*8/30/2016*	*8/31/2016*	*9/1/2016*	
	RUN TIME	*1026-1602*	*1020-1603*	*1020-1604*	
	MEASURED DATA				
P_{static}	Stack Static Pressure, inches H_2O	-1.10	-1.10	-1.10	-1.10
y	Meter Box Correction Factor	0.956	0.956	0.956	0.956
P_{bar}	Barometric Pressure, inches Hg	30.23	30.05	30.08	30.12
V_m	Sample Volume, L^3	18.330	18.337	17.257	17.974
$Dp^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	1.9118	1.9372	1.9699	1.9396
T_m	Average Meter Temperature, °F	91	88	75	85
T_s	Average Stack Temperature, °F	117	114	109	113
CO_2	Carbon Dioxide content, % by volume	0.2	0.2	0.1	0.2
O_2	Oxygen content, % by volume	20.7	20.5	20.8	20.7
N_2	Nitrogen content, % by volume	79.1	79.3	79.1	79.2
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	0	0	0	
As	Diameter or Dimensions, inches:	35.50	35.50	35.50	35.50
Q	Sample Run Duration, minutes	20	20	20	20
	CALCULATED DATA				
$V_{m(std)}$	Standard Meter Volume,L	16.981	16.949	16.365	16.765
$V_{m(std)}$	Standard Meter Volume,ft^3	0.600	0.598	0.578	0.592
$V_{m(std)}$	Standard Meter Volume, m^3	0.017	0.017	0.016	0.017
Q_m	Average Sampling Rate, dscfm	0.849	0.847	0.818	0.838
P_s	Stack Pressure, inches Hg	30.15	29.97	30.00	30.04
B_{ws}	Moisture, % by volume	2.0	2.3	1.5	1.9
$B_{ws(sat)}$	Moisture (at saturation), % by volume	10.5	9.7	8.4	9.5
V_{wstd}	Standard Water Vapor Volume, ft^3	0.000	0.000	0.000	0.000
$1-B_{ws}$	Dry Mole Fraction	0.980	0.977	0.985	0.981
M_d	Molecular Weight (d.b.), lb/lb•mole	28.86	28.85	28.85	28.85
M_s	Molecular Weight (w.b.), lb/lb•mole	28.65	28.60	28.70	28.65
V_s	Stack Gas Velocity, ft/s	112.2	113.8	115.0	113.7
A	Stack Area, ft^2	6.9	6.9	6.9	6.87
Q_a	Stack Gas Volumetric flow, acfm	46,279	46,953	47,431	46,887
Q_s	Stack Gas Volumetric flow, dscfm	41,821	42,243	43,470	42,511
Q_s	Stack Gas Volumetric flow, dscmm	1,184	1,196	1,231	1,204

Summary of Stack Gas Parameters and Test Results
050074.0172
AK Steel-Middletown
EPA Method 0031-Summary
Pushing Baghouse

	RUN NUMBER	*P-0031-1*	*P-0031-2*	*P-0031-3*	*Average*
	RUN DATE	*8/30/2016*	*8/31/2016*	*9/1/2016*	
	RUN TIME	*1026-1602*	*1020-1603*	*1020-1604*	
	Chloromethane	BDL	DDL	BDL	
	Analysis, ug/sample	0.36	0.41	0.36	0.4
	Molecular Weight, MW	50.49	50.49	50.49	50.49
	Concentration, mg/dscm	2.14E-02	2.45E-02	2.22E-02	2.27E-02
ppmdv	**Parts Per Billion, Dry Basis**	1.02E+01	1.16E+01	1.05E+01	1.08E+01
	Emission Rate, lb/hr	3.34E-03	3.86E-03	3.60E-03	3.60E-03
	Vinyl Chloride	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.1
	Molecular Weight, MW	62.50	62.50	62.50	62.50
	Concentration, mg/dscm	7.13E-03	7.14E-03	7.39E-03	7.22E-03
ppmdv	**Parts Per Billion, Dry Basis**	2.74E+00	2.74E+00	2.84E+00	2.77E+00
	Emission Rate, lb/hr	1.11E-03	1.13E-03	1.20E-03	1.15E-03
	Bromomethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.54	0.54	0.54	0.5
	Molecular Weight, MW	94.95	94.95	94.95	94.95
	Concentration, mg/dscm	3.21E-02	3.21E-02	3.33E-02	3.25E-02
ppmdv	**Parts Per Billion, Dry Basis**	8.11E+00	8.13E+00	8.41E+00	8.22E+00
	Emission Rate, lb/hr	5.02E-03	5.08E-03	5.41E-03	5.17E-03
	Chloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.1
	Molecular Weight, MW	64.51	64.51	64.51	64.51
	Concentration, mg/dscm	7.13E-03	7.14E-03	7.39E-03	7.22E-03
ppmdv	**Parts Per Billion, Dry Basis**	2.65E+00	2.66E+00	2.75E+00	2.69E+00
	Emission Rate, lb/hr	1.11E-03	1.13E-03	1.20E-03	1.15E-03
	1,1-Dichloroethene	BDL	BDL	BDL	
	Analysis, ug/sample	0.06	0.06	0.06	0.1
	Molecular Weight, MW	96.94	96.94	96.94	96.94
	Concentration, mg/dscm	3.57E-03	3.57E-03	3.70E-03	3.61E-03
ppmdv	**Parts Per Billion, Dry Basis**	8.83E-01	8.84E-01	9.15E-01	8.94E-01
	Emission Rate, lb/hr	5.57E-04	5.64E-04	6.01E-04	5.74E-04
	Iodomethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.18	0.18	0.18	0.2
	Molecular Weight, MW	142.93	142.93	142.93	142.93
	Concentration, mg/dscm	1.07E-02	1.07E-02	1.11E-02	1.08E-02
ppmdv	**Parts Per Billion, Dry Basis**	1.80E+00	1.80E+00	1.86E+00	1.82E+00
	Emission Rate, lb/hr	1.67E-03	1.69E-03	1.80E-03	1.72E-03
	Carbon Disulfide	BDL	DLL	DLL	
	Analysis, ug/sample	0.12	0.16	0.13	0.1
	Molecular Weight, MW	76.14	76.14	76.14	76.14
	Concentration, mg/dscm	7.13E-03	9.31E-03	7.77E-03	8.07E-03
ppmdv	**Parts Per Billion, Dry Basis**	2.25E+00	2.94E+00	2.45E+00	2.55E+00
	Emission Rate, lb/hr	1.11E-03	1.47E-03	1.26E-03	1.28E-03
	Methylene Chloride	DDL	DDL	DDL	
	Analysis, ug/sample	0.70	0.76	0.63	0.7
	Molecular Weight, MW	84.93	84.93	84.93	84.93
	Concentration, mg/dscm	4.22E-02	4.46E-02	3.90E-02	4.19E-02
ppmdv	**Parts Per Billion, Dry Basis**	1.19E+01	1.26E+01	1.10E+01	1.17E+01
	Emission Rate, lb/hr	6.59E-03	7.04E-03	6.34E-03	6.60E-03
	Chloroform	BDL	BDL	BDL	
	Analysis, ug/sample	0.06	0.06	0.06	0.1
	Molecular Weight, MW	119.37	119.37	119.37	119.37
	Concentration, mg/dscm	3.57E-03	3.57E-03	3.70E-03	3.61E-03
ppmdv	**Parts Per Billion, Dry Basis**	7.17E-01	7.18E-01	7.43E-01	7.26E-01
	Emission Rate, lb/hr	5.57E-04	5.64E-04	6.01E-04	5.74E-04
	1,1,1 Trichloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.06	0.06	0.06	0.1
	Molecular Weight, MW	133.50	133.50	133.50	133.50
	Concentration, mg/dscm	3.57E-03	3.57E-03	3.70E-03	3.61E-03
ppmdv	**Parts Per Billion, Dry Basis**	6.41E-01	6.42E-01	6.65E-01	6.44E-01
	Emission Rate, lb/hr	5.57E-04	5.64E-04	6.01E-04	5.69E-04
	Carbon Tetrachloride	BDL	BDL	BDL	
	Analysis, ug/sample	0.06	0.06	0.06	0.1
	Molecular Weight, MW	153.81	153.81	153.81	153.81
	Concentration, mg/dscm	3.57E-03	3.57E-03	3.70E-03	3.61E-03
ppmdv	**Parts Per Billion, Dry Basis**	5.56E-01	5.57E-01	5.77E-01	5.64E-01
	Emission Rate, lb/hr	5.57E-04	5.64E-04	6.01E-04	5.74E-04
	Benzene	ADL	ADL	DDL	
	Analysis, ug/sample	3.73	3.01	0.79	2.5
	Molecular Weight, MW	78.11	78.11	78.11	78.11
	Concentration, mg/dscm	2.16E-01	1.72E-01	4.76E-02	1.45E-01
ppmdv	**Parts Per Billion, Dry Basis**	6.62E+01	5.29E+01	1.46E+01	4.46E+01
	Emission Rate, lb/hr	3.37E-02	2.72E-02	7.73E-03	2.29E-02
	1,2-Dichloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.06	0.06	0.06	0.1
	Molecular Weight, MW	98.95	98.95	98.95	98.95
	Concentration, mg/dscm	3.57E-03	3.57E-03	3.70E-03	3.61E-03
ppmdv	**Parts Per Billion, Dry Basis**	8.65E-01	8.66E-01	8.97E-01	8.76E-01
	Emission Rate, lb/hr	5.57E-04	5.64E-04	6.01E-04	5.74E-04

Summary of Stack Gas Parameters and Test Results
050074.0172
AK Steel-Middletown
EPA Method 0031-Summary
Pushing Baghouse

	RUN NUMBER	*P-0031-1*	*P-0031-2*	*P-0031-3*	*average*
	RUN DATE	*8/30/2016*	*8/31/2016*	*9/1/2016*	
	RUN TIME	*1026-1602*	*1020-1603*	*1020-1604*	
	Trichloroethene	BDL	BDL	BDL	
	Analysis, ug/sample	0.06	0.06	0.06	0.1
	Molecular Weight, MW	131.39	131.39	131.39	131.39
	Concentration, mg/dscm	3.57E-03	3.57E-03	3.70E-03	3.61E-03
ppmdv	**Parts Per Billion, Dry Basis**	6.51E-01	6.53E-01	6.75E-01	6.60E-01
	Emission Rate, lb/hr	5.57E-04	5.64E-04	6.01E-04	5.74E-04
	1,2-Dichloropropane	BDL	BDL	BDL	
	Analysis, ug/sample	0.06	0.06	0.06	0.1
	Molecular Weight, MW	112.98	112.98	112.98	112.98
	Concentration, mg/dscm	3.57E-03	3.57E-03	3.70E-03	3.61E-03
ppmdv	**Parts Per Billion, Dry Basis**	7.57E-01	7.59E-01	7.85E-01	7.67E-01
	Emission Rate, lb/hr	5.57E-04	5.64E-04	6.01E-04	5.74E-04
	Toluene	DDL	DDL	DDL	
	Analysis, ug/sample	1.13	0.84	0.37	0.8
	Molecular Weight, MW	92.14	92.14	92.14	92.14
	Concentration, mg/dscm	6.61E-02	4.85E-02	2.25E-02	4.57E-02
ppmdv	**Parts Per Billion, Dry Basis**	1.72E+01	1.26E+01	5.86E+00	1.19E+01
	Emission Rate, lb/hr	1.03E-02	7.65E-03	3.65E-03	7.21E-03
	1,1,2-Trichloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.1
	Molecular Weight, MW	133.40	133.40	133.40	133.40
	Concentration, mg/dscm	7.13E-03	7.14E-03	7.39E-03	7.22E-03
ppmdv	**Parts Per Billion, Dry Basis**	1.28E+00	1.29E+00	1.33E+00	1.30E+00
	Emission Rate, lb/hr	1.11E-03	1.13E-03	1.20E-03	1.15E-03
	Tetrachloroethene	BDL	BDL	BDL	
	Analysis, ug/sample	0.06	0.06	0.06	0.1
	Molecular Weight, MW	165.82	165.82	165.82	165.82
	Concentration, mg/dscm	3.57E-03	3.57E-03	3.70E-03	3.61E-03
ppmdv	**Parts Per Billion, Dry Basis**	5.16E-01	5.17E-01	5.35E-01	5.23E-01
	Emission Rate, lb/hr	5.57E-04	5.64E-04	6.01E-04	5.74E-04
	Chlorobenzene	BDL	BDL	BDL	
	Analysis, ug/sample	0.06	0.06	0.06	0.1
	Molecular Weight, MW	112.56	112.56	112.56	112.56
	Concentration, mg/dscm	3.57E-03	3.57E-03	3.70E-03	3.61E-03
ppmdv	**Parts Per Billion, Dry Basis**	7.60E-01	7.62E-01	7.88E-01	7.70E-01
	Emission Rate, lb/hr	5.57E-04	5.64E-04	6.01E-04	5.74E-04
	Ethylbenzene	DDL	DDL	BDL	
	Analysis, ug/sample	0.08	0.08	0.06	0.1
	Molecular Weight, MW	106.17	106.17	106.17	106.17
	Concentration, mg/dscm	4.61E-03	4.89E-03	3.70E-03	4.40E-03
ppmdv	**Parts Per Billion, Dry Basis**	1.04E+00	1.11E+00	8.36E-01	9.95E-01
	Emission Rate, lb/hr	7.21E-04	7.73E-04	6.01E-04	6.98E-04
	M&P Xylene	DDL	DDL	BDL	
	Analysis, ug/sample	0.32	0.32	0.18	0.3
	Molecular Weight, MW	106.16	106.16	106.16	106.16
	Concentration, mg/dscm	1.89E-02	1.83E-02	1.11E-02	1.61E-02
ppmdv	**Parts Per Billion, Dry Basis**	4.26E+00	4.14E+00	2.51E+00	3.64E+00
	Emission Rate, lb/hr	2.95E-03	2.89E-03	1.80E-03	2.55E-03
	O-xylene	DDL	DDL	BDL	
	Analysis, ug/sample	0.08	0.08	0.06	0.1
	Molecular Weight, MW	106.16	106.16	106.16	106.16
	Concentration, mg/dscm	4.94E-03	4.91E-03	3.70E-03	4.51E-03
ppmdv	**Parts Per Billion, Dry Basis**	1.12E+00	1.11E+00	8.36E-01	1.02E+00
	Emission Rate, lb/hr	7.72E-04	7.75E-04	6.01E-04	7.16E-04
	Styrene	DDL	DDL	BDL	
	Analysis, ug/sample	1.33	1.36	0.12	0.9
	Molecular Weight, MW	104.15	104.15	104.15	104.15
	Concentration, mg/dscm	7.37E-02	7.52E-02	7.39E-03	5.21E-02
ppmdv	**Parts Per Billion, Dry Basis**	1.70E+01	1.73E+01	1.70E+00	1.20E+01
	Emission Rate, lb/hr	1.15E-02	1.19E-02	1.20E-03	8.20E-03
	Bromoform	BDL	BDL	BDL	
	Analysis, ug/sample	0.06	0.06	0.06	0.1
	Molecular Weight, MW	252.73	252.73	252.73	252.73
	Concentration, mg/dscm	3.57E-03	3.57E-03	3.70E-03	3.61E-03
ppmdv	**Parts Per Billion, Dry Basis**	3.39E-01	3.39E-01	3.51E-01	3.43E-01
	Emission Rate, lb/hr	5.57E-04	5.64E-04	6.01E-04	5.74E-04
	1,1,2,2-Tetrachloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.1
	Molecular Weight, MW	167.85	167.85	167.85	167.85
	Concentration, mg/dscm	7.13E-03	7.14E-03	7.39E-03	7.22E-03
ppmdv	**Parts Per Billion, Dry Basis**	1.02E+00	1.02E+00	1.06E+00	1.03E+00
	Emission Rate, lb/hr	1.11E-03	1.13E-03	1.20E-03	1.15E-03
	Acrylonitrile	BDL	BDL	BDL	
	Analysis, ug/sample	0.30	0.30	0.30	0.3
	Molecular Weight, MW	53.06	53.06	53.06	53.06
	Concentration, mg/dscm	1.78E-02	1.79E-02	1.85E-02	1.81E-02
ppmdv	**Parts Per Billion, Dry Basis**	8.06E+00	8.08E+00	8.36E+00	8.17E+00
	Emission Rate, lb/hr	2.79E-03	2.82E-03	3.00E-03	2.87E-03

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 316 - Formaldehyde
Pushing Baghouse

	RUN NUMBER	***P-316-1***	***P-316-2***	***P-316-3***	
	RUN DATE	***8/30/2016***	***8/31/2016***	***9/1/2016***	***Average***
	RUN TIME	***1026-1501***	***1020-1502***	***1020-1513***	
	MEASURED DATA				
P_{static}	Stack Static Pressure, inches H_2O	-1.10	-1.10	-1.10	-1.10
y	Meter Box Correction Factor	1.010	1.010	1.010	1.010
P_{bar}	Barometric Pressure, inches Hg	30.23	30.05	30.08	30.12
V_m	Sample Volume, ft^3	41.372	41.202	44.771	42.448
$Dp^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	1.9118	1.9372	1.9699	1.9396
DH	Avg Meter Orifice Pressure, in. H_2O	1.90	1.96	2.03	1.96
T_m	Average Meter Temperature, °F	80	79	73	77
T_s	Average Stack Temperature, °F	117	114	109	113
V_{lc}	Condensate Collected, ml	17.7	20.7	14.2	17.5
CO_2	Carbon Dioxide content, % by volume	0.2	0.2	0.1	0.2
O_2	Oxygen content, % by volume	20.7	20.5	20.8	20.7
N_2	Nitrogen content, % by volume	79.2	79.3	79.1	79.2
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	
As	Diameter or Dimensions, inches:	35.50	35.50	35.50	35.50
Q	Sample Run Duration, minutes	54	53	57	55
D_n	Nozzle Diameter, inches	0.152	0.152	0.152	0.152
	CALCULATED DATA				
A_n	Nozzle Area, ft^2	0.000126	0.000126	0.000126	0.000126
$V_{m(std)}$	Standard Meter Volume, ft^3	41.455	41.122	45.240	42.605
$V_{m(std)}$	Standard Meter Volume, m^3	1.174	1.164	1.281	1.206
Q_m	Average Sampling Rate, dscfm	0.768	0.779	0.791	0.779
P_s	Stack Pressure, inches Hg	30.15	29.97	30.00	30.04
B_{ws}	Moisture, % by volume	2.0	2.3	1.5	1.9
$B_{ws(sat)}$	Moisture (at saturation), % by volume	10.5	9.7	8.4	9.5
V_{wstd}	Standard Water Vapor Volume, ft^3	0.833	0.974	0.668	0.825
$1-B_{ws}$	Dry Mole Fraction	0.980	0.977	0.985	0.981
M_d	Molecular Weight (d.b.), lb/lb•mole	28.85	28.85	28.85	28.85
M_s	Molecular Weight (w.b.), lb/lb•mole	28.64	28.60	28.70	28.64
V_s	Stack Gas Velocity, ft/s	112.2	113.8	115.0	113.7
A	Stack Area, ft^2	6.9	6.9	6.9	6.87
Q_a	Stack Gas Volumetric flow, acfm	46,284	46,953	47,431	46,890
Q_s	Stack Gas Volumetric flow, dscfm	41,821	42,243	43,470	42,511
Q_s	Stack Gas Volumetric flow, dscmm	1,184	1,196	1,231	1,204
I	Isokinetic Sampling Ratio, %	100.2	100.5	99.3	100.0

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 316 - Formaldehyde
Pushing Baghouse

	RUN NUMBER	***P-316-1***	***P-316-2***	***P-316-3***	
	RUN DATE	***8/30/2016***	***8/31/2016***	***9/1/2016***	***Average***
	RUN TIME	***1026-1501***	***1020-1502***	***1020-1513***	
	EMISSIONS DATA				
	Formaldehyde, ug/sample*	BDL	BDL	BDL	
	Analysis, *u* g/sample	0.0025	0.0025	0.0025	**0.0025**
	Molecular Weight, MW	30.0	30.0	30.0	**30.0**
	Concentration, mg/dscm	**2.13E-06**	**2.15E-06**	**1.95E-06**	**2.08E-06**
	Concentration, lb/dscf	**1.327E-13**	**1.34E-13**	**1.22E-13**	**1.29E-13**
ppmdv	**Parts Per Million, Dry Basis**	**1.70E-06**	**1.72E-06**	**1.56E-06**	**1.66E-06**
	Emission Rate, lb/hr	**3.33E-07**	**3.39E-07**	**3.17E-07**	**3.30E-07**

Summary of Stack Gas Parameters and Test Results
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AK Steel-Middletown
EPA Method 0031-Run 1
Combustion Stack
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	RUN NUMBER RUN DATE RUN TIME	C-0031-1A 9/8/2016 0935-0955	C-0031-1B 9/8/2016 1008-1028	C-0031-1C 9/8/2016 1041-1101	C-0031-1D 9/8/2016 1112-1132	C-0031-1E 9/8/2016 1144-1204	C-0031-1F 9/8/2016 1215-1235	Average
	MEASURED DATA							
P_{static}	Stack Static Pressure, inches H_2O	-0.80	-0.80	-0.80	-0.80	-0.80	-0.80	-0.80
y	Meter Box Correction Factor	1.085	1.085	1.085	1.085	1.085	1.085	1.085
P_{bar}	Barometric Pressure, inches Hg	30.00	30.00	30.00	30.00	30.00	30.00	30.00
V_m	Sample Volume, L^3	19.330	19.740	19.910	19.940	18.830	19.000	19.458
$Dp^{1/2}$	Average Square Root Dp, $(In.\ H_2O)^{1/2}$	0.1810	0.1810	0.1810	0.1810	0.1810	0.1810	0.1810
T_m	Average Meter Temperature, °F	88	94	95	95	97	100	95
T_s	Average Stack Temperature, °F	380	380	380	380	380	380	380
CO_2	Carbon Dioxide content, % by volume	3.0	3.0	3.0	3.0	3.0	3.0	3.0
O_2	Oxygen content, % by volume	15.0	15.0	15.0	15.0	15.0	15.0	15.0
N_2	Nitrogen content, % by volume	82.0	82.0	82.0	82.0	82.0	82.0	82.0
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	1	1	1	
As	Diameter or Dimensions, inches:	168.00	168.00	168.00	168.00	168.00	168.00	168.00
Q	Sample Run Duration, minutes	20	20	20	20	20	20	20
	CALCULATED DATA							
$V_{m(std)}$	Standard Meter Volume,L	20.262	20.467	20.606	20.637	19.419	19.489	20.147
$V_{m(std)}$	Standard Meter Volume,ft^3	0.715	0.723	0.728	0.729	0.686	0.688	0.711
$V_{m(std)}$	Standard Meter Volume, m^3	0.020	0.020	0.021	0.021	0.019	0.019	0.020
Q_m	Average Sampling Rate, dscfm	1.013	1.023	1.030	1.032	0.971	0.974	1.007
P_s	Stack Pressure, inches Hg	29.94	29.94	29.94	29.94	29.94	29.94	29.94
B_{ws}	Moisture, % by volume	12.0	12.0	12.0	12.0	12.0	12.0	12.0
$B_{ws(sat)}$	Moisture (at saturation), % by volume	100.0	100.0	100.0	100.0	100.0	100.0	100.0
V_{wstd}	Standard Water Vapor Volume, ft^3	0.000	0.000	0.000	0.000	0.000	0.000	0.000
$1-B_{ws}$	Dry Mole Fraction	0.880	0.880	0.880	0.880	0.880	0.880	0.880
M_d	Molecular Weight (d.b.), lb/lb•mole	29.08	29.08	29.08	29.08	29.08	29.08	29.08
M_s	Molecular Weight (w.b.), lb/lb•mole	27.75	27.75	27.75	27.75	27.75	27.75	27.75
V_s	Stack Gas Velocity, ft/s	13.1	13.1	13.1	13.1	13.1	13.1	13.1
A	Stack Area, ft^2	153.9	153.9	153.9	153.9	153.9	153.9	153.94
Q_a	Stack Gas Volumetric flow, acfm	120,709	120,709	120,709	120,709	120,709	120,709	120,709
Q_s	Stack Gas Volumetric flow, dscfm	66,790	66,790	66,790	66,790	66,790	66,790	66,790
Q_s	Stack Gas Volumetric flow, dscmm	1,891	1,891	1,891	1,891	1,891	1,891	1,891

Summary of Stack Gas Parameters and Test Results
050074.0172
AK Steel-Middletown
EPA Method 0031-Run 1
Combustion Stack

	RUN NUMBER	*C-0031-1A*	*C-0031-1B*	*C-0031-1C*	*C-0031-1D*	*C-0031-1E*	*C-0031-1F*	*Sum*
	RUN DATE	*9/8/2016*	*9/8/2016*	*9/8/2016*	*9/8/2016*	*9/8/2016*	*9/8/2016*	
	RUN TIME	*0935-0955*	*1008-1028*	*1041-1101*	*1112-1132*	*1144-1204*	*1215-1235*	
	Chloromethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, *u* g/sample	0.12	0.12	0.12	0.12	0.12	0.12	**0.7**
	Molecular Weight, MW	50.49	50.49	50.49	50.49	50.49	50.49	**50.49**
	Concentration, mg/dscm	**5.92E-03**	**5.86E-03**	**5.82E-03**	**5.82E-03**	**6.18E-03**	**6.16E-03**	**3.58E-02**
ppmdv	**Parts Per Billion, Dry Basis**	**2.82E+00**	**2.79E+00**	**2.77E+00**	**2.76E+00**	**2.94E+00**	**2.93E+00**	**1.70E+01**
	Emission Rate, lb/hr	**1.48E-03**	**1.46E-03**	**1.45E-03**	**1.45E-03**	**1.54E-03**	**1.54E-03**	**8.93E-03**
	Vinyl Chloride	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, *u* g/sample	0.04	0.04	0.04	0.04	0.04	0.04	**0.2**
	Molecular Weight, MW	62.50	62.50	62.50	62.50	62.50	62.50	**62.50**
	Concentration, mg/dscm	**1.97E-03**	**1.95E-03**	**1.94E-03**	**1.94E-03**	**2.06E-03**	**2.05E-03**	**1.19E-02**
ppmdv	**Parts Per Billion, Dry Basis**	**7.58E-01**	**7.51E-01**	**7.46E-01**	**7.44E-01**	**7.91E-01**	**7.88E-01**	**4.58E+00**
	Emission Rate, lb/hr	**4.93E-04**	**4.88E-04**	**4.85E-04**	**4.84E-04**	**5.14E-04**	**5.12E-04**	**2.98E-03**
	Bromomethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.18	0.18	0.18	0.18	0.18	0.18	**1.1**
	Molecular Weight, MW	94.95	94.95	94.95	94.95	94.95	94.95	**94.95**
	Concentration, mg/dscm	8.88E-03	8.80E-03	8.74E-03	8.72E-03	9.27E-03	9.24E-03	**5.36E-02**
ppmdv	**Parts Per Billion, Dry Basis**	2.25	2.22	2.21	2.21	2.34	2.34	**1.36E+01**
	Emission Rate, lb/hr	**2.22E-03**	**2.20E-03**	**2.18E-03**	**2.18E-03**	**2.31E-03**	**2.31E-03**	**1.34E-02**
	Chloroethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.04	0.04	0.04	**0.2**
	Molecular Weight, MW	64.51	64.51	64.51	64.51	64.51	64.51	**64.51**
	Concentration, mg/dscm	1.97E-03	1.95E-03	1.94E-03	1.94E-03	2.06E-03	2.05E-03	**1.19E-02**
ppmdv	**Parts Per Billion, Dry Basis**	0.735	0.727	0.722	0.721	0.767	0.764	**4.44E+00**
	Emission Rate, lb/hr	**4.93E-04**	**4.88E-04**	**4.85E-04**	**4.84E-04**	**5.14E-04**	**5.12E-04**	**2.98E-03**
	1,1-Dichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	**0.1**
	Molecular Weight, MW	96.94	96.94	96.94	96.94	96.94	96.94	**96.94**
	Concentration, mg/dscm	9.87E-04	9.77E-04	9.71E-04	9.69E-04	1.03E-03	1.03E-03	**5.96E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.244	0.242	0.240	0.240	0.255	0.254	**1.48E+00**
	Emission Rate, lb/hr	**2.46E-04**	**2.44E-04**	**2.42E-04**	**2.42E-04**	**2.57E-04**	**2.56E-04**	**1.49E-03**
	Iodomethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.06	0.06	0.06	0.06	0.06	0.06	**0.4**
	Molecular Weight, MW	142.93	142.93	142.93	142.93	142.93	142.93	**142.93**
	Concentration, mg/dscm	2.96E-03	2.93E-03	2.91E-03	2.91E-03	3.09E-03	3.08E-03	**1.79E-02**
ppmdv	**Parts Per Billion, Dry Basis**	0.497	0.492	0.489	0.488	0.519	0.517	**3.00E+00**
	Emission Rate, lb/hr	**7.39E-04**	**7.32E-04**	**7.27E-04**	**7.26E-04**	**7.71E-04**	**7.69E-04**	**4.46E-03**
	Carbon Disulfide	DLL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.04	0.04	0.04	**0.2**
	Molecular Weight, MW	76.14	76.14	76.14	76.14	76.14	76.14	**76.14**
	Concentration, mg/dscm	2.12E-03	1.95E-03	1.94E-03	1.94E-03	2.06E-03	2.05E-03	**1.21E-02**
ppmdv	**Parts Per Billion, Dry Basis**	0.669	0.616	0.612	0.611	0.649	0.647	**3.80E+00**
	Emission Rate, lb/hr	**5.30E-04**	**4.88E-04**	**4.85E-04**	**4.84E-04**	**5.14E-04**	**5.12E-04**	**3.01E-03**
	Methylene Chloride	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.20	0.20	0.20	0.20	0.20	0.20	**1.2**
	Molecular Weight, MW	84.93	84.93	84.93	84.93	84.93	84.93	**84.93**
	Concentration, mg/dscm	9.87E-03	9.77E-03	9.71E-03	9.69E-03	1.03E-02	1.03E-02	**5.96E-02**
ppmdv	**Parts Per Billion, Dry Basis**	2.8	2.8	2.7	2.7	2.9	2.9	**1.68E+01**
	Emission Rate, lb/hr	**2.46E-03**	**2.44E-03**	**2.42E-03**	**2.42E-03**	**2.57E-03**	**2.56E-03**	**1.49E-02**
	Chloroform	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	**0.1**
	Molecular Weight, MW	119.37	119.37	119.37	119.37	119.37	119.37	**119.37**
	Concentration, mg/dscm	9.87E-04	9.77E-04	9.71E-04	9.69E-04	1.03E-03	1.03E-03	**5.96E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.199	0.197	0.195	0.195	0.207	0.206	**1.20E+00**
	Emission Rate, lb/hr	**2.46E-04**	**2.44E-04**	**2.42E-04**	**2.42E-04**	**2.57E-04**	**2.56E-04**	**1.49E-03**
	1,1,1 Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	**0.1**
	Molecular Weight, MW	133.50	133.50	133.50	133.50	133.50	133.50	**133.50**
	Concentration, mg/dscm	9.87E-04	9.77E-04	9.71E-04	9.69E-04	1.03E-03	1.03E-03	**5.96E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.177	0.176	0.175	0.174	0.185	0.185	**1.07E+00**
	Emission Rate, lb/hr	**2.46E-04**	**2.44E-04**	**2.42E-04**	**2.42E-04**	**2.57E-04**	**2.56E-04**	**1.49E-03**
	Carbon Tetrachloride	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	**0.1**
	Molecular Weight, MW	153.81	153.81	153.81	153.81	153.81	153.81	**153.81**
	Concentration, mg/dscm	9.87E-04	9.77E-04	9.71E-04	9.69E-04	1.03E-03	1.03E-03	**5.96E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.154	0.153	0.151	0.151	0.161	0.160	**9.30E-01**
	Emission Rate, lb/hr	**2.46E-04**	**2.44E-04**	**2.42E-04**	**2.42E-04**	**2.57E-04**	**2.56E-04**	**1.49E-03**
	Benzene	ADL	ADL	ADL	ADL	ADL	ADL	
	Analysis, ug/sample	3.612	4.336	3.369	2.911	4.376	3.039	**21.6**
	Molecular Weight, MW	78.11	78.11	78.11	78.11	78.11	78.11	**78.11**
	Concentration, mg/dscm	1.78E-01	2.12E-01	1.64E-01	1.41E-01	2.26E-01	1.56E-01	**1.08E+00**
ppmdv	**Parts Per Billion, Dry Basis**	54.788	65.109	50.247	43.351	69.258	47.924	**3.31E+02**
	Emission Rate, lb/hr	**4.45E-02**	**5.29E-02**	**4.08E-02**	**3.52E-02**	**5.63E-02**	**3.89E-02**	**2.69E-01**
	1,2-Dichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	**0.1**
	Molecular Weight, MW	98.95	98.95	98.95	98.95	98.95	98.95	**98.95**
	Concentration, mg/dscm	9.87E-04	9.77E-04	9.71E-04	9.69E-04	1.03E-03	1.03E-03	**5.96E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.239	0.237	0.235	0.235	0.250	0.249	**1.45E+00**
	Emission Rate, lb/hr	**2.46E-04**	**2.44E-04**	**2.42E-04**	**2.42E-04**	**2.57E-04**	**2.56E-04**	**1.49E-03**

Summary of Stack Gas Parameters and Test Results
050074.0172
AK Steel-Middletown
EPA Method 0031-Run 1
Combustion Stack

	RUN NUMBER	C-0031-1A	C-0031-1B	C-0031-1C	C-0031-1D	C-0031-1E	C-0031-1F	SUM
	RUN DATE	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016	
	RUN TIME	0935-0955	1008-1028	1041-1101	1112-1132	1144-1204	1215-1235	
	Trichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	131.39	131.39	131.39	131.39	131.39	131.39	131.39
	Concentration, mg/dscm	9.87E-04	9.77E-04	9.71E-04	9.69E-04	1.03E-03	1.03E-03	5.96E-03
ppmdv	Parts Per Billion, Dry Basis	0.180	0.179	0.177	0.177	0.188	0.187	1.09E+00
	Emission Rate, lb/hr	2.46E-04	2.44E-04	2.42E-04	2.42E-04	2.57E-04	2.56E-04	1.49E-03
	1,2-Dichloropropane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	112.98	112.98	112.98	112.98	112.98	112.98	112.98
	Concentration, mg/dscm	9.87E-04	9.77E-04	9.71E-04	9.69E-04	1.03E-03	1.03E-03	5.96E-03
ppmdv	Parts Per Billion, Dry Basis	0.210	0.208	0.206	0.206	0.219	0.218	1.27E+00
	Emission Rate, lb/hr	2.46E-04	2.44E-04	2.42E-04	2.42E-04	2.57E-04	2.56E-04	1.49E-03
	Toluene	DDL	DDL	DDL	ADL	BDL	DDL	
	Analysis, ug/sample	0.79	0.29	0.18	0.69	0.10	0.11	2.2
	Molecular Weight, MW	92.14	92.14	92.14	92.14	92.14	92.14	92.14
	Concentration, mg/dscm	3.89E-02	1.39E-02	8.93E-03	3.32E-02	5.15E-03	5.75E-03	1.06E-01
ppmdv	Parts Per Billion, Dry Basis	10.133	3.628	2.326	8.660	1.342	1.497	2.76E+01
	Emission Rate, lb/hr	9.71E-03	3.48E-03	2.23E-03	8.30E-03	1.29E-03	1.43E-03	2.64E-02
	1,1,2-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.04	0.04	0.04	0.2
	Molecular Weight, MW	133.40	133.40	133.40	133.40	133.40	133.40	133.40
	Concentration, mg/dscm	1.97E-03	1.95E-03	1.94E-03	1.94E-03	2.06E-03	2.05E-03	1.19E-02
ppmdv	Parts Per Billion, Dry Basis	0.355	0.352	0.349	0.349	0.371	0.369	2.15E+00
	Emission Rate, lb/hr	4.93E-04	4.88E-04	4.85E-04	4.84E-04	5.14E-04	5.12E-04	2.98E-03
	Tetrachloroethene	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	165.82	165.82	165.82	165.82	165.82	165.82	165.82
	Concentration, mg/dscm	9.87E-04	9.77E-04	9.71E-04	9.69E-04	1.03E-03	1.03E-03	5.96E-03
ppmdv	Parts Per Billion, Dry Basis	0.143	0.141	0.141	0.140	0.149	0.149	8.63E-01
	Emission Rate, lb/hr	2.46E-04	2.44E-04	2.42E-04	2.42E-04	2.57E-04	2.56E-04	1.49E-03
	Chlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	112.56	112.56	112.56	112.56	112.56	112.56	112.56
	Concentration, mg/dscm	9.87E-04	9.77E-04	9.71E-04	9.69E-04	1.03E-03	1.03E-03	5.96E-03
ppmdv	Parts Per Billion, Dry Basis	0.211	0.208	0.207	0.207	0.220	0.219	1.27E+00
	Emission Rate, lb/hr	2.46E-04	2.44E-04	2.42E-04	2.42E-04	2.57E-04	2.56E-04	1.49E-03
	Ethylbenzene	DDL	BDL	BDL	DDL	BDL	BDL	
	Analysis, ug/sample	0.03	0.02	0.02	0.03	0.02	0.02	0.1
	Molecular Weight, MW	106.17	106.17	106.17	106.17	106.17	106.17	106.17
	Concentration, mg/dscm	1.58E-03	9.77E-04	9.71E-04	1.31E-03	1.03E-03	1.03E-03	6.89E-03
ppmdv	Parts Per Billion, Dry Basis	0.357	0.221	0.219	0.296	0.233	0.232	1.56E+00
	Emission Rate, lb/hr	3.94E-04	2.44E-04	2.42E-04	3.27E-04	2.57E-04	2.56E-04	1.72E-03
	M&P Xylene	DDL	DDL	BDL	DDL	BDL	BDL	
	Analysis, ug/sample	0.29	0.08	0.06	0.26	0.06	0.06	0.8
	Molecular Weight, MW	106.16	106.16	106.16	106.16	106.16	106.16	106.16
	Concentration, mg/dscm	1.45E-02	3.86E-03	2.91E-03	1.24E-02	3.09E-03	3.08E-03	3.99E-02
ppmdv	Parts Per Billion, Dry Basis	3.281	0.873	0.658	2.805	0.699	0.696	9.01E+00
	Emission Rate, lb/hr	3.62E-03	9.64E-04	7.27E-04	3.10E-03	7.71E-04	7.69E-04	9.95E-03
	O-xylene	DDL	DDL	BDL	DDL	BDL	BDL	
	Analysis, ug/sample	0.07	0.02	0.02	0.06	0.02	0.02	0.2
	Molecular Weight, MW	106.16	106.16	106.16	106.16	106.16	106.16	106.16
	Concentration, mg/dscm	3.36E-03	1.17E-03	9.71E-04	2.76E-03	1.03E-03	1.03E-03	1.03E-02
ppmdv	Parts Per Billion, Dry Basis	0.759	0.265	0.219	0.625	0.233	0.232	2.33E+00
	Emission Rate, lb/hr	8.38E-04	2.93E-04	2.42E-04	6.90E-04	2.57E-04	2.56E-04	2.58E-03
	Styrene	DDL	BDL	BDL	DDL	BDL	BDL	
	Analysis, ug/sample	0.10	0.04	0.04	0.09	0.04	0.04	0.4
	Molecular Weight, MW	104.15	104.15	104.15	104.15	104.15	104.15	104.15
	Concentration, mg/dscm	5.08E-03	1.95E-03	1.94E-03	4.46E-03	2.06E-03	2.05E-03	1.76E-02
ppmdv	Parts Per Billion, Dry Basis	1.172	0.450	0.447	1.028	0.475	0.473	4.04E+00
	Emission Rate, lb/hr	1.27E-03	4.88E-04	4.85E-04	1.11E-03	5.14E-04	5.12E-04	4.38E-03
	Bromoform	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	252.73	252.73	252.73	252.73	252.73	252.73	252.73
	Concentration, mg/dscm	9.87E-04	9.77E-04	9.71E-04	9.69E-04	1.03E-03	1.03E-03	5.96E-03
ppmdv	Parts Per Billion, Dry Basis	0.094	0.093	0.092	0.092	0.098	0.097	5.66E-01
	Emission Rate, lb/hr	2.46E-04	2.44E-04	2.42E-04	2.42E-04	2.57E-04	2.56E-04	1.49E-03
	1,1,2,2-Tetrachloroethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.04	0.04	0.04	0.2
	Molecular Weight, MW	167.85	167.85	167.85	167.85	167.85	167.85	167.85
	Concentration, mg/dscm	1.97E-03	1.95E-03	1.94E-03	1.94E-03	2.06E-03	2.05E-03	1.19E-02
ppmdv	Parts Per Billion, Dry Basis	0.282	0.280	0.278	0.277	0.295	0.294	1.70E+00
	Emission Rate, lb/hr	4.93E-04	4.88E-04	4.85E-04	4.84E-04	5.14E-04	5.12E-04	2.98E-03
	Acrylonitrile	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.10	0.10	0.10	0.10	0.10	0.10	0.6
	Molecular Weight, MW	53.06	53.06	53.06	53.06	53.06	53.06	53.06
	Concentration, mg/dscm	4.94E-03	4.89E-03	4.85E-03	4.85E-03	5.15E-03	5.13E-03	2.98E-02
ppmdv	Parts Per Billion, Dry Basis	2.233	2.210	2.196	2.192	2.330	2.321	1.35E+01
	Emission Rate, lb/hr	1.23E-03	1.22E-03	1.21E-03	1.21E-03	1.29E-03	1.28E-03	7.44E-03

Summary of Stack Gas Parameters and Test Results
050074.0172
AK Steel-Middletown
EPA Method 0031-Run 2
Combustion Stack

	RUN NUMBER RUN DATE RUN TIME	C-0031-2A 9/8/2016 1245-1305	C-0031-2B 9/8/2016 1315-1335	C-0031-2C 9/8/2016 1345-1405	C-0031-2D 9/8/2016 1415-1435	C-0031-2E 9/8/2016 1445-1505	C-0031-2F 9/8/2016 1512-1532	Average
	MEASURED DATA							
P_{static}	Stack Static Pressure, inches H_2O	-0.80	-0.80	-0.80	-0.80	-0.80	-0.80	-0.80
y	Meter Box Correction Factor	1.085	1.085	1.085	1.085	1.085	1.085	1.085
P_{bar}	Barometric Pressure, inches Hg	30.00	30.00	30.00	30.00	30.00	30.00	30.00
V_m	Sample Volume, L^3	19.590	18.900	19.340	19.400	19.080	18.410	19.120
$Dp^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	0.1799	0.1799	0.1799	0.1799	0.1799	0.1799	0.1799
T_m	Average Meter Temperature, °F	103	102	102	103	107	107	104
T_s	Average Stack Temperature, °F	381	381	381	381	381	381	381
CO_2	Carbon Dioxide content, % by volume	3.0	3.0	3.0	3.0	3.0	3.0	3.0
O_2	Oxygen content, % by volume	15.0	15.0	15.0	15.0	15.0	15.0	15.0
N_2	Nitrogen content, % by volume	82.0	82.0	82.0	82.0	82.0	82.0	82.0
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	1	1	1	
As	Diameter or Dimensions, inches:	168.00	168.00	168.00	168.00	168.00	168.00	168.00
Q	Sample Run Duration, minutes	20	20	20	20	20	20	20
	CALCULATED DATA							
$V_{m(std)}$	Standard Meter Volume,L	19.987	19.317	19.767	19.793	19.329	18.651	19.474
$V_{m(std)}$	Standard Meter Volume,ft^3	0.706	0.682	0.698	0.699	0.683	0.659	0.688
$V_{m(std)}$	Standard Meter Volume, m^3	0.020	0.019	0.020	0.020	0.019	0.019	0.019
Q_m	Average Sampling Rate, dscfm	0.999	0.966	0.988	0.990	0.966	0.933	0.974
P_s	Stack Pressure, inches Hg	29.94	29.94	29.94	29.94	29.94	29.94	29.94
B_{ws}	Moisture, % by volume	12.0	12.0	12.0	12.0	12.0	12.0	12.0
$B_{ws(sat)}$	Moisture (at saturation), % by volume	100.0	100.0	100.0	100.0	100.0	100.0	100.0
V_{wstd}	Standard Water Vapor Volume, ft^3	0.000	0.000	0.000	0.000	0.000	0.000	0.000
$1-B_{ws}$	Dry Mole Fraction	0.880	0.880	0.880	0.880	0.880	0.880	0.880
M_d	Molecular Weight (d.b.), lb/lb•mole	29.08	29.08	29.08	29.08	29.08	29.08	29.08
M_s	Molecular Weight (w.b.), lb/lb•mole	27.75	27.75	27.75	27.75	27.75	27.75	27.75
V_s	Stack Gas Velocity, ft/s	13.0	13.0	13.0	13.0	13.0	13.0	13.0
A	Stack Area, ft^2	153.9	153.9	153.9	153.9	153.9	153.9	153.94
Q_a	Stack Gas Volumetric flow, acfm	120,047	120,047	120,047	120,047	120,047	120,047	120,047
Q_s	Stack Gas Volumetric flow, dscfm	66,345	66,345	66,345	66,345	66,345	66,345	66,345
Q_s	Stack Gas Volumetric flow, dscmm	1,879	1,879	1,879	1,879	1,879	1,879	1,879

Summary of Stack Gas Parameters and Test Results
050074.0172
AK Steel-Middletown
EPA Method 0031-Run 2
Combustion Stack

	RUN NUMBER	C-0031-2A	C-0031-2B	C-0031-2C	C-0031-2D	C-0031-2E	C-0031-2F	Sum
	RUN DATE	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016	
	RUN TIME	1245-1305	1315-1335	1345-1405	1415-1435	1445-1505	1512-1532	
	Chloromethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.12	0.12	0.12	0.7
	Molecular Weight, MW	50.49	50.49	50.49	50.49	50.49	50.49	50.49
	Concentration, mg/dscm	6.00E-03	6.21E-03	6.07E-03	6.06E-03	6.21E-03	6.43E-03	3.70E-02
ppmdv	**Parts Per Billion, Dry Basis**	2.85E+00	2.95E+00	2.89E+00	2.88E+00	2.95E+00	3.06E+00	1.76E+01
	Emission Rate, lb/hr	1.49E-03	1.54E-03	1.51E-03	1.50E-03	1.54E-03	1.60E-03	9.17E-03
	Vinyl Chloride	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.04	0.04	0.04	0.2
	Molecular Weight, MW	62.50	62.50	62.50	62.50	62.50	62.50	62.50
	Concentration, mg/dscm	2.00E-03	2.07E-03	2.02E-03	2.02E-03	2.07E-03	2.14E-03	1.23E-02
ppmdv	**Parts Per Billion, Dry Basis**	7.69E-01	7.95E-01	7.77E-01	7.76E-01	7.95E-01	8.24E-01	4.74E+00
	Emission Rate, lb/hr	4.96E-04	5.14E-04	5.02E-04	5.01E-04	5.13E-04	5.32E-04	3.06E-03
	Bromomethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.18	0.18	0.18	0.18	0.18	0.18	1.1
	Molecular Weight, MW	94.95	94.95	94.95	94.95	94.95	94.95	94.95
	Concentration, mg/dscm	9.01E-03	9.32E-03	9.11E-03	9.10E-03	9.31E-03	9.65E-03	5.55E-02
ppmdv	**Parts Per Billion, Dry Basis**	2.28	2.36	2.30	2.30	2.35	2.44	1.40E+01
	Emission Rate, lb/hr	2.23E-03	2.31E-03	2.26E-03	2.26E-03	2.31E-03	2.39E-03	1.38E-02
	Chloroethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.04	0.04	0.04	0.2
	Molecular Weight, MW	64.51	64.51	64.51	64.51	64.51	64.51	64.51
	Concentration, mg/dscm	2.00E-03	2.07E-03	2.02E-03	2.02E-03	2.07E-03	2.14E-03	1.23E-02
ppmdv	**Parts Per Billion, Dry Basis**	0.745	0.771	0.753	0.752	0.770	0.798	4.59E+00
	Emission Rate, lb/hr	4.96E-04	5.14E-04	5.02E-04	5.01E-04	5.13E-04	5.32E-04	3.06E-03
	1,1-Dichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	96.94	96.94	96.94	96.94	96.94	96.94	96.94
	Concentration, mg/dscm	1.00E-03	1.04E-03	1.01E-03	1.01E-03	1.03E-03	1.07E-03	6.17E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.248	0.256	0.251	0.250	0.256	0.266	1.53E+00
	Emission Rate, lb/hr	2.48E-04	2.57E-04	2.51E-04	2.51E-04	2.57E-04	2.66E-04	1.53E-03
	Iodomethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.06	0.06	0.06	0.06	0.06	0.06	0.4
	Molecular Weight, MW	142.93	142.93	142.93	142.93	142.93	142.93	142.93
	Concentration, mg/dscm	3.00E-03	3.11E-03	3.04E-03	3.03E-03	3.10E-03	3.22E-03	1.85E-02
ppmdv	**Parts Per Billion, Dry Basis**	0.504	0.522	0.510	0.509	0.521	0.540	3.11E+00
	Emission Rate, lb/hr	7.45E-04	7.70E-04	7.53E-04	7.52E-04	7.70E-04	7.98E-04	4.59E-03
	Carbon Disulfide	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.04	0.04	0.04	0.2
	Molecular Weight, MW	76.14	76.14	76.14	76.14	76.14	76.14	76.14
	Concentration, mg/dscm	2.00E-03	2.07E-03	2.02E-03	2.02E-03	2.07E-03	2.14E-03	1.23E-02
ppmdv	**Parts Per Billion, Dry Basis**	0.631	0.653	0.638	0.637	0.652	0.676	3.89E+00
	Emission Rate, lb/hr	4.96E-04	5.14E-04	5.02E-04	5.01E-04	5.13E-04	5.32E-04	3.06E-03
	Methylene Chloride	DDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.28	0.20	0.20	0.20	0.20	0.20	1.3
	Molecular Weight, MW	84.93	84.93	84.93	84.93	84.93	84.93	84.93
	Concentration, mg/dscm	1.41E-02	1.04E-02	1.01E-02	1.01E-02	1.03E-02	1.07E-02	6.57E-02
ppmdv	**Parts Per Billion, Dry Basis**	4.0	2.9	2.9	2.9	2.9	3.0	1.86E+01
	Emission Rate, lb/hr	3.49E-03	2.57E-03	2.51E-03	2.51E-03	2.57E-03	2.66E-03	1.63E-02
	Chloroform	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	119.37	119.37	119.37	119.37	119.37	119.37	119.37
	Concentration, mg/dscm	1.00E-03	1.04E-03	1.01E-03	1.01E-03	1.03E-03	1.07E-03	6.17E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.201	0.208	0.203	0.203	0.208	0.216	1.24E+00
	Emission Rate, lb/hr	2.48E-04	2.57E-04	2.51E-04	2.51E-04	2.57E-04	2.66E-04	1.53E-03
	1,1,1 Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	133.50	133.50	133.50	133.50	133.50	133.50	133.50
	Concentration, mg/dscm	1.00E-03	1.04E-03	1.01E-03	1.01E-03	1.03E-03	1.07E-03	6.17E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.180	0.186	0.182	0.182	0.186	0.193	1.11E+00
	Emission Rate, lb/hr	2.48E-04	2.57E-04	2.51E-04	2.51E-04	2.57E-04	2.66E-04	1.53E-03
	Carbon Tetrachloride	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	153.81	153.81	153.81	153.81	153.81	153.81	153.81
	Concentration, mg/dscm	1.00E-03	1.04E-03	1.01E-03	1.01E-03	1.03E-03	1.07E-03	6.17E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.156	0.162	0.158	0.158	0.161	0.167	9.62E-01
	Emission Rate, lb/hr	2.48E-04	2.57E-04	2.51E-04	2.51E-04	2.57E-04	2.66E-04	1.53E-03
	Benzene	ADL	ADL	ADL	ADL	ADL	ADL	
	Analysis, ug/sample	2.203	2.821	4.723	3.63	3.831	3.777	21.0
	Molecular Weight, MW	78.11	78.11	78.11	78.11	78.11	78.11	78.11
	Concentration, mg/dscm	1.10E-01	1.46E-01	2.39E-01	1.83E-01	1.98E-01	2.03E-01	1.08E+00
ppmdv	**Parts Per Billion, Dry Basis**	33.875	44.881	73.432	56.364	60.912	62.239	3.32E+02
	Emission Rate, lb/hr	2.73E-02	3.62E-02	5.93E-02	4.55E-02	4.92E-02	5.02E-02	2.68E-01
	1,2-Dichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	98.95	98.95	98.95	98.95	98.95	98.95	98.95
	Concentration, mg/dscm	1.00E-03	1.04E-03	1.01E-03	1.01E-03	1.03E-03	1.07E-03	6.17E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.243	0.251	0.245	0.245	0.251	0.260	1.50E+00
	Emission Rate, lb/hr	2.48E-04	2.57E-04	2.51E-04	2.51E-04	2.57E-04	2.66E-04	1.53E-03

Summary of Stack Gas Parameters and Test Results
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Combustion Stack

	RUN NUMBER	C-0031-2A	C-0031-2B	C-0031-2C	C-0031-2D	C-0031-2E	C-0031-2F	SUM
	RUN DATE	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016	9/8/2016	
	RUN TIME	1245-1305	1315-1335	1345-1405	1415-1435	1445-1505	1512-1532	
	Trichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	131.39	131.39	131.39	131.39	131.39	131.39	131.39
	Concentration, mg/dscm	1.00E-03	1.04E-03	1.01E-03	1.01E-03	1.03E-03	1.07E-03	**6.17E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.183	0.189	0.185	0.185	0.189	0.196	**1.13E+00**
	Emission Rate, lb/hr	2.48E-04	2.57E-04	2.51E-04	2.51E-04	2.57E-04	2.66E-04	**1.53E-03**
	1,2-Dichloropropane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	112.98	112.98	112.98	112.98	112.98	112.98	112.98
	Concentration, mg/dscm	1.00E-03	1.04E-03	1.01E-03	1.01E-03	1.03E-03	1.07E-03	**6.17E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.213	0.220	0.215	0.215	0.220	0.228	**1.31E+00**
	Emission Rate, lb/hr	2.48E-04	2.57E-04	2.51E-04	2.51E-04	2.57E-04	2.66E-04	**1.53E-03**
	Toluene	ADL	BDL	ADL	BDL	BDL	DDL	
	Analysis, ug/sample	0.50	0.10	1.12	0.10	0.10	0.14	2.1
	Molecular Weight, MW	92.14	92.14	92.14	92.14	92.14	92.14	92.14
	Concentration, mg/dscm	2.49E-02	5.18E-03	5.67E-02	5.05E-03	5.17E-03	7.51E-03	**1.04E-01**
ppmdv	**Parts Per Billion, Dry Basis**	6.492	1.349	14.762	1.316	1.348	1.956	**2.72E+01**
	Emission Rate, lb/hr	6.18E-03	1.28E-03	1.41E-02	1.25E-03	1.28E-03	1.86E-03	**2.59E-02**
	1,1,2-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.04	0.04	0.04	0.2
	Molecular Weight, MW	133.40	133.40	133.40	133.40	133.40	133.40	133.40
	Concentration, mg/dscm	2.00E-03	2.07E-03	2.02E-03	2.02E-03	2.07E-03	2.14E-03	**1.23E-02**
ppmdv	**Parts Per Billion, Dry Basis**	0.360	0.373	0.364	0.364	0.372	0.386	**2.22E+00**
	Emission Rate, lb/hr	4.96E-04	5.14E-04	5.02E-04	5.01E-04	5.13E-04	5.32E-04	**3.06E-03**
	Tetrachloroethene	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	165.82	165.82	165.82	165.82	165.82	165.82	165.82
	Concentration, mg/dscm	1.00E-03	1.04E-03	1.01E-03	1.01E-03	1.03E-03	1.07E-03	**6.17E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.145	0.150	0.146	0.146	0.150	0.155	**8.93E-01**
	Emission Rate, lb/hr	2.48E-04	2.57E-04	2.51E-04	2.51E-04	2.57E-04	2.66E-04	**1.53E-03**
	Chlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	112.56	112.56	112.56	112.56	112.56	112.56	112.56
	Concentration, mg/dscm	1.00E-03	1.04E-03	1.01E-03	1.01E-03	1.03E-03	1.07E-03	**6.17E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.213	0.221	0.216	0.215	0.221	0.229	**1.31E+00**
	Emission Rate, lb/hr	2.48E-04	2.57E-04	2.51E-04	2.51E-04	2.57E-04	2.66E-04	**1.53E-03**
	Ethylbenzene	DDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	106.17	106.17	106.17	106.17	106.17	106.17	106.17
	Concentration, mg/dscm	1.05E-03	1.04E-03	1.01E-03	1.01E-03	1.03E-03	1.07E-03	**6.22E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.238	0.234	0.229	0.228	0.234	0.242	**1.41E+00**
	Emission Rate, lb/hr	2.61E-04	2.57E-04	2.51E-04	2.51E-04	2.57E-04	2.66E-04	**1.54E-03**
	M&P Xylene	DDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.17	0.06	0.06	0.06	0.06	0.06	0.5
	Molecular Weight, MW	106.16	106.16	106.16	106.16	106.16	106.16	106.16
	Concentration, mg/dscm	8.46E-03	3.11E-03	3.04E-03	3.03E-03	3.10E-03	3.22E-03	**2.40E-02**
ppmdv	**Parts Per Billion, Dry Basis**	1.912	0.702	0.686	0.685	0.702	0.727	**5.42E+00**
	Emission Rate, lb/hr	2.10E-03	7.70E-04	7.53E-04	7.52E-04	7.70E-04	7.98E-04	**5.94E-03**
	O-xylene	DDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	106.16	106.16	106.16	106.16	106.16	106.16	106.16
	Concentration, mg/dscm	1.95E-03	1.04E-03	1.01E-03	1.01E-03	1.03E-03	1.07E-03	**7.12E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.441	0.234	0.229	0.228	0.234	0.242	**1.61E+00**
	Emission Rate, lb/hr	4.84E-04	2.57E-04	2.51E-04	2.51E-04	2.57E-04	2.66E-04	**1.76E-03**
	Styrene	DDL	BDL	DDL	BDL	BDL	DDL	
	Analysis, ug/sample	0.07	0.04	0.05	0.04	0.04	0.04	0.3
	Molecular Weight, MW	104.15	104.15	104.15	104.15	104.15	104.15	104.15
	Concentration, mg/dscm	3.50E-03	2.07E-03	2.33E-03	2.02E-03	2.07E-03	2.25E-03	**1.42E-02**
ppmdv	**Parts Per Billion, Dry Basis**	0.807	0.477	0.536	0.466	0.477	0.519	**3.28E+00**
	Emission Rate, lb/hr	8.69E-04	5.14E-04	5.77E-04	5.01E-04	5.13E-04	5.59E-04	**3.53E-03**
	Bromoform	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	252.73	252.73	252.73	252.73	252.73	252.73	252.73
	Concentration, mg/dscm	1.00E-03	1.04E-03	1.01E-03	1.01E-03	1.03E-03	1.07E-03	**6.17E-03**
ppmdv	**Parts Per Billion, Dry Basis**	0.095	0.098	0.096	0.096	0.098	0.102	**5.86E-01**
	Emission Rate, lb/hr	2.48E-04	2.57E-04	2.51E-04	2.51E-04	2.57E-04	2.66E-04	**1.53E-03**
	1,1,2,2-Tetrachloroethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.04	0.04	0.04	0.2
	Molecular Weight, MW	167.85	167.85	167.85	167.85	167.85	167.85	167.85
	Concentration, mg/dscm	2.00E-03	2.07E-03	2.02E-03	2.02E-03	2.07E-03	2.14E-03	**1.23E-02**
ppmdv	**Parts Per Billion, Dry Basis**	0.286	0.296	0.289	0.289	0.296	0.307	**1.76E+00**
	Emission Rate, lb/hr	4.96E-04	5.14E-04	5.02E-04	5.01E-04	5.13E-04	5.32E-04	**3.06E-03**
	Acrylonitrile	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.10	0.10	0.10	0.10	0.10	0.10	0.6
	Molecular Weight, MW	53.06	53.06	53.06	53.06	53.06	53.06	53.06
	Concentration, mg/dscm	5.00E-03	5.18E-03	5.06E-03	5.05E-03	5.17E-03	5.36E-03	**3.06E-02**
ppmdv	**Parts Per Billion, Dry Basis**	2.264	2.342	2.289	2.286	2.341	2.426	**1.39E+01**
	Emission Rate, lb/hr	1.24E-03	1.28E-03	1.25E-03	1.25E-03	1.28E-03	1.33E-03	**7.65E-03**

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	RUN NUMBER RUN DATE RUN TIME	C-0031-4A 9/15/2016 0945-1005	C-0031-4B 9/15/2016 1020-1040	C-0031-4C 9/15/2016 1055-1115	C-0031-4D 9/15/2016 1126-1146	C-0031-4E 9/15/2016 1158-1218	C-0031-4F 9/15/2016 1228-1248	Average
	MEASURED DATA							
P_{static}	Stack Static Pressure, inches H_2O	-0.90	-0.90	-0.90	-0.90	-0.90	-0.90	-0.90
y	Meter Box Correction Factor	1.085	1.085	1.085	1.085	1.085	1.085	1.085
P_{bar}	Barometric Pressure, inches Hg	30.24	30.24	30.24	30.24	30.24	30.24	30.24
V_m	Sample Volume, L^3	18.440	18.880	19.110	18.980	19.470	19.000	18.980
$Dp^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	0.2020	0.2020	0.2020	0.2020	0.2020	0.2020	0.2020
T_m	Average Meter Temperature, °F	70	75	77	80	86	89	80
T_s	Average Stack Temperature, °F	356	356	356	356	356	356	356
CO_2	Carbon Dioxide content, % by volume	3.0	3.0	3.0	3.0	3.0	3.0	3.0
O_2	Oxygen content, % by volume	15.0	15.0	15.0	15.0	15.0	15.0	15.0
N_2	Nitrogen content, % by volume	82.0	82.0	82.0	82.0	82.0	82.0	82.0
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	1	1	1	
As	Diameter or Dimensions, Inches:	168.00	168.00	168.00	168.00	168.00	168.00	168.00
Q	Sample Run Duration, minutes	20	20	20	20	20	20	20
	CALCULATED DATA							
$V_{m(std)}$	Standard Meter Volume,L	20.145	20.433	20.605	20.351	20.647	20.038	20.370
$V_{m(std)}$	Standard Meter Volume,ft^3	0.711	0.722	0.728	0.719	0.729	0.708	0.719
$V_{m(std)}$	Standard Meter Volume, m^3	0.020	0.020	0.021	0.020	0.021	0.020	0.020
Q_m	Average Sampling Rate, dscfm	1.007	1.022	1.030	1.018	1.032	1.002	1.018
P_s	Stack Pressure, inches Hg	30.17	30.17	30.17	30.17	30.17	30.17	30.17
B_{ws}	Moisture, % by volume	12.0	12.0	12.0	12.0	12.0	12.0	12.0
$B_{ws(sat)}$	Moisture (at saturation), % by volume	100.0	100.0	100.0	100.0	100.0	100.0	100.0
V_{wstd}	Standard Water Vapor Volume, ft^3	0.000	0.000	0.000	0.000	0.000	0.000	0.000
$1-B_{ws}$	Dry Mole Fraction	0.880	0.880	0.880	0.880	0.880	0.880	0.880
M_d	Molecular Weight (d.b.), lb/lb•mole	29.08	29.08	29.08	29.08	29.08	29.08	29.08
M_s	Molecular Weight (w.b.), lb/lb•mole	27.75	27.75	27.75	27.75	27.75	27.75	27.75
V_s	Stack Gas Velocity, ft/s	14.3	14.3	14.3	14.3	14.3	14.3	14.3
A	Stack Area, ft^2	153.9	153.9	153.9	153.9	153.9	153.9	153.94
Q_a	Stack Gas Volumetric flow, acfm	132,263	132,263	132,263	132,263	132,263	132,263	132,263
Q_s	Stack Gas Volumetric flow, dscfm	75,921	75,921	75,921	75,921	75,921	75,921	75,921
Q_s	Stack Gas Volumetric flow, dscmm	2,150	2,150	2,150	2,150	2,150	2,150	2,150

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	RUN NUMBER	C-0031-4A	C-0031-4B	C-0031-4C	C-0031-4D	C-0031-4E	C-0031-4F	Sum
	RUN DATE	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	
	RUN TIME	0945-1005	1020-1040	1055-1115	1126-1146	1158-1218	1228-1248	
	Chloromethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.12	0.12	0.12	0.7
	Molecular Weight, MW	50.49	50.49	50.49	50.49	50.49	50.49	50.49
	Concentration, mg/dscm	5.96E-03	5.87E-03	5.82E-03	5.90E-03	5.81E-03	5.99E-03	3.54E-02
ppmdv	Parts Per Billion, Dry Basis	2.83E+00	2.79E+00	2.77E+00	2.80E+00	2.76E+00	2.85E+00	1.68E+01
	Emission Rate, lb/hr	1.69E-03	1.67E-03	1.65E-03	1.67E-03	1.65E-03	1.70E-03	1.00E-02
	Vinyl Chloride	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.04	0.04	0.04	0.2
	Molecular Weight, MW	62.50	62.50	62.50	62.50	62.50	62.50	62.50
	Concentration, mg/dscm	1.99E-03	1.96E-03	1.94E-03	1.97E-03	1.94E-03	2.00E-03	1.18E-02
ppmdv	Parts Per Billion, Dry Basis	7.63E-01	7.52E-01	7.46E-01	7.55E-01	7.44E-01	7.67E-01	4.53E+00
	Emission Rate, lb/hr	5.64E-04	5.56E-04	5.51E-04	5.58E-04	5.50E-04	5.67E-04	3.34E-03
	Bromomethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.18	0.18	0.18	0.18	0.18	0.18	1.1
	Molecular Weight, MW	94.95	94.95	94.95	94.95	94.95	94.95	94.95
	Concentration, mg/dscm	8.94E-03	8.81E-03	8.74E-03	8.85E-03	8.72E-03	8.98E-03	5.30E-02
ppmdv	Parts Per Billion, Dry Basis	2.26	2.23	2.21	2.24	2.20	2.27	1.34E+01
	Emission Rate, lb/hr	2.54E-03	2.50E-03	2.48E-03	2.51E-03	2.47E-03	2.55E-03	1.50E-02
	Chloroethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.04	0.04	0.04	0.2
	Molecular Weight, MW	64.51	64.51	64.51	64.51	64.51	64.51	64.51
	Concentration, mg/dscm	1.99E-03	1.96E-03	1.94E-03	1.97E-03	1.94E-03	2.00E-03	1.18E-02
ppmdv	Parts Per Billion, Dry Basis	0.739	0.728	0.722	0.731	0.721	0.743	4.38E+00
	Emission Rate, lb/hr	5.64E-04	5.56E-04	5.51E-04	5.58E-04	5.50E-04	5.67E-04	3.34E-03
	1,1-Dichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	96.94	96.94	96.94	96.94	96.94	96.94	96.94
	Concentration, mg/dscm	9.93E-04	9.79E-04	9.71E-04	9.83E-04	9.69E-04	9.98E-04	5.89E-03
ppmdv	Parts Per Billion, Dry Basis	0.246	0.242	0.240	0.243	0.240	0.247	1.46E+00
	Emission Rate, lb/hr	2.82E-04	2.78E-04	2.75E-04	2.79E-04	2.75E-04	2.83E-04	1.67E-03
	Iodomethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.06	0.06	0.06	0.06	0.06	0.06	0.4
	Molecular Weight, MW	142.93	142.93	142.93	142.93	142.93	142.93	142.93
	Concentration, mg/dscm	2.98E-03	2.94E-03	2.91E-03	2.95E-03	2.91E-03	2.99E-03	1.77E-02
ppmdv	Parts Per Billion, Dry Basis	0.500	0.493	0.489	0.495	0.488	0.503	2.97E+00
	Emission Rate, lb/hr	8.45E-04	8.33E-04	8.26E-04	8.37E-04	8.25E-04	8.50E-04	5.02E-03
	Carbon Disulfide	ADL	BDL	BDL	ADL	BDL	BDL	
	Analysis, ug/sample	0.75	0.04	0.04	0.36	0.04	0.04	1.3
	Molecular Weight, MW	76.14	76.14	76.14	76.14	76.14	76.14	76.14
	Concentration, mg/dscm	3.74E-02	1.96E-03	1.94E-03	1.75E-02	1.94E-03	2.00E-03	6.28E-02
ppmdv	Parts Per Billion, Dry Basis	11.801	0.617	0.612	5.531	0.611	0.629	1.98E+01
	Emission Rate, lb/hr	1.06E-02	5.56E-04	5.51E-04	4.98E-03	5.50E-04	5.67E-04	1.78E-02
	Methylene Chloride	BDL	BDL	DDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.20	0.20	2.48	0.20	0.20	0.20	3.5
	Molecular Weight, MW	84.93	84.93	84.93	84.93	84.93	84.93	84.93
	Concentration, mg/dscm	9.93E-03	9.79E-03	1.20E-01	9.83E-03	9.69E-03	9.98E-03	1.70E-01
ppmdv	Parts Per Billion, Dry Basis	2.8	2.8	34.0	2.8	2.7	2.8	4.79E+01
	Emission Rate, lb/hr	2.82E-03	2.78E-03	3.42E-02	2.79E-03	2.75E-03	2.83E-03	4.81E-02
	Chloroform	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	119.37	119.37	119.37	119.37	119.37	119.37	119.37
	Concentration, mg/dscm	9.93E-04	9.79E-04	9.71E-04	9.83E-04	9.69E-04	9.98E-04	5.89E-03
ppmdv	Parts Per Billion, Dry Basis	0.200	0.197	0.195	0.198	0.195	0.201	1.18E+00
	Emission Rate, lb/hr	2.82E-04	2.78E-04	2.75E-04	2.79E-04	2.75E-04	2.83E-04	1.67E-03
	1,1,1 Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	133.50	133.50	133.50	133.50	133.50	133.50	133.50
	Concentration, mg/dscm	9.93E-04	9.79E-04	9.71E-04	9.83E-04	9.69E-04	9.98E-04	5.89E-03
ppmdv	Parts Per Billion, Dry Basis	0.179	0.176	0.175	0.177	0.174	0.179	1.06E+00
	Emission Rate, lb/hr	2.82E-04	2.78E-04	2.75E-04	2.79E-04	2.75E-04	2.83E-04	1.67E-03
	Carbon Tetrachloride	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	153.81	153.81	153.81	153.81	153.81	153.81	153.81
	Concentration, mg/dscm	9.93E-04	9.79E-04	9.71E-04	9.83E-04	9.69E-04	9.98E-04	5.89E-03
ppmdv	Parts Per Billion, Dry Basis	0.155	0.153	0.151	0.153	0.151	0.156	9.20E-01
	Emission Rate, lb/hr	2.82E-04	2.78E-04	2.75E-04	2.79E-04	2.75E-04	2.83E-04	1.67E-03
	Benzene	ADL	ADL	ADL	ADL	ADL	ADL	
	Analysis, ug/sample	17.01	15.96	19.42	9.01	20.52	23.73	105.7
	Molecular Weight, MW	78.11	78.11	78.11	78.11	78.11	78.11	78.11
	Concentration, mg/dscm	8.44E-01	7.81E-01	9.43E-01	4.43E-01	9.94E-01	1.18E+00	5.19E+00
ppmdv	Parts Per Billion, Dry Basis	259.505	240.055	289.660	136.066	305.443	363.951	1.59E+03
	Emission Rate, lb/hr	2.40E-01	2.22E-01	2.67E-01	1.26E-01	2.82E-01	3.36E-01	1.47E+00
	1,2-Dichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	98.95	98.95	98.95	98.95	98.95	98.95	98.95
	Concentration, mg/dscm	9.93E-04	9.79E-04	9.71E-04	9.83E-04	9.69E-04	9.98E-04	5.89E-03
ppmdv	Parts Per Billion, Dry Basis	0.241	0.237	0.235	0.238	0.235	0.242	1.43E+00
	Emission Rate, lb/hr	2.82E-04	2.78E-04	2.75E-04	2.79E-04	2.75E-04	2.83E-04	1.67E-03

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	RUN NUMBER	C-0031-4A	C-0031-4B	C-0031-4C	C-0031-4D	C-0031-4E	C-0031-4F	SUM
	RUN DATE	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	9/15/2016	
	RUN TIME	0945-1005	1020-1040	1055-1115	1126-1146	1158-1218	1228-1248	
	Trichloroethene	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	131.39	131.39	131.39	131.39	131.39	131.39	131.39
	Concentration, mg/dscm	9.93E-04	9.79E-04	9.71E-04	9.83E-04	9.69E-04	9.98E-04	5.89E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.181	0.179	0.177	0.180	0.177	0.182	1.08E+00
	Emission Rate, lb/hr	2.82E-04	2.78E-04	2.75E-04	2.79E-04	2.75E-04	2.83E-04	1.67E-03
	1,2-Dichloropropane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	112.98	112.98	112.98	112.98	112.98	112.98	112.98
	Concentration, mg/dscm	9.93E-04	9.79E-04	9.71E-04	9.83E-04	9.69E-04	9.98E-04	5.89E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.211	0.208	0.206	0.209	0.206	0.212	1.25E+00
	Emission Rate, lb/hr	2.82E-04	2.78E-04	2.75E-04	2.79E-04	2.75E-04	2.83E-04	1.67E-03
	Toluene	ADL	BDL	DDL	ADL	ADL	ADL	
	Analysis, ug/sample	6.82	0.10	3.21	2.46	3.15	3.65	19.4
	Molecular Weight, MW	92.14	92.14	92.14	92.14	92.14	92.14	92.14
	Concentration, mg/dscm	3.39E-01	4.89E-03	1.56E-01	1.21E-01	1.53E-01	1.82E-01	9.55E-01
ppmdv	**Parts Per Billion, Dry Basis**	88.190	1.275	40.588	31.532	39.749	47.457	2.49E+02
	Emission Rate, lb/hr	9.61E-02	1.39E-03	4.42E-02	3.43E-02	4.33E-02	5.17E-02	2.71E-01
	1,1,2-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.04	0.04	0.04	0.2
	Molecular Weight, MW	133.40	133.40	133.40	133.40	133.40	133.40	133.40
	Concentration, mg/dscm	1.99E-03	1.96E-03	1.94E-03	1.97E-03	1.94E-03	2.00E-03	1.18E-02
ppmdv	**Parts Per Billion, Dry Basis**	0.357	0.352	0.349	0.354	0.349	0.359	2.12E+00
	Emission Rate, lb/hr	5.64E-04	5.56E-04	5.51E-04	5.58E-04	5.50E-04	5.67E-04	3.34E-03
	Tetrachloroethene	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	165.82	165.82	165.82	165.82	165.82	165.82	165.82
	Concentration, mg/dscm	9.93E-04	9.79E-04	9.71E-04	9.83E-04	9.69E-04	9.98E-04	5.89E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.144	0.142	0.141	0.142	0.140	0.144	8.53E-01
	Emission Rate, lb/hr	2.82E-04	2.78E-04	2.75E-04	2.79E-04	2.75E-04	2.83E-04	1.67E-03
	Chlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	112.56	112.56	112.56	112.56	112.56	112.56	112.56
	Concentration, mg/dscm	9.93E-04	9.79E-04	9.71E-04	9.83E-04	9.69E-04	9.98E-04	5.89E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.212	0.209	0.207	0.210	0.207	0.213	1.26E+00
	Emission Rate, lb/hr	2.82E-04	2.78E-04	2.75E-04	2.79E-04	2.75E-04	2.83E-04	1.67E-03
	Ethylbenzene	DDL	BDL	BDL	DDL	BDL	BDL	
	Analysis, ug/sample	0.11	0.02	0.02	0.04	0.02	0.02	0.2
	Molecular Weight, MW	106.17	106.17	106.17	106.17	106.17	106.17	106.17
	Concentration, mg/dscm	5.31E-03	9.79E-04	9.71E-04	1.87E-03	9.69E-04	9.98E-04	1.11E-02
ppmdv	**Parts Per Billion, Dry Basis**	1.201	0.221	0.219	0.422	0.219	0.226	2.51E+00
	Emission Rate, lb/hr	1.51E-03	2.78E-04	2.75E-04	5.30E-04	2.75E-04	2.83E-04	3.15E-03
	M&P Xylene	DDL	BDL	BDL	ADL	BDL	BDL	
	Analysis, ug/sample	2.38	0.06	0.06	0.55	0.06	0.06	3.2
	Molecular Weight, MW	106.16	106.16	106.16	106.16	106.16	106.16	106.16
	Concentration, mg/dscm	1.18E-01	2.94E-03	2.91E-03	2.69E-02	2.91E-03	2.99E-03	1.57E-01
ppmdv	**Parts Per Billion, Dry Basis**	26.716	0.664	0.658	6.078	0.657	0.677	3.55E+01
	Emission Rate, lb/hr	3.35E-02	8.33E-04	8.26E-04	7.63E-03	8.25E-04	8.50E-04	4.45E-02
	O-xylene	DDL	BDL	BDL	DDL	BDL	BDL	
	Analysis, ug/sample	0.44	0.02	0.02	0.10	0.02	0.02	0.6
	Molecular Weight, MW	106.16	106.16	106.16	106.16	106.16	106.16	106.16
	Concentration, mg/dscm	2.20E-02	9.79E-04	9.71E-04	4.96E-03	9.69E-04	9.98E-04	3.09E-02
ppmdv	**Parts Per Billion, Dry Basis**	4.973	0.221	0.219	1.122	0.219	0.226	6.98E+00
	Emission Rate, lb/hr	6.24E-03	2.78E-04	2.75E-04	1.41E-03	2.75E-04	2.83E-04	8.76E-03
	Styrene	DDL	BDL	BDL	DDL	BDL	BDL	
	Analysis, ug/sample	0.69	0.04	0.04	0.16	0.04	0.04	1.0
	Molecular Weight, MW	104.15	104.15	104.15	104.15	104.15	104.15	104.15
	Concentration, mg/dscm	3.43E-02	1.96E-03	1.94E-03	7.96E-03	1.94E-03	2.00E-03	5.00E-02
ppmdv	**Parts Per Billion, Dry Basis**	7.895	0.451	0.447	1.835	0.447	0.460	1.15E+01
	Emission Rate, lb/hr	9.72E-03	5.56E-04	5.51E-04	2.26E-03	5.50E-04	5.67E-04	1.42E-02
	Bromoform	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.02	0.02	0.02	0.02	0.02	0.02	0.1
	Molecular Weight, MW	252.73	252.73	252.73	252.73	252.73	252.73	252.73
	Concentration, mg/dscm	9.93E-04	9.79E-04	9.71E-04	9.83E-04	9.69E-04	9.98E-04	5.89E-03
ppmdv	**Parts Per Billion, Dry Basis**	0.094	0.093	0.092	0.093	0.092	0.095	5.60E-01
	Emission Rate, lb/hr	2.82E-04	2.78E-04	2.75E-04	2.79E-04	2.75E-04	2.83E-04	1.67E-03
	1,1,2,2-Tetrachloroethane	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.04	0.04	0.04	0.04	0.04	0.04	0.2
	Molecular Weight, MW	167.85	167.85	167.85	167.85	167.85	167.85	167.85
	Concentration, mg/dscm	1.99E-03	1.96E-03	1.94E-03	1.97E-03	1.94E-03	2.00E-03	1.18E-02
ppmdv	**Parts Per Billion, Dry Basis**	0.284	0.280	0.278	0.281	0.277	0.285	1.69E+00
	Emission Rate, lb/hr	5.64E-04	5.56E-04	5.51E-04	5.58E-04	5.50E-04	5.67E-04	3.34E-03
	Acrylonitrile	BDL	BDL	BDL	BDL	BDL	BDL	
	Analysis, ug/sample	0.10	0.10	0.10	0.10	0.10	0.10	0.6
	Molecular Weight, MW	53.06	53.06	53.06	53.06	53.06	53.06	53.06
	Concentration, mg/dscm	4.96E-03	4.89E-03	4.85E-03	4.91E-03	4.84E-03	4.99E-03	2.95E-02
ppmdv	**Parts Per Billion, Dry Basis**	2.246	2.214	2.196	2.223	2.191	2.258	1.33E+01
	Emission Rate, lb/hr	1.41E-03	1.39E-03	1.38E-03	1.39E-03	1.37E-03	1.42E-03	8.36E-03

Summary of Stack Gas Parameters and Test Results
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AK Steel-Middletown
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Combustion Stack
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	RUN NUMBER RUN DATE RUN TIME	C-0031-1 9/8/2016 0935-1235	C-0031-2 9/8/2016 1245-1532	C-0031-4 9/15/2016 0945-1248	Average
	MEASURED DATA				
P_{static}	Stack Static Pressure, inches H_2O	-0.80	-0.80	-0.90	-0.83
y	Meter Box Correction Factor	1.085	1.085	1.085	1.085
P_{bar}	Barometric Pressure, inches Hg	30.00	30.00	30.24	30.08
V_m	Sample Volume, L^3	19.458	19.120	18.980	19.186
$Dp^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	0.1810	0.1799	0.2020	0.1876
T_m	Average Meter Temperature, °F	95	104	80	93
T_s	Average Stack Temperature, °F	380	381	356	372
CO_2	Carbon Dioxide content, % by volume	3.0	3.0	3.0	3.0
O_2	Oxygen content, % by volume	15.0	15.0	15.0	15.0
N_2	Nitrogen content, % by volume	82.0	82.0	82.0	82.0
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	0	0	0	
As	Diameter or Dimensions, inches:	168.00	168.00	168.00	168.00
Q	Sample Run Duration, minutes	20	20	20	20
	CALCULATED DATA				
$V_{m(std)}$	Standard Meter Volume,L	20.147	19.474	20.370	19.997
$V_{m(std)}$	Standard Meter Volume,ft^3	0.711	0.688	0.719	0.706
$V_{m(std)}$	Standard Meter Volume, m^3	0.020	0.019	0.020	0.020
Q_m	Average Sampling Rate, dscfm	1.007	0.974	1.018	1.000
P_s	Stack Pressure, inches Hg	29.94	29.94	30.17	30.02
B_{ws}	Moisture, % by volume	12.0	12.0	12.0	12.0
$B_{ws(sat)}$	Moisture (at saturation), % by volume	100.0	100.0	100.0	100.0
V_{wstd}	Standard Water Vapor Volume, ft^3	0.000	0.000	0.000	0.000
$1-B_{ws}$	Dry Mole Fraction	0.880	0.880	0.880	0.880
M_d	Molecular Weight (d.b.), lb/lb•mole	29.08	29.08	29.08	29.08
M_s	Molecular Weight (w.b.), lb/lb•mole	27.75	27.75	27.75	27.75
V_s	Stack Gas Velocity, ft/s	13.1	13.0	14.3	13.5
A	Stack Area. ft^2	153.9	153.9	153.9	153.94
Q_a	Stack Gas Volumetric flow, acfm	120,709	120,047	132,263	124,340
Q_s	Stack Gas Volumetric flow, dscfm	66,790	66,345	75,921	69,685
Q_s	Stack Gas Volumetric flow, dscmm	1,891	1,879	2,150	1,973

Summary of Stack Gas Parameters and Test Results
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	RUN NUMBER	C-0031-1	C-0031-2	C-0031-4	Average
	RUN DATE	9/8/2016	9/8/2016	9/15/2016	
	RUN TIME	0935-1235	1245-1532	0945-1248	
	Chloromethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.72	0.72	0.72	0.7
	Molecular Weight, MW	50.49	50.49	50.49	50.49
	Concentration, mg/dscm	3.58E-02	3.70E-02	3.54E-02	3.60E-02
ppmdv	Parts Per Billion, Dry Basis	1.70E+01	1.76E+01	1.68E+01	1.71E+01
	Emission Rate, lb/hr	8.93E-03	9.17E-03	1.00E-02	9.38E-03
	Vinyl Chloride	BDL	BDL	BDL	
	Analysis, ug/sample	0.24	0.24	0.24	0.2
	Molecular Weight, MW	62.50	62.50	62.50	62.50
	Concentration, mg/dscm	1.19E-02	1.23E-02	1.18E-02	1.20E-02
ppmdv	Parts Per Billion, Dry Basis	4.58E+00	4.74E+00	4.53E+00	4.61E+00
	Emission Rate, lb/hr	2.98E-03	3.06E-03	3.34E-03	3.13E-03
	Bromomethane	BDL	BDL	BDL	
	Analysis, ug/sample	1.08	1.08	1.08	1.1
	Molecular Weight, MW	94.95	94.95	94.95	94.95
	Concentration, mg/dscm	5.36E-02	5.55E-02	5.30E-02	5.41E-02
ppmdv	Parts Per Billion, Dry Basis	1.36E+01	1.40E+01	1.34E+01	1.37E+01
	Emission Rate, lb/hr	1.34E-02	1.38E-02	1.50E-02	1.41E-02
	Chloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.24	0.24	0.24	0.2
	Molecular Weight, MW	64.51	64.51	64.51	64.51
	Concentration, mg/dscm	1.19E-02	1.23E-02	1.18E-02	1.20E-02
ppmdv	Parts Per Billion, Dry Basis	4.44E+00	4.59E+00	4.38E+00	4.47E+00
	Emission Rate, lb/hr	2.98E-03	3.06E-03	3.34E-03	3.13E-03
	1,1-Dichloroethene	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.1
	Molecular Weight, MW	96.94	96.94	96.94	96.94
	Concentration, mg/dscm	5.96E-03	6.17E-03	5.89E-03	6.01E-03
ppmdv	Parts Per Billion, Dry Basis	1.48E+00	1.53E+00	1.46E+00	1.49E+00
	Emission Rate, lb/hr	1.49E-03	1.53E-03	1.67E-03	1.56E-03
	Iodomethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.36	0.36	0.36	0.4
	Molecular Weight, MW	142.93	142.93	142.93	142.93
	Concentration, mg/dscm	1.79E-02	1.85E-02	1.77E-02	1.80E-02
ppmdv	Parts Per Billion, Dry Basis	3.00E+00	3.11E+00	2.97E+00	3.03E+00
	Emission Rate, lb/hr	4.46E-03	4.59E-03	5.02E-03	4.69E-03
	Carbon Disulfide	DLL	DLL	DLL	
	Analysis, ug/sample	0.24	0.24	1.27	0.6
	Molecular Weight, MW	76.14	76.14	76.14	76.14
	Concentration, mg/dscm	1.21E-02	1.23E-02	6.28E-02	2.91E-02
ppmdv	Parts Per Billion, Dry Basis	3.80E+00	3.89E+00	1.98E+01	9.22E+00
	Emission Rate, lb/hr	3.01E-03	3.06E-03	1.78E-02	7.62E-03
	Methylene Chloride	BDL	BDL	BDL	
	Analysis, ug/sample	1.20	1.28	3.48	2.0
	Molecular Weight, MW	84.93	84.93	84.93	84.93
	Concentration, mg/dscm	5.96E-02	6.57E-02	1.70E-01	9.83E-02
ppmdv	Parts Per Billion, Dry Basis	1.68E+01	1.86E+01	4.79E+01	2.81E+01
	Emission Rate, lb/hr	1.49E-02	1.63E-02	4.81E-02	2.59E-02
	Chloroform	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.1
	Molecular Weight, MW	119.37	119.37	119.37	119.37
	Concentration, mg/dscm	5.96E-03	6.17E-03	5.89E-03	6.01E-03
ppmdv	Parts Per Billion, Dry Basis	1.20E+00	1.24E+00	1.18E+00	1.21E+00
	Emission Rate, lb/hr	1.49E-03	1.53E-03	1.67E-03	1.56E-03
	1,1,1 Trichloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.1
	Molecular Weight, MW	133.50	133.50	133.50	133.50
	Concentration, mg/dscm	5.96E-03	6.17E-03	5.89E-03	6.01E-03
ppmdv	Parts Per Billion, Dry Basis	1.07E+00	1.11E+00	1.06E+00	1.08E+00
	Emission Rate, lb/hr	1.49E-03	1.53E-03	1.67E-03	1.56E-03
	Carbon Tetrachloride	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.1
	Molecular Weight, MW	153.81	153.81	153.81	153.81
	Concentration, mg/dscm	5.96E-03	6.17E-03	5.89E-03	6.01E-03
ppmdv	Parts Per Billion, Dry Basis	9.30E-01	9.62E-01	9.20E-01	9.37E-01
	Emission Rate, lb/hr	1.49E-03	1.53E-03	1.67E-03	1.56E-03
	Benzene	ADL	ADL	ADL	
	Analysis, ug/sample	21.64	20.99	105.65	49.4
	Molecular Weight, MW	78.11	78.11	78.11	78.11
	Concentration, mg/dscm	1.08E+00	1.08E+00	5.19E+00	2.45E+00
ppmdv	Parts Per Billion, Dry Basis	3.31E+02	3.32E+02	1.59E+03	7.52E+02
	Emission Rate, lb/hr	2.69E-01	2.68E-01	1.47E+00	6.70E-01
	1,2-Dichloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.1
	Molecular Weight, MW	98.95	98.95	98.95	98.95
	Concentration, mg/dscm	5.96E-03	6.17E-03	5.89E-03	6.01E-03
ppmdv	Parts Per Billion, Dry Basis	1.45E+00	1.50E+00	1.43E+00	1.46E+00
	Emission Rate, lb/hr	1.49E-03	1.53E-03	1.67E-03	1.56E-03

Summary of Stack Gas Parameters and Test Results
050074.0172
AK Steel-Middletown
EPA Method 0031-Summary
Combustion Stack

	RUN NUMBER	*C-0031-1*	*C-0031-2*	*C-0031-4*	*average*
	RUN DATE	*9/8/2016*	*9/8/2016*	*9/15/2016*	
	RUN TIME	*0935-1235*	*1245-1532*	*0945-1248*	
	Trichloroethene	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.1
	Molecular Weight, MW	131.39	131.39	131.39	131.39
	Concentration, mg/dscm	5.96E-03	6.17E-03	5.89E-03	6.01E-03
ppmdv	**Parts Per Billion, Dry Basis**	1.09E+00	1.13E+00	1.08E+00	1.10E+00
	Emission Rate, lb/hr	1.49E-03	1.53E-03	1.67E-03	1.56E-03
	1,2-Dichloropropane	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.1
	Molecular Weight, MW	112.98	112.98	112.98	112.98
	Concentration, mg/dscm	5.96E-03	6.17E-03	5.89E-03	6.01E-03
ppmdv	**Parts Per Billion, Dry Basis**	1.27E+00	1.31E+00	1.25E+00	1.28E+00
	Emission Rate, lb/hr	1.49E-03	1.53E-03	1.67E-03	1.56E-03
	Toluene	DDL	DDL	DDL	
	Analysis, ug/sample	2.16	2.06	19.39	7.9
	Molecular Weight, MW	92.14	92.14	92.14	92.14
	Concentration, mg/dscm	1.06E-01	1.04E-01	9.55E-01	3.88E-01
ppmdv	**Parts Per Billion, Dry Basis**	2.76E+01	2.72E+01	2.49E+02	1.01E+02
	Emission Rate, lb/hr	2.64E-02	2.59E-02	2.71E-01	1.08E-01
	1,1,2-Trichloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.24	0.24	0.24	0.2
	Molecular Weight, MW	133.40	133.40	133.40	133.40
	Concentration, mg/dscm	1.19E-02	1.23E-02	1.18E-02	1.20E-02
ppmdv	**Parts Per Billion, Dry Basis**	2.15E+00	2.22E+00	2.12E+00	2.16E+00
	Emission Rate, lb/hr	2.98E-03	3.06E-03	3.34E-03	3.13E-03
	Tetrachloroethene	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.1
	Molecular Weight, MW	165.82	165.82	165.82	165.82
	Concentration, mg/dscm	5.96E-03	6.17E-03	5.89E-03	6.01E-03
ppmdv	**Parts Per Billion, Dry Basis**	8.63E-01	8.93E-01	8.53E-01	8.69E-01
	Emission Rate, lb/hr	1.49E-03	1.53E-03	1.67E-03	1.56E-03
	Chlorobenzene	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.1
	Molecular Weight, MW	112.56	112.56	112.56	112.56
	Concentration, mg/dscm	5.96E-03	6.17E-03	5.89E-03	6.01E-03
ppmdv	**Parts Per Billion, Dry Basis**	1.27E+00	1.31E+00	1.26E+00	1.28E+00
	Emission Rate, lb/hr	1.49E-03	1.53E-03	1.67E-03	1.56E-03
	Ethylbenzene	DDL	DDL	DDL	
	Analysis, ug/sample	0.14	0.12	0.23	0.2
	Molecular Weight, MW	106.17	106.17	106.17	106.17
	Concentration, mg/dscm	6.89E-03	6.22E-03	1.11E-02	8.07E-03
ppmdv	**Parts Per Billion, Dry Basis**	1.56E+00	1.41E+00	2.51E+00	1.82E+00
	Emission Rate, lb/hr	1.72E-03	1.54E-03	3.15E-03	2.14E-03
	M&P Xylene	DDL	DDL	DDL	
	Analysis, ug/sample	0.81	0.47	3.17	1.5
	Molecular Weight, MW	106.16	106.16	106.16	106.16
	Concentration, mg/dscm	3.99E-02	2.40E-02	1.57E-01	7.35E-02
ppmdv	**Parts Per Billion, Dry Basis**	9.01E+00	5.42E+00	3.55E+01	1.66E+01
	Emission Rate, lb/hr	9.95E-03	5.94E-03	4.45E-02	2.01E-02
	O-xylene	DDL	DDL	DDL	
	Analysis, ug/sample	0.21	0.14	0.62	0.3
	Molecular Weight, MW	106.16	106.16	106.16	106.16
	Concentration, mg/dscm	1.03E-02	7.12E-03	3.09E-02	1.61E-02
ppmdv	**Parts Per Billion, Dry Basis**	2.33E+00	1.61E+00	6.98E+00	3.64E+00
	Emission Rate, lb/hr	2.58E-03	1.76E-03	8.76E-03	4.37E-03
	Styrene	DDL	DDL	DDL	
	Analysis, ug/sample	0.36	0.28	1.01	0.5
	Molecular Weight, MW	104.15	104.15	104.15	104.15
	Concentration, mg/dscm	1.76E-02	1.42E-02	5.00E-02	2.73E-02
ppmdv	**Parts Per Billion, Dry Basis**	4.04E+00	3.28E+00	1.15E+01	6.29E+00
	Emission Rate, lb/hr	4.38E-03	3.53E-03	1.42E-02	7.37E-03
	Bromoform	BDL	BDL	BDL	
	Analysis, ug/sample	0.12	0.12	0.12	0.1
	Molecular Weight, MW	252.73	252.73	252.73	252.73
	Concentration, mg/dscm	5.96E-03	6.17E-03	5.89E-03	6.01E-03
ppmdv	**Parts Per Billion, Dry Basis**	5.66E-01	5.86E-01	5.60E-01	5.70E-01
	Emission Rate, lb/hr	1.49E-03	1.53E-03	1.67E-03	1.56E-03
	1,1,2,2-Tetrachloroethane	BDL	BDL	BDL	
	Analysis, ug/sample	0.24	0.24	0.24	0.2
	Molecular Weight, MW	167.85	167.85	167.85	167.85
	Concentration, mg/dscm	1.19E-02	1.23E-02	1.18E-02	1.20E-02
ppmdv	**Parts Per Billion, Dry Basis**	1.70E+00	1.76E+00	1.69E+00	1.72E+00
	Emission Rate, lb/hr	2.98E-03	3.06E-03	3.34E-03	3.13E-03
	Acrylonitrile	BDL	BDL	BDL	
	Analysis, ug/sample	0.60	0.60	0.60	0.6
	Molecular Weight, MW	53.06	53.06	53.06	53.06
	Concentration, mg/dscm	2.98E-02	3.08E-02	2.95E-02	3.00E-02
ppmdv	**Parts Per Billion, Dry Basis**	1.35E+01	1.39E+01	1.33E+01	1.36E+01
	Emission Rate, lb/hr	7.44E-03	7.65E-03	8.36E-03	7.82E-03

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 316 - Formaldehyde
Combustion Stack

	RUN NUMBER	***C-316-1***	***C-316-2***	***C-316-4***	
	RUN DATE	***9/8/2016***	***9/8/2016***	***9/15/2016***	***Average***
	RUN TIME	***0953-1053***	***1246-1346***	***0945-1045***	
	MEASURED DATA				
P_{static}	Stack Static Pressure, inches H_2O	-0.80	-0.80	-0.90	-0.83
y	Meter Box Correction Factor	0.993	0.993	1.005	0.997
P_{bar}	Barometric Pressure, inches Hg	30.00	30.00	30.24	30.08
V_m	Sample Volume, ft^3	36.961	37.884	40.917	38.587
$Dp^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	0.1810	0.1799	0.2020	0.1876
DH	Avg Meter Orifice Pressure, in. H_2O	1.20	1.27	1.43	1.30
T_m	Average Meter Temperature, °F	74	84	67	75
T_s	Average Stack Temperature, °F	380	381	356	372
V_{lc}	Condensate Collected, ml	105.6	104.5	107.0	105.7
CO_2	Carbon Dioxide content, % by volume	3.8	3.8	4.0	3.9
O_2	Oxygen content, % by volume	13.7	13.7	12.4	13.2
N_2	Nitrogen content, % by volume	82.6	82.6	83.6	82.9
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	
As	Diameter or Dimensions, inches:	168.00	168.00	168.00	168.00
Q	Sample Run Duration, minutes	60	60	60	60
D_n	Nozzle Diameter, inches	0.500	0.500	0.500	0.500
	CALCULATED DATA				
A_n	Nozzle Area, ft^2	0.001363	0.001363	0.001363	0.001363
$V_{m(std)}$	Standard Meter Volume, ft^3	36.479	36.709	41.768	38.319
$V_{m(std)}$	Standard Meter Volume, m^3	1.033	1.039	1.183	1.085
Q_m	Average Sampling Rate, dscfm	0.608	0.612	0.696	0.639
P_s	Stack Pressure, inches Hg	29.94	29.94	30.17	30.02
B_{ws}	Moisture, % by volume	12.0	11.8	10.8	11.5
$B_{ws(sat)}$	Moisture (at saturation), % by volume	100.0	100.0	100.0	100.0
V_{wstd}	Standard Water Vapor Volume, ft^3	4.971	4.919	5.036	4.975
$1-B_{ws}$	Dry Mole Fraction	0.880	0.882	0.892	0.885
M_d	Molecular Weight (d.b.), lb/lb•mole	29.15	29.15	29.14	29.15
M_s	Molecular Weight (w.b.), lb/lb•mole	27.81	27.83	27.94	27.86
V_s	Stack Gas Velocity, ft/s	13.1	13.0	14.3	13.4
A	Stack Area, ft^2	153.9	153.9	153.9	153.94
Q_a	Stack Gas Volumetric flow, acfm	120,572	119,868	131,819	124,087
Q_s	Stack Gas Volumetric flow, dscfm	66,720	66,384	76,731	69,945
Q_s	Stack Gas Volumetric flow, dscmm	1,889	1,880	2,173	1,981
I	Isokinetic Sampling Ratio, %	102.9	104.1	102.4	103.1

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 316 - Formaldehyde
Combustion Stack

	RUN NUMBER	***C-316-1***	***C-316-2***	***C-316-4***	
	RUN DATE	***9/8/2016***	***9/8/2016***	***9/15/2016***	***Average***
	RUN TIME	***0953-1053***	***1246-1346***	***0945-1045***	
	EMISSIONS DATA				
	Formaldehyde, ug/sample*	BDL	BDL	BDL	
	Analysis, *u*g/sample	2.50	2.50	2.50	**2.5**
	Molecular Weight, MW	30.0	30.0	30.0	**30.0**
	Concentration, mg/dscm	**2.42E-03**	**2.41E-03**	**2.11E-03**	**2.31E-03**
	Concentration, lb/dscf	**1.508E-10**	**1.50E-10**	**1.32E-10**	**1.44E-10**
ppmdv	**Parts Per Million, Dry Basis**	**1.93E-03**	**1.92E-03**	**1.69E-03**	**1.85E-03**
	Emission Rate, lb/hr	**6.04E-04**	**5.97E-04**	**6.06E-04**	**6.02E-04**

APPENDIX A-6

HYDROGEN CHLORIDE AND HYDROGEN FLUORIDE

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 26
Pushing Baghouse

	RUN NUMBER	***P-26-1***	***P-26-2***	***P-26-3***	***P-26-4***	
	RUN DATE	***8/23/2016***	***8/23/2016***	***8/24/2016***	***8/25/2016***	***Average***
	RUN TIME	***1021-1337***	***1352-1726***	***1027-1526***	***1028-1509***	
	MEASURED DATA					
P_{static}	Stack Static Pressure, inches H_2O	-1.90	-1.90	-1.90	-1.90	-1.90
y	Meter Box Correction Factor	0.989	0.989	0.989	0.989	0.989
P_{bar}	Barometric Pressure, inches Hg	29.95	29.95	29.97	30.30	30.07
V_m	Sample Volume, ft^3	41.150	42.000	43.925	42.327	42.751
$Dp^{1/2}$	Average Square Root Dp, $(in.\ H_2O)^{1/2}$	1.7698	1.7003	1.7787	1.7602	1.7464
DH	Avg Meter Orifice Pressure, in. H_2O	4.03	2.99	1.82	1.77	2.19
T_m	Average Meter Temperature, °F	71	79	77	80	79
T_s	Average Stack Temperature, °F	110	115	110	118	114
V_{lc}	Condensate Collected, ml	13.2	13.4	21.0	28.4	20.9
CO_2	Carbon Dioxide content, % by volume	0.3	0.3	0.2	0.3	0.2
O_2	Oxygen content, % by volume	20.7	20.7	20.8	20.7	20.7
N_2	Nitrogen content, % by volume	79.0	79.0	79.0	79.1	79.0
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	1	
As	Diameter or Dimensions, inches:	35.50	35.50	35.50	35.50	35.50
Q	Sample Run Duration, minutes	39.62	31.33	58.02	55.30	48.22
D_n	Nozzle Diameter, inches	0.213	0.213	0.156	0.156	0.175
	CALCULATED DATA					
A_n	Nozzle Area, ft^2	0.000247	0.000247	0.000133	0.000133	0.000171
$V_{m(std)}$	Standard Meter Volume, ft^3	40.892	41.052	42.959	41.612	41.874
$V_{m(std)}$	Standard Meter Volume, m^3	1.158	1.162	1.216	1.178	1.186
Q_m	Average Sampling Rate, dscfm	1.032	1.310	0.740	0.752	0.934
P_s	Stack Pressure, inches Hg	29.81	29.81	29.83	30.16	29.93
B_{ws}	Moisture, % by volume	1.5	1.5	2.2	3.1	2.3
$B_{ws(sat)}$	Moisture (at saturation), % by volume	8.7	10.0	8.7	10.8	9.8
V_{wstd}	Standard Water Vapor Volume, ft^3	0.621	0.631	0.988	1.337	0.985
$1-B_{ws}$	Dry Mole Fraction	0.985	0.985	0.978	0.969	0.977
M_d	Molecular Weight (d.b.), lb/lb•mole	28.87	28.87	28.87	28.87	28.87
M_s	Molecular Weight (w.b.), lb/lb•mole	28.71	28.70	28.62	28.53	28.62
V_s	Stack Gas Velocity, ft/s	103.7	100.1	104.4	103.6	102.7
A	Stack Area, ft^2	6.9	6.9	6.9	6.9	6.87
Q_a	Stack Gas Volumetric flow, acfm	42,778	41,280	43,043	42,726	42,349
Q_s	Stack Gas Volumetric flow, dscfm	38,875	37,180	38,842	38,104	38,042
Q_s	Stack Gas Volumetric flow, dscmm	1,101	1,053	1,100	1,079	1,077
I	Isokinetic Sampling Ratio, %	73.8	97.9	98.7	102.3	99.6

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 26
Pushing Baghouse

	RUN NUMBER	*P-26-1*	*P-26-2*	*P-26-3*	*P-26-4*	
	RUN DATE	*8/23/2016*	*8/23/2016*	*8/24/2016*	*8/25/2016*	*Average*
	RUN TIME	*1021-1337*	*1352-1726*	*1027-1526*	*1028-1509*	
	EMISSIONS DATA					
	Hydrogen Chloride (HCl)	ADL	ADL	ADL	ADL	**ADL**
	Analysis, *u* g/sample	408.0	440.0	334.0	379.0	**384.3**
	Molecular Weight, MW	36.5	36.5	36.5	36.5	**36.5**
	Concentration, lb/dscf	**2.20E-08**	**2.36E-08**	**1.71E-08**	**2.00E-08**	**2.02E-08**
	Concentration, mg/dscm	**3.52E-01**	**3.79E-01**	**2.75E-01**	**3.22E-01**	**3.25E-01**
ppmdv	**Parts Per Million, Dry Basis**	**2.32E-01**	**2.49E-01**	**1.81E-01**	**2.12E-01**	**2.14E-01**
	Emission Rate, lb/hr	**5.12E-02**	**5.26E-02**	**3.99E-02**	**4.58E-02**	**4.61E-02**
	Hydrogen Fluoride (HF)	BDL	BDL	BDL	BDL	**BDL**
	Analysis, *u* g/sample	107.0	119.0	117.0	116.0	**117.3**
	Molecular Weight, MW	20.0	20.0	20.0	20.0	**20.0**
	Concentration, lb/dscf	**5.76E-09**	**6.38E-09**	**5.99E-09**	**6.13E-09**	**6.17E-09**
	Concentration, mg/dscm	**9.24E-02**	**1.02E-01**	**9.62E-02**	**9.84E-02**	**9.90E-02**
ppmdv	**Parts Per Million, Dry Basis**	**1.11E-01**	**1.23E-01**	**1.15E-01**	**1.18E-01**	**1.19E-01**
	Emission Rate, lb/hr	**0.01342719**	**0.014226499**	**0.013963928**	**0.01402089**	**1.41E-02**

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 26
Pushing Baghouse

	RUN NUMBER	*P-26-1*	*P-26-2*	*P-26-3*	*P-26-4*	
	RUN DATE	*8/23/2016*	*8/23/2016*	*8/24/2016*	*8/25/2016*	*Average*
	RUN TIME	*1021-1337*	*1352-1726*	*1027-1526*	*1028-1509*	
	EMISSIONS DATA					
	Hydrogen Chloride (HCl)					
	Analysis, *u* g/sample	408.0	440.0	334.0	379.0	**384.3**
	Molecular Weight, MW	36.5	36.5	36.5	36.5	**36.5**
	Concentration, lb/dscf	**2.20E-08**	**2.36E-08**	**1.71E-08**	**2.00E-08**	**2.02E-08**
	Concentration, mg/dscm	**3.95E-01**	**3.36E-01**	**4.51E-01**	**5.04E-01**	**4.30E-01**
ppmdv	**Parts Per Million, Dry Basis**	**2.32E-01**	**2.49E-01**	**1.81E-01**	**2.12E-01**	**2.14E-01**
	Emission Rate, lb/hr	**5.12E-02**	**5.26E-02**	**3.99E-02**	**4.58E-02**	**4.61E-02**
	Hydrogen Fluoride (HF)					
	Analysis, *u* g/sample	107.0	119.0	117.0	116.0	**117.3**
	Molecular Weight, MW	20.0	20.0	20.0	20.0	**20.0**
	Concentration, lb/dscf	**5.76E-09**	**6.38E-09**	**5.99E-09**	**6.13E-09**	**6.17E-09**
	Concentration, mg/dscm	**1.04E-01**	**9.08E-02**	**1.58E-01**	**1.54E-01**	**1.34E-01**
ppmdv	**Parts Per Million, Dry Basis**	**1.11E-01**	**1.23E-01**	**1.15E-01**	**1.18E-01**	**1.19E-01**
	Emission Rate, lb/hr	**0.01342719**	**0.014226499**	**0.013963928**	**0.01402089**	**1.41E-02**

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 26
Combustion Stack

	RUN NUMBER	***C-26-1***	***C-26-2***	***C-26-3***	
	RUN DATE	***9/6/2016***	***9/8/2016***	***9/8/2016***	***Average***
	RUN TIME	***1450-1602***	***1008-1108***	***1155-1255***	
	MEASURED DATA				
P_{static}	Stack Static Pressure, inches H_2O	-0.80	-0.80	-0.80	-0.80
y	Meter Box Correction Factor	1.005	1.005	1.005	1.005
P_{bar}	Barometric Pressure, inches Hg	30.20	30.00	30.00	30.07
V_m	Sample Volume, ft^3	40.897	41.162	42.446	41.502
$Dp^{1/2}$	Average Square Root Dp, $(in.\ H_2O)^{1/2}$	0.1955	0.2000	0.2000	0.1985
DH	Avg Meter Orifice Pressure, in. H_2O	1.45	1.40	1.40	1.42
T_m	Average Meter Temperature, °F	90	78	85	84
T_s	Average Stack Temperature, °F	300	361	380	347
V_{lc}	Condensate Collected, ml	106.1	107.6	109.9	107.9
CO_2	Carbon Dioxide content, % by volume	3.0	3.8	3.8	3.5
O_2	Oxygen content, % by volume	15.0	13.7	13.7	14.1
N_2	Nitrogen content, % by volume	82.0	82.6	82.6	82.4
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	
As	Diameter or Dimensions, inches:	168.00	168.00	168.00	168.00
Q	Sample Run Duration, minutes	60.00	60.00	60.00	60.00
D_n	Nozzle Diameter, inches	0.500	0.500	0.500	0.500
	CALCULATED DATA				
A_n	Nozzle Area, ft^2	0.001363	0.001363	0.001363	0.001363
$V_{m(std)}$	Standard Meter Volume, ft^3	39.951	40.831	41.564	40.782
$V_{m(std)}$	Standard Meter Volume, m^3	1.131	1.156	1.177	1.155
Q_m	Average Sampling Rate, dscfm	0.666	0.681	0.693	0.680
P_s	Stack Pressure, inches Hg	30.14	29.94	29.94	30.01
B_{ws}	Moisture, % by volume	11.1	11.0	11.1	11.1
$B_{ws(sat)}$	Moisture (at saturation), % by volume	100.0	100.0	100.0	100.0
V_{wstd}	Standard Water Vapor Volume, ft^3	4.994	5.065	5.173	5.077
$1-B_{ws}$	Dry Mole Fraction	0.889	0.890	0.889	0.889
M_d	Molecular Weight (d.b.), lb/lb•mole	29.08	29.15	29.15	29.13
M_s	Molecular Weight (w.b.), lb/lb•mole	27.85	27.92	27.92	27.89
V_s	Stack Gas Velocity, ft/s	13.4	14.2	14.4	14.0
A	Stack Area, ft^2	153.9	153.9	153.9	153.94
Q_a	Stack Gas Volumetric flow, acfm	123,387	131,462	132,983	129,277
Q_s	Stack Gas Volumetric flow, dscfm	76,729	75,239	74,360	75,443
Q_s	Stack Gas Volumetric flow, dscmm	2,173	2,131	2,106	2,136
I	Isokinetic Sampling Ratio, %	98.0	102.1	105.2	101.8

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
US EPA Test Method 26
Combustion Stack

	RUN NUMBER	***C-26-1***	***C-26-2***	***C-26-3***	
	RUN DATE	***9/6/2016***	***9/8/2016***	***9/8/2016***	***Average***
	RUN TIME	***1450-1602***	***1008-1108***	***1155-1255***	
	EMISSIONS DATA				
	Hydrogen Chloride (HCl)	ADL	ADL	ADL	**ADL**
	Analysis, *u* g/sample	11,600.0	6,870.0	9,210.0	**9,226.7**
	Molecular Weight, MW	36.5	36.5	36.5	**36.5**
	Concentration, lb/dscf	**6.39E-07**	**3.70E-07**	**4.87E-07**	**4.99E-07**
	Concentration, mg/dscm	**1.03E+01**	**5.94E+00**	**7.83E+00**	**8.01E+00**
ppmdv	**Parts Per Million, Dry Basis**	**6.74E+00**	**3.91E+00**	**5.15E+00**	**5.27E+00**
	Emission Rate, lb/hr	**2.94E+00**	**1.67E+00**	**2.18E+00**	**2.26E+00**
	Hydrogen Fluoride (HF)	ADL	ADL	ADL	**ADL**
	Analysis, *u* g/sample	329.0	313.0	305.0	**315.7**
	Molecular Weight, MW	20.0	20.0	20.0	**20.0**
	Concentration, lb/dscf	**1.81E-08**	**1.69E-08**	**1.61E-08**	**1.70E-08**
	Concentration, mg/dscm	**2.91E-01**	**2.71E-01**	**2.59E-01**	**2.74E-01**
ppmdv	**Parts Per Million, Dry Basis**	**3.49E-01**	**3.25E-01**	**3.11E-01**	**3.28E-01**
	Emission Rate, lb/hr	**8.34E-02**	**7.61E-02**	**7.20E-02**	**7.72E-02**

APPENDIX A-7

HYDROGEN CYANIDE

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
OTM 29 - Hydrogen Cyanide
Pushing Baghouse

	RUN NUMBER	*P-HCN-1*	*P-HCN-2*	*P-HCN-3*	*P-HCN-4*	
	RUN DATE	*8/23/2016*	*8/23/2016*	*8/24/2016*	*8/25/2016*	*Average*
	RUN TIME	*1021-1243*	*1352-1618*	*1027-1354*	*1028-1354*	
	MEASURED DATA					
P_{static}	Stack Static Pressure, inches H_2O	-1.80	-1.80	-1.10	-1.10	-1.33
y	Meter Box Correction Factor	0.993	0.993	0.993	0.993	0.993
P_{bar}	Barometric Pressure, inches Hg	29.95	29.95	29.97	30.30	30.07
V_m	Sample Volume, ft^3	34.315	32.027	33.110	33.509	32.882
$Dp^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	1.8551	1.8037	1.7438	1.7470	1.7648
DH	Avg Meter Orifice Pressure, in. H_2O	5.06	4.74	1.90	1.86	2.83
T_m	Average Meter Temperature, °F	72	80	77	79	79
T_s	Average Stack Temperature, °F	105	118	106	121	115
V_{lc}	Condensate Collected, ml	13.4	11.1	13.3	21.9	15.4
CO_2	Carbon Dioxide content, % by volume	0.3	0.3	0.2	0.3	0.2
O_2	Oxygen content, % by volume	20.7	20.7	20.8	20.7	20.7
N_2	Nitrogen content, % by volume	79.0	79.0	79.0	79.1	79.0
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	1	
As	Diameter or Dimensions, inches:	35.50	35.50	35.50	35.50	35.50
Q	Sample Run Duration, minutes	30.57	26.02	44.27	45.53	38.61
D_n	Nozzle Diameter, inches	0.195	0.195	0.156	0.156	0.169
	CALCULATED DATA					
A_n	Nozzle Area, ft^2	0.000207	0.000207	0.000133	0.000133	0.000158
$V_{m(std)}$	Standard Meter Volume, ft^3	34.259	31.477	32.519	33.145	32.380
$V_{m(std)}$	Standard Meter Volume, m^3	0.970	0.891	0.921	0.939	0.917
Q_m	Average Sampling Rate, dscfm	1.121	1.210	0.735	0.728	0.891
P_s	Stack Pressure, inches Hg	29.82	29.82	29.89	30.22	29.98
B_{ws}	Moisture, % by volume	1.8	1.6	1.9	3.0	2.2
$B_{ws(sat)}$	Moisture (at saturation), % by volume	7.5	10.9	7.7	11.7	10.1
V_{wstd}	Standard Water Vapor Volume, ft^3	0.631	0.522	0.626	1.031	0.726
$1-B_{ws}$	Dry Mole Fraction	0.982	0.984	0.981	0.970	0.978
M_d	Molecular Weight (d.b.), lb/lb•mole	28.87	28.87	28.87	28.87	28.87
M_s	Molecular Weight (w.b.), lb/lb•mole	28.67	28.69	28.66	28.54	28.63
V_s	Stack Gas Velocity, ft/s	108.3	106.5	101.8	103.0	103.7
A	Stack Area, ft^2	6.9	6.9	6.9	6.9	6.87
Q_a	Stack Gas Volumetric flow, acfm	44,664	43,909	41,980	42,466	42,785
Q_s	Stack Gas Volumetric flow, dscfm	40,828	39,305	38,367	37,787	38,486
Q_s	Stack Gas Volumetric flow, dscmm	1,156	1,113	1,086	1,070	1,090
I	Isokinetic Sampling Ratio, %	91.0	102.0	99.2	99.8	100.3

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
OTM 29 - Hydrogen Cyanide
Pushing Baghouse

	RUN NUMBER	***P-HCN-1***	***P-HCN-2***	***P-HCN-3***	***P-HCN-4***	
	RUN DATE	***8/23/2016***	***8/23/2016***	***8/24/2016***	***8/25/2016***	***Average***
	RUN TIME	***1021-1243***	***1352-1618***	***1027-1354***	***1028-1354***	
	EMISSIONS DATA					
	Hydrogen Cyanide (HCN)	ADL	ADL	ADL	ADL	**ADL**
	Analysis, *u* g/sample	180.0	160.0	110.0	150.0	**140.0**
	Molecular Weight, MW	27.0	27.0	27.0	27.0	**27.0**
	Concentration, lb/dscf	**1.16E-08**	**1.12E-08**	**7.44E-09**	**9.96E-09**	**0.0**
	Concentration, mg/dscm	**1.86E-01**	**1.80E-01**	**1.19E-01**	**1.60E-01**	**1.53E-01**
ppmdv	**Parts Per Million, Dry Basis**	**1.65E-01**	**1.59E-01**	**1.06E-01**	**1.42E-01**	**1.36E-01**
	Emission Rate, lb/hr	**2.83E-02**	**2.64E-02**	**1.71E-02**	**2.26E-02**	**2.20E-02**

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
OTM 29 - Hydrogen Cyanide
Combustion Stack

	RUN NUMBER	***C-HCN-1***	***C-HCN-2***	***C-HCN-3***	
	RUN DATE	***9/6/2016***	***9/8/2016***	***9/8/2016***	***Average***
	RUN TIME	***1450-1550***	***1008-1108***	***1155-1255***	
	MEASURED DATA				
P_{static}	Stack Static Pressure, inches H_2O	-0.75	-0.98	-0.93	-0.89
y	Meter Box Correction Factor	1.009	1.009	1.009	1.009
P_{bar}	Barometric Pressure, inches Hg	30.20	30.00	30.00	30.07
V_m	Sample Volume, ft^3	34.356	34.981	32.964	34.100
$Dp^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	0.1978	0.1894	0.1742	0.1871
DH	Avg Meter Orifice Pressure, in. H_2O	1.74	1.27	1.02	1.34
T_m	Average Meter Temperature, °F	94	80	86	87
T_s	Average Stack Temperature, °F	288	360	380	343
V_{lc}	Condensate Collected, ml	61.2	113.5	106.9	93.9
CO_2	Carbon Dioxide content, % by volume	3.0	3.8	3.8	3.5
O_2	Oxygen content, % by volume	15.0	13.7	13.7	14.1
N_2	Nitrogen content, % by volume	82.0	82.6	82.6	82.4
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
	Circular Stack? 1=Y,0=N:	1	1	1	
As	Diameter or Dimensions, inches:	168.00	168.00	168.00	168.00
Q	Sample Run Duration, minutes	47.50	60.00	60.00	55.83
D_n	Nozzle Diameter, inches	0.500	0.483	0.483	0.489
	CALCULATED DATA				
A_n	Nozzle Area, ft^2	0.001363	0.001272	0.001272	0.001303
$V_{m(std)}$	Standard Meter Volume, ft^3	33.506	34.698	32.318	33.507
$V_{m(std)}$	Standard Meter Volume, m^3	0.949	0.983	0.915	0.949
Q_m	Average Sampling Rate, dscfm	0.705	0.578	0.539	0.607
P_s	Stack Pressure, inches Hg	30.14	29.93	29.93	30.00
B_{ws}	Moisture, % by volume	7.9	13.3	13.5	11.6
$B_{ws(sat)}$	Moisture (at saturation), % by volume	100.0	100.0	100.0	100.0
V_{wstd}	Standard Water Vapor Volume, ft^3	2.881	5.342	5.032	4.418
$1-B_{ws}$	Dry Mole Fraction	0.921	0.867	0.865	0.884
M_d	Molecular Weight (d.b.), lb/lb•mole	29.08	29.15	29.15	29.13
M_s	Molecular Weight (w.b.), lb/lb•mole	28.20	27.66	27.65	27.84
V_s	Stack Gas Velocity, ft/s	13.3	13.5	12.6	13.2
A	Stack Area, ft^2	153.9	153.9	153.9	153.94
Q_a	Stack Gas Volumetric flow, acfm	123,062	125,023	116,407	121,497
Q_s	Stack Gas Volumetric flow, dscfm	80,559	69,752	63,312	71,208
Q_s	Stack Gas Volumetric flow, dscmm	2,281	1,975	1,793	2,016
I	Isokinetic Sampling Ratio, %	98.9	100.3	102.9	100.7

Summary of Stack Gas Parameters and Test Results
50074.0172
AK Steel - Middletown, OH
OTM 29 - Hydrogen Cyanide
Combustion Stack
Page 2 of 2

	RUN NUMBER	***C-HCN-1***	***C-HCN-2***	***C-HCN-3***	
	RUN DATE	***9/6/2016***	***9/8/2016***	***9/8/2016***	***Average***
	RUN TIME	***1450-1550***	***1008-1108***	***1155-1255***	
	EMISSIONS DATA				
	Hydrogen Cyanide (HCN)	ADL	ADL	ADL	**ADL**
	Analysis, *u* g/sample	390.0	390.0	530.0	**436.7**
	Molecular Weight, MW	27.0	27.0	27.0	**27.0**
	Concentration, lb/dscf	**2.56E-08**	**2.47E-08**	**3.61E-08**	**2.88E-08**
	Concentration, mg/dscm	**4.11E-01**	**3.97E-01**	**5.79E-01**	**4.62E-01**
ppmdv	**Parts Per Million, Dry Basis**	**3.65E-01**	**3.53E-01**	**5.14E-01**	**4.11E-01**
	Emission Rate, lb/hr	**1.24E-01**	**1.03E-01**	**1.37E-01**	**1.21E-01**

APPENDIX A-8

SEMI-VOLATILE ORGANIC HAP

Summary of Stack Gas Parameters and Test Results
AK Steel-Middletown, OH
CARB 428 - PCB/D/F
Pushing Baghouse

	RUN NUMBER	P-CARB-1	P-CARB-2	P-CARB-3	
	RUN DATE	9/12-13/16	9/13-14/16	9/14-15/16	Average
	RUN TIME	1026-1220	1339-1617	1635-2340	
	MEASURED DATA				
γ	Meter Box Correction Factor	0.989	0.989	0.989	0.989
ΔH	Avg Meter Orifice Pressure, in. H_2O	1.79	1.730	1.745	1.755
P_{bar}	Barometric Pressure, inches Hg	30.20	30.21	30.24	30.22
V_m	Sample Volume, ft^3	145.653	145.058	147.718	146.143
T_m	Average Meter Temperature, °F	70	76	72	73
P_{static}	Stack Static Pressure, inches H_2O	-2.00	-1.80	-1.90	-1.90
T_s	Average Stack Temperature, °F	106	108	103	106
V_{lc}	Condensate Collected, ml	49.3	65.5	70.7	61.8
CO_2	Carbon Dioxide content, % by volume	0.50	0.50	0.50	0.5
O_2	Oxygen content, % by volume	20.5	20.5	20.5	20.5
N_2	Nitrogen content, % by volume	79.0	79.0	79.0	79.0
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
$\Delta p^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	1.7691	1.7332	1.7342	1.7455
	Circular Stack? 1=Y,0=N:	1	1	1	1.00
As	Diameter or Dimensions, inches:	35.50	35.50	35.50	35.50
Θ	Sample Run Duration, minutes	192	195	198	195
D_n	Nozzle Diameter, inches	0.156	0.156	0.156	0.156
	CALCULATED DATA				
A_n	Nozzle Area, ft^2	0.00013	0.00013	0.00013	0.00013
$V_{m(std)}$	Standard Meter Volume, dscf	145.423	143.234	147.108	145.255
$V_{m(std)}$	Standard Meter Volume, dscm	4.118	4.056	4.166	4.113
P_s	Stack Pressure, inches Hg	30.05	30.08	30.10	30.08
B_{ws}	Moisture, % by volume	1.6	2.1	2.2	2.0
$B_{ws(sat)}$	Moisture (at saturation), % by volume	7.7	8.1	7.0	7.6
V_{wstd}	Standard Water Vapor Volume, ft^3	2.321	3.083	3.328	2.910
$1-B_{ws}$	Dry Mole Fraction	0.984	0.979	0.978	0.980
M_d	Molecular Weight (d.b.), lb/lb•mole	28.90	28.90	28.90	28.90
M_s	Molecular Weight (w.b.), lb/lb•mole	28.73	28.67	28.66	28.69
V_s	Stack Gas Velocity, ft/s	102.9	101.0	100.6	101.5
A	Stack Area, ft^2	6.87	6.87	6.87	6.87
Q_a	Stack Gas Volumetric flow, acfm	42,422	41,660	41,492	41,858
Q_s	Stack Gas Volumetric flow, dscfm	39,109	38,094	38,266	38,490
$Q_{s(cmm)}$	Stack Gas Volumetric flow, dscmm	1,107.5	1,078.7	1,083.6	1089.9
I	Isokinetic Sampling Ratio, %	100.3	99.9	100.6	100.3

Summary of Stack Gas Parameters and Test Results
AK Steel-Middletown, OH
CARB 428 - PCB/D/F
Pushing Baghouse

	RUN NUMBER	*P-CARB-1*	*P-CARB-2*	*P-CARB-3*	
	RUN DATE	*9/12-13/16*	*9/13-14/16*	*9/14-15/16*	*Average*
	RUN TIME	*1026-1220*	*1339-1617*	*1635-2340*	
	EMISSIONS DATA				
	DIOXINS:				
	2,3,7,8- TCDD	BDL	BDL	BDL	BDL
(pg)	Catch, pg	1.00	1.10	1.60	1.23
(ug/dscm)	Concentration, ug/dscm, as measured	2.43E-07	2.71E-07	3.84E-07	2.99E-07
(lb/hr)	Emission Rate, lb/hr	3.55E-11	3.86E-11	5.49E-11	4.30E-11
	1,2,3,7,8- PeCDD	BDL	BDL	BDL	BDL
(pg)	Catch, pg	0.62	0.85	0.77	0.75
(ug/dscm)	Concentration, ug/dscm, as measured	1.51E-07	2.10E-07	1.85E-07	1.82E-07
(lb/hr)	Emission Rate, lb/hr	2.20E-11	2.98E-11	2.64E-11	2.61E-11
	1,2,3,4,7,8 HxCDD	BDL	BDL	BDL	BDL
(pg)	Catch, pg	1.20	0.97	1.10	1.09
(ug/dscm)	Concentration, ug/dscm, as measured	2.91E-07	2.39E-07	2.64E-07	2.65E-07
(lb/hr)	Emission Rate, lb/hr	4.26E-11	3.41E-11	3.78E-11	3.81E-11
	1,2,3,6,7,8- HxCDD	BDL	BDL	BDL	BDL
(pg)	Catch, pg	1.10	0.87	0.98	0.98
(ug/dscm)	Concentration, ug/dscm, as measured	2.67E-07	2.14E-07	2.35E-07	2.39E-07
(lb/hr)	Emission Rate, lb/hr	3.90E-11	3.05E-11	3.36E-11	3.44E-11

Summary of Stack Gas Parameters and Test Results
AK Steel-Middletown, OH
CARB 428 - PCB/D/F
Pushing Baghouse

	RUN NUMBER	***P-CARB-1***	***P-CARB-2***	***P-CARB-3***	
	RUN DATE	***9/12-13/16***	***9/13-14/16***	***9/14-15/16***	***Average***
	RUN TIME	***1026-1220***	***1339-1617***	***1635-2340***	
	EMISSIONS DATA				
	DIOXINS:				
	1,2,3,7,8,9-HxCDD	BDL	BDL	BDL	BDL
(pg)	Catch, pg	1.20	0.96	1.10	1.09
(ug/dscm)	Concentration, ug/dscm, as measured	2.91E-07	2.37E-07	2.64E-07	2.64E-07
(lb/hr)	Emission Rate, lb/hr	4.26E-11	3.37E-11	3.78E-11	3.80E-11
	1,2,3,4,6,7,8-HpCDD	ADL	ADL	BDL	DLL
(pg)	Catch, pg	1.59	3.82	0.98	2.13
(ug/dscm)	Concentration, ug/dscm, as measured	3.86E-07	9.42E-07	2.35E-07	5.21E-07
(lb/hr)	Emission Rate, lb/hr	5.64E-11	1.34E-10	3.36E-11	7.47E-11
	OCDD	ADL	ADL	BDL	DLL
(pg)	Catch, pg	5.93	21.60	2.90	10.14
(ug/dscm)	Concentration, ug/dscm, as measured	1.44E-06	5.33E-06	6.96E-07	2.49E-06
(lb/hr)	Emission Rate, lb/hr	2.11E-10	7.58E-10	9.96E-11	3.56E-10
	TOTAL DIOXINS	DLL	DLL	BDL	DLL
(ug/dscm)	Concentration, ug/dscm, as measured	3.07E-06	7.44E-06	2.26E-06	4.26E-06
(lb/hr)	Emission Rate, lb/hr	4.49E-10	1.06E-09	3.24E-10	6.11E-10

Summary of Stack Gas Parameters and Test Results
AK Steel-Middletown, OH
CARB 428 - PCB/D/F
Pushing Baghouse

	RUN NUMBER	*P-CARB-1*	*P-CARB-2*	*P-CARB-3*	
	RUN DATE	*9/12-13/16*	*9/13-14/16*	*9/14-15/16*	*Average*
	RUN TIME	*1026-1220*	*1339-1617*	*1635-2340*	
	EMISSIONS DATA				
	FURANS:				
	2,3,7,8- TCDF	ADL	ADL	ADL	ADL
(pg)	Catch, pg	3.99	1.32	2.42	2.58
(ug/dscm)	Concentration, ug/dscm, as measured	9.69E-07	3.25E-07	5.81E-07	6.25E-07
(lb/hr)	Emission Rate, lb/hr	1.42E-10	4.63E-11	8.31E-11	9.04E-11
	1,2,3,7,8- PeCDF	ADL	BDL	BDL	DLL
(pg)	Catch, pg	1.96	2.20	0.62	1.59
(ug/dscm)	Concentration, ug/dscm, as measured	4.76E-07	5.42E-07	1.49E-07	3.89E-07
(lb/hr)	Emission Rate, lb/hr	6.96E-11	7.72E-11	2.13E-11	5.60E-11
	2,3,4,7,8- PeCDF	ADL	BDL	BDL	DLL
(pg)	Catch, pg	1.20	1.60	0.61	1.14
(ug/dscm)	Concentration, ug/dscm, as measured	2.91E-07	3.94E-07	1.46E-07	2.77E-07
(lb/hr)	Emission Rate, lb/hr	4.26E-11	5.62E-11	2.09E-11	3.99E-11
	1,2,3,4,7,8- HxCDF	BDL	ADL	BDL	DLL
(pg)	Catch, pg	0.53	0.89	0.75	0.72
(ug/dscm)	Concentration, ug/dscm, as measured	1.29E-07	2.19E-07	1.80E-07	1.76E-07
(lb/hr)	Emission Rate, lb/hr	1.88E-11	3.12E-11	2.58E-11	2.53E-11

Summary of Stack Gas Parameters and Test Results
AK Steel-Middletown, OH
CARB 428 - PCB/D/F
Pushing Baghouse

	RUN NUMBER	*P-CARB-1*	*P-CARB-2*	*P-CARB-3*	
	RUN DATE	*9/12-13/16*	*9/13-14/16*	*9/14-15/16*	*Average*
	RUN TIME	*1026-1220*	*1339-1617*	*1635-2340*	
	EMISSIONS DATA				
	FURANS:				
	1,2,3,6,7,8-HxCDF	BDL	ADL	BDL	DLL
(pg)	Catch, pg	0.47	0.96	0.67	0.70
(ug/dscm)	Concentration, ug/dscm, as measured	1.14E-07	2.37E-07	1.61E-07	1.71E-07
(lb/hr)	Emission Rate, lb/hr	1.67E-11	3.37E-11	2.30E-11	2.45E-11
	2,3,4,6,7,8- HxCDF	BDL	BDL	BDL	BDL
(pg)	Catch, pg	0.51	0.49	0.73	0.58
(ug/dscm)	Concentration, ug/dscm, as measured	1.24E-07	1.21E-07	1.75E-07	1.40E-07
(lb/hr)	Emission Rate, lb/hr	1.81E-11	1.72E-11	2.51E-11	2.01E-11
	1,2,3,7,8,9-HxCDF	BDL	BDL	BDL	BDL
(pg)	Catch, pg	2.20	1.50	0.88	1.53
(ug/dscm)	Concentration, ug/dscm, as measured	5.34E-07	3.70E-07	2.11E-07	3.72E-07
(lb/hr)	Emission Rate, lb/hr	7.81E-11	5.27E-11	3.02E-11	5.37E-11
	1,2,3,4,6,7,8,-HpCDF	BDL	BDL	BDL	BDL
(pg)	Catch, pg	0.96	1.60	1.00	1.19
(ug/dscm)	Concentration, ug/dscm, as measured	2.33E-07	3.94E-07	2.40E-07	2.89E-07
(lb/hr)	Emission Rate, lb/hr	3.41E-11	5.62E-11	3.43E-11	4.15E-11
	1,2,3,4,7,8,9-HpCDF	BDL	BDL	BDL	BDL
(pg)	Catch, pg	0.51	0.65	1.40	0.85
(ug/dscm)	Concentration, ug/dscm, as measured	1.24E-07	1.60E-07	3.36E-07	2.07E-07
(lb/hr)	Emission Rate, lb/hr	1.81E-11	2.28E-11	4.81E-11	2.97E-11

Summary of Stack Gas Parameters and Test Results
AK Steel-Middletown, OH
CARB 428 - PCB/D/F
Pushing Baghouse

	RUN NUMBER	***P-CARB-1***	***P-CARB-2***	***P-CARB-3***	
	RUN DATE	***9/12-13/16***	***9/13-14/16***	***9/14-15/16***	***Average***
	RUN TIME	***1026-1220***	***1339-1617***	***1635-2340***	
	EMISSIONS DATA				
	FURANS:				
	OCDF	ADL	BDL	BDL	DLL
(pg)	Catch, pg	0.98	0.90	0.52	0.80
(ug/dscm)	Concentration, ug/dscm, as measured	2.38E-07	2.22E-07	1.25E-07	1.95E-07
(lb/hr)	Emission Rate, lb/hr	3.48E-11	3.16E-11	1.79E-11	2.81E-11
	TOTAL FURANS	DLL	DLL	DLL	DLL
(ug/dscm)	Concentration, ug/dscm, as measured	3.23E-06	2.99E-06	2.30E-06	2.84E-06
(lb/hr)	Emission Rate, lb/hr	4.72E-10	4.25E-10	3.30E-10	4.09E-10

Summary of Stack Gas Parameters and Test Results
AK Steel - Middletown, OH
CARB Methods 429
Pushing Baghouse

	RUN NUMBER	***P-CARB-1***	***P-CARB-2***	***P-CARB-3***	
	RUN DATE	***9/12-13/16***	***9/13-14/16***	***9/14-15/16***	***Average***
	RUN TIME	***1026-1220***	***1339-1617***	***1635-2340***	
	MEASURED DATA				
γ	Meter Box Correction Factor	0.989	0.989	0.989	0.989
ΔH	Avg Meter Orifice Pressure, in. H_2O	1.79	1.73	1.75	1.755
P_{bar}	Barometric Pressure, inches Hg	30.20	30.21	30.24	30.22
V_m	Sample Volume, ft^3	145.653	145.058	147.718	146.143
T_m	Average Meter Temperature, °F	70	76	72	73
P_{static}	Stack Static Pressure, inches H_2O	-2.00	-1.80	-1.90	-1.90
T_s	Average Stack Temperature, °F	106	108	103	106
V_{lc}	Condensate Collected, ml	49.3	65.5	70.7	61.8
CO_2	Carbon Dioxide content, % by volume	0.50	0.50	0.50	0.5
O_2	Oxygen content, % by volume	20.5	20.5	20.5	20.5
N_2	Nitrogen content, % by volume	79.0	79.0	79.0	79.0
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
$\Delta p^{1/2}$	Average Square Root Dp, $(in.\ H_2O)^{1/2}$	1.7691	1.7332	1.7342	1.7455
	Circular Stack? 1=Y,0=N:	1	1	1	1.00
As	Diameter or Dimensions, inches	35.50	35.50	35.50	35.50
Θ	Sample Run Duration, minutes	192	195	198	195
D_n	Nozzle Diameter, inches	0.156	0.156	0.156	0.156
	CALCULATED DATA				
A_n	Nozzle Area, ft^2	0.00013	0.00013	0.00013	0.00013
$V_{m(std)}$	Standard Meter Volume, dscf	145.423	143.234	147.108	145.255
$V_{m(std)}$	Standard Meter Volume, dscm	4.118	4.056	4.166	4.113
P_s	Stack Pressure, inches Hg	30.05	30.08	30.10	30.08
B_{ws}	Moisture, % by volume	1.6	2.1	2.2	2.0
$B_{ws(sat)}$	Moisture (at saturation), % by volume	7.7	8.1	7.0	7.6
V_{wstd}	Standard Water Vapor Volume, ft^3	2.321	3.083	3.328	2.910
$1-B_{ws}$	Dry Mole Fraction	0.984	0.979	0.978	0.980
M_d	Molecular Weight (d.b.), lb/lb•mole	28.90	28.90	28.90	28.90
M_s	Molecular Weight (w.b.), lb/lb•mole	28.73	28.67	28.66	28.69
V_s	Stack Gas Velocity, ft/s	102.9	101.0	100.6	101.5
A	Stack Area, ft^2	6.87	6.87	6.87	6.87
Q_a	Stack Gas Volumetric flow, acfm	42,422	41,660	41,492	41,858
Q_s	Stack Gas Volumetric flow, dscfm	39,109	38,094	38,266	38,490
$Q_{s(cmm)}$	Stack Gas Volumetric flow, dscmm	1,107.5	1,078.7	1,083.6	1089.9
I	Isokinetic Sampling Ratio, %	100.1	99.8	100.6	100.2

Summary of Stack Gas Parameters and Test Results
AK Steel - Middletown, OH
CARB Methods 429
Pushing Baghouse

	RUN NUMBER	P-CARB-1	P-CARB-2	P-CARB-3	
	RUN DATE	9/12-13/16	9/13-14/16	9/14-15/16	Average
	RUN TIME	1026-1220	1339-1617	1635-2340	
	EMISSIONS DATA				
	PAH:				
	Naphthalene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	33000.0	46500.0	13000.0	30833.33
(ug/dscm)	Concentration, ug/dscm, as measured	8.01E+00	1.15E+01	3.12E+00	7.53E+00
(lb/hr)	Emission Rate, lb/hr	1.17E-03	1.63E-03	4.46E-04	1.08E-03
	Acenaphthylene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	663.0	1520.0	699.0	960.67
(ug/dscm)	Concentration, ug/dscm, as measured	1.61E-01	3.75E-01	1.68E-01	2.35E-01
(lb/hr)	Emission Rate, lb/hr	2.35E-05	5.34E-05	2.40E-05	3.36E-05
	Acenaphthene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	112.0	280.0	101.0	164.33
(ug/dscm)	Concentration, ug/dscm, as measured	2.72E-02	6.90E-02	2.42E-02	4.02E-02
(lb/hr)	Emission Rate, lb/hr	3.98E-06	9.83E-06	3.47E-06	5.76E-06
	Fluorene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	761.0	1970.0	798.0	1176.33
(ug/dscm)	Concentration, ug/dscm, as measured	1.85E-01	4.86E-01	1.92E-01	2.87E-01
(lb/hr)	Emission Rate, lb/hr	2.70E-05	6.92E-05	2.74E-05	4.12E-05
	Phenanthrene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	2390.0	5580.0	2040.0	3336.67
(ug/dscm)	Concentration, ug/dscm, as measured	5.80E-01	1.38E+00	4.90E-01	8.15E-01
(lb/hr)	Emission Rate, lb/hr	8.48E-05	1.96E-04	7.00E-05	1.17E-04
	Anthracene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	322.0	851.0	384.0	519.00
(ug/dscm)	Concentration, ug/dscm, as measured	7.82E-02	2.10E-01	9.22E-02	1.27E-01
(lb/hr)	Emission Rate, lb/hr	1.14E-05	2.99E-05	1.32E-05	1.82E-05

( ) Not Detected. Value shown is the detection limit for that sample.
{ } Estimated Maximum Possible Concentration.

Summary of Stack Gas Parameters and Test Results
AK Steel - Middletown, OH
CARB Methods 429
Pushing Baghouse

	RUN NUMBER	*P-CARB-1*	*P-CARB-2*	*P-CARB-3*	
	RUN DATE	*9/12-13/16*	*9/13-14/16*	*9/14-15/16*	*Average*
	RUN TIME	*1026-1220*	*1339-1617*	*1635-2340*	
	EMISSIONS DATA				
	PAH's:				
	Fluoranthene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	718.0	1700.0	618.0	1012.00
(ug/dscm)	Concentration, ug/dscm, as measured	1.74E-01	4.19E-01	1.48E-01	2.47E-01
(lb/hr)	Emission Rate, lb/hr	2.55E-05	5.97E-05	2.12E-05	3.55E-05
	Pyrene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	302.0	850.0	272.0	474.67
(ug/dscm)	Concentration, ug/dscm, as measured	7.33E-02	2.10E-01	6.53E-02	1.16E-01
(lb/hr)	Emission Rate, lb/hr	1.07E-05	2.98E-05	9.34E-06	1.66E-05
	Benzo (a) Anthracene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	87.0	203.0	58.0	116.00
(ug/dscm)	Concentration, ug/dscm, as measured	2.11E-02	5.00E-02	1.39E-02	2.84E-02
(lb/hr)	Emission Rate, lb/hr	3.09E-06	7.13E-06	1.99E-06	4.07E-06
	Chrysene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	200.0	447.0	127.0	258.00
(ug/dscm)	Concentration, ug/dscm, as measured	4.86E-02	1.10E-01	3.05E-02	6.31E-02
(lb/hr)	Emission Rate, lb/hr	7.10E-06	1.57E-05	4.36E-06	9.05E-06
	Benzo (b) Fluoranthene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	122.0	247.0	74.6	147.87
(ug/dscm)	Concentration, ug/dscm, as measured	2.96E-02	6.09E-02	1.79E-02	3.61E-02
(lb/hr)	Emission Rate, lb/hr	4.33E-06	8.67E-06	2.56E-06	5.19E-06

( ) Not Detected. Value shown is the detection limit for that sample.
{ } Estimated Maximum Possible Concentration.

Summary of Stack Gas Parameters and Test Results
AK Steel - Middletown, OH
CARB Methods 429
Pushing Baghouse

	RUN NUMBER	*P-CARB-1*	*P-CARB-2*	*P-CARB-3*	
	RUN DATE	*9/12-13/16*	*9/13-14/16*	*9/14-15/16*	*Average*
	RUN TIME	*1026-1220*	*1339-1617*	*1635-2340*	
	EMISSIONS DATA				
	PAH's:				
	Benzo (k) Fluoranthene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	102.0	211.0	58.0	123.67
(ug/dscm)	Concentration, ug/dscm, as measured	2.48E-02	5.20E-02	1.39E-02	3.02E-02
(lb/hr)	Emission Rate, lb/hr	3.62E-06	7.41E-06	1.99E-06	4.34E-06
	Benzo (a) Pyrene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	30.6	77.0	16.3	41.30
(ug/dscm)	Concentration, ug/dscm, as measured	7.43E-03	1.90E-02	3.91E-03	1.01E-02
(lb/hr)	Emission Rate, lb/hr	1.09E-06	2.70E-06	5.60E-07	1.45E-06
	Perylene	ADL	ADL	BDL	ADL
(ng)	Catch, ng	9.0	18.5	6.0	11.18
(ug/dscm)	Concentration, ug/dscm, as measured	2.19E-03	4.56E-03	1.44E-03	2.73E-03
(lb/hr)	Emission Rate, lb/hr	3.21E-07	6.49E-07	2.06E-07	3.92E-07
	Indeno (1, 2, 3 - cd) Pyrene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	74.7	164.0	23.6	87.43
(ug/dscm)	Concentration, ug/dscm, as measured	1.81E-02	4.04E-02	5.67E-03	2.14E-02
(lb/hr)	Emission Rate, lb/hr	2.65E-06	5.76E-06	8.10E-07	3.07E-06

( ) Not Detected. Value shown is the detection limit for that sample.
{ } Estimated Maximum Possible Concentration.

Summary of Stack Gas Parameters and Test Results
AK Steel - Middletown, OH
CARB Methods 429
Pushing Baghouse

	RUN NUMBER	*P-CARB-1*	*P-CARB-2*	*P-CARB-3*	
	RUN DATE	*9/12-13/16*	*9/13-14/16*	*9/14-15/16*	*Average*
	RUN TIME	*1026-1220*	*1339-1617*	*1635-2340*	
	EMISSIONS DATA				
	PAH's:				
	Dibenzo (a, h) Anthracene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	25.1	24.9	24.5	24.83
(ug/dscm)	Concentration, ug/dscm, as measured	6.10E-03	6.14E-03	5.88E-03	6.04E-03
(lb/hr)	Emission Rate, lb/hr	8.91E-07	8.74E-07	8.41E-07	8.69E-07
	Benzo (ghi) Perylene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	48.6	95.1	21.7	55.13
(ug/dscm)	Concentration, ug/dscm, as measured	1.18E-02	2.34E-02	5.21E-03	1.35E-02
(lb/hr)	Emission Rate, lb/hr	1.73E-06	3.34E-06	7.45E-07	1.94E-06
	Total PAH	ADL	ADL	ADL	ADL
(ng)	Catch, ng	38967.0	60738.5	18321.7	39342.41
(ug/dscm)	Concentration, ug/dscm, as measured	9.46E+00	1.50E+01	4.40E+00	9.61E+00
(lb/hr)	Emission Rate, lb/hr	1.38E-03	2.13E-03	6.29E-04	1.38E-03
	Total PAH lbs/hr	3.05E-12	4.70E-12	1.39E-12	3.04E-12

{ } Estimated Maximum Possible Concentration.

Summary of Stack Gas Parameters and Test Results
AK Steel-Middletown, OH
CARB 428 - PCB/D/F
Combustion Stack

	RUN NUMBER	C-CARB-1	C-CARB-2	C-CARB-3	
	RUN DATE	9/12/2016	9/13/2016	9/14/2016	Average
	RUN TIME	1005-1405	0955-1355	0955-1355	
	MEASURED DATA				
γ	Meter Box Correction Factor	1.005	1.005	1.005	1.005
ΔH	Avg Meter Orifice Pressure, in. H_2O	1.39	1.396	1.400	1.396
P_{bar}	Barometric Pressure, inches Hg	30.20	30.15	30.21	30.19
V_m	Sample Volume, ft^3	161.468	161.966	162.621	162.018
T_m	Average Meter Temperature, °F	80	81	81	81
P_{static}	Stack Static Pressure, inches H_2O	-0.94	-0.90	-0.90	-0.91
T_s	Average Stack Temperature, °F	360	362	357	360
V_{lc}	Condensate Collected, ml	332.5	361.0	416.9	370.1
CO_2	Carbon Dioxide content, % by volume	3.00	3.00	3.00	3.0
O_2	Oxygen content, % by volume	15.0	15.0	15.0	15.0
N_2	Nitrogen content, % by volume	82.0	82.0	82.0	82.0
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
$\Delta p^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	0.1994	0.2000	0.2000	0.1998
	Circular Stack? 1=Y,0=N:	1	1	1	1.00
As	Diameter or Dimensions, inches:	168.00	168.00	168.00	168.00
Θ	Sample Run Duration, minutes	240	240	240	240
D_n	Nozzle Diameter, inches	0.500	0.500	0.500	0.500
	CALCULATED DATA				
A_n	Nozzle Area, ft^2	0.00136	0.00136	0.00136	0.00136
$V_{m(std)}$	Standard Meter Volume, dscf	160.632	160.566	161.537	160.912
$V_{m(std)}$	Standard Meter Volume, dscm	4.549	4.547	4.574	4.557
P_s	Stack Pressure, inches Hg	30.13	30.08	30.14	30.12
B_{ws}	Moisture, % by volume	8.9	9.6	10.8	9.8
$B_{ws(sat)}$	Moisture (at saturation), % by volume	100.0	100.0	100.0	100.0
V_{wstd}	Standard Water Vapor Volume, ft^3	15.651	16.992	19.623	17.422
$1-B_{ws}$	Dry Mole Fraction	0.911	0.904	0.892	0.902
M_d	Molecular Weight (d.b.), lb/lb•mole	29.08	29.08	29.08	29.08
M_s	Molecular Weight (w.b.), lb/lb•mole	28.10	28.02	27.88	28.00
V_s	Stack Gas Velocity, ft/s	14.1	14.2	14.2	14.1
A	Stack Area, ft^2	153.94	153.94	153.94	153.94
Q_a	Stack Gas Volumetric flow, acfm	130,165	130,997	130,794	130,652
Q_s	Stack Gas Volumetric flow, dscfm	76,880	76,477	75,905	76,421
$Q_{s(cmm)}$	Stack Gas Volumetric flow, dscmm	2,177.0	2,165.6	2,149.4	2164.0
I	Isokinetic Sampling Ratio, %	98.3	98.8	100.1	99.1

Summary of Stack Gas Parameters and Test Results
AK Steel-Middletown, OH
CARB 428 - PCB/D/F
Combustion Stack

	RUN NUMBER	*C-CARB-1*	*C-CARB-2*	*C-CARB-3*	
	RUN DATE	*9/12/2016*	*9/13/2016*	*9/14/2016*	*Average*
	RUN TIME	*1005-1405*	*0955-1355*	*0955-1355*	
	EMISSIONS DATA				
	DIOXINS:				
	2,3,7,8- TCDD	BDL	BDL	BDL	BDL
(pg)	Catch, pg	0.85	0.95	1.50	1.10
(ug/dscm)	Concentration, ug/dscm, as measured	1.87E-07	2.09E-07	3.28E-07	2.41E-07
(lb/hr)	Emission Rate, lb/hr	5.37E-11	5.97E-11	9.30E-11	6.88E-11
	1,2,3,7,8- PeCDD	ADL	ADL	ADL	ADL
(pg)	Catch, pg	4.70	6.57	5.72	5.66
(ug/dscm)	Concentration, ug/dscm, as measured	1.03E-06	1.44E-06	1.25E-06	1.24E-06
(lb/hr)	Emission Rate, lb/hr	2.97E-10	4.13E-10	3.55E-10	3.55E-10
	1,2,3,4,7,8 HxCDD	ADL	BDL	BDL	DLL
(pg)	Catch, pg	1.84	4.80	2.60	3.08
(ug/dscm)	Concentration, ug/dscm, as measured	4.05E-07	1.06E-06	5.68E-07	6.76E-07
(lb/hr)	Emission Rate, lb/hr	1.16E-10	3.02E-10	1.61E-10	1.93E-10
	1,2,3,6,7,8- HxCDD	BDL	BDL	ADL	DLL
(pg)	Catch, pg	7.60	4.30	10.80	7.57
(ug/dscm)	Concentration, ug/dscm, as measured	1.67E-06	9.46E-07	2.36E-06	1.66E-06
(lb/hr)	Emission Rate, lb/hr	4.80E-10	2.70E-10	6.70E-10	4.73E-10

Summary of Stack Gas Parameters and Test Results
AK Steel-Middletown, OH
CARB 428 - PCB/D/F
Combustion Stack

	RUN NUMBER	*C-CARB-1*	*C-CARB-2*	*C-CARB-3*	
	RUN DATE	*9/12/2016*	*9/13/2016*	*9/14/2016*	*Average*
	RUN TIME	*1005-1405*	*0955-1355*	*0955-1355*	
	EMISSIONS DATA				
	DIOXINS:				
	1,2,3,7,8,9-HxCDD	BDL	BDL	BDL	BDL
(pg)	Catch, pg	3.50	4.80	5.70	4.67
(ug/dscm)	Concentration, ug/dscm, as measured	7.69E-07	1.06E-06	1.25E-06	1.02E-06
(lb/hr)	Emission Rate, lb/hr	2.21E-10	3.02E-10	3.54E-10	2.92E-10
	1,2,3,4,6,7,8-HpCDD	ADL	ADL	ADL	ADL
(pg)	Catch, pg	22.2	21.9	27.80	23.97
(ug/dscm)	Concentration, ug/dscm, as measured	4.88E-06	4.82E-06	6.08E-06	5.26E-06
(lb/hr)	Emission Rate, lb/hr	1.40E-09	1.38E-09	1.72E-09	1.50E-09
	OCDD	ADL	ADL	ADL	ADL
(pg)	Catch, pg	21.00	22.8	27.40	23.73
(ug/dscm)	Concentration, ug/dscm, as measured	4.62E-06	5.01E-06	5.99E-06	5.21E-06
(lb/hr)	Emission Rate, lb/hr	1.33E-09	1.43E-09	1.70E-09	1.49E-09
	TOTAL DIOXINS	DLL	DLL	DLL	DLL
(ug/dscm)	Concentration, ug/dscm, as measured	1.36E-05	1.45E-05	1.78E-05	1.53E-05
(lb/hr)	Emission Rate, lb/hr	3.90E-09	4.16E-09	5.06E-09	4.37E-09

Summary of Stack Gas Parameters and Test Results
AK Steel-Middletown, OH
CARB 428 - PCB/D/F
Combustion Stack

	RUN NUMBER	*C-CARB-1*	*C-CARB-2*	*C-CARB-3*	
	RUN DATE	*9/12/2016*	*9/13/2016*	*9/14/2016*	*Average*
	RUN TIME	*1005-1405*	*0955-1355*	*0955-1355*	
	EMISSIONS DATA				
	FURANS:				
	2,3,7,8- TCDF	ADL	ADL	ADL	ADL
(pg)	Catch, pg	10.7	6.01	10.2	8.97
(ug/dscm)	Concentration, ug/dscm, as measured	2.35E-06	1.32E-06	2.23E-06	1.97E-06
(lb/hr)	Emission Rate, lb/hr	6.76E-10	3.78E-10	6.33E-10	5.62E-10
	1,2,3,7,8- PeCDF	ADL	ADL	ADL	ADL
(pg)	Catch, pg	9.71	7.09	8.69	8.50
(ug/dscm)	Concentration, ug/dscm, as measured	2.13E-06	1.56E-06	1.90E-06	1.86E-06
(lb/hr)	Emission Rate, lb/hr	6.13E-10	4.46E-10	5.39E-10	5.33E-10
	2,3,4,7,8- PeCDF	ADL	ADL	ADL	ADL
(pg)	Catch, pg	10.10	7.97	5.40	7.82
(ug/dscm)	Concentration, ug/dscm, as measured	2.22E-06	1.75E-06	1.18E-06	1.72E-06
(lb/hr)	Emission Rate, lb/hr	6.38E-10	5.01E-10	3.35E-10	4.91E-10
	1,2,3,4,7,8- HxCDF	ADL	ADL	ADL	ADL
(pg)	Catch, pg	12.90	16.10	15.40	14.80
(ug/dscm)	Concentration, ug/dscm, as measured	2.84E-06	3.54E-06	3.37E-06	3.25E-06
(lb/hr)	Emission Rate, lb/hr	8.15E-10	1.01E-09	9.55E-10	9.27E-10

Summary of Stack Gas Parameters and Test Results
AK Steel-Middletown, OH
CARB 428 - PCB/D/F
Combustion Stack

	RUN NUMBER	*C-CARB-1*	*C-CARB-2*	*C-CARB-3*	
	RUN DATE	*9/12/2016*	*9/13/2016*	*9/14/2016*	*Average*
	RUN TIME	*1005-1405*	*0955-1355*	*0955-1355*	
	EMISSIONS DATA				
	FURANS:				
	1,2,3,6,7,8-HxCDF	ADL	BDL	BDL	DLL
(pg)	Catch, pg	5.42	3.40	4.20	4.34
(ug/dscm)	Concentration, ug/dscm, as measured	1.19E-06	7.48E-07	9.18E-07	9.53E-07
(lb/hr)	Emission Rate, lb/hr	3.42E-10	2.14E-10	2.61E-10	2.72E-10
	2,3,4,6,7,8- HxCDF	ADL	BDL	BDL	DLL
(pg)	Catch, pg	2.32	2.60	3.00	2.64
(ug/dscm)	Concentration, ug/dscm, as measured	5.10E-07	5.72E-07	6.56E-07	5.79E-07
(lb/hr)	Emission Rate, lb/hr	1.47E-10	1.63E-10	1.86E-10	1.65E-10
	1,2,3,7,8,9-HxCDF	ADL	BDL	BDL	DLL
(pg)	Catch, pg	2.12	3.20	2.40	2.57
(ug/dscm)	Concentration, ug/dscm, as measured	4.66E-07	7.04E-07	5.25E-07	5.65E-07
(lb/hr)	Emission Rate, lb/hr	1.34E-10	2.01E-10	1.49E-10	1.61E-10
	1,2,3,4,6,7,8,-HpCDF	ADL	ADL	ADL	ADL
(pg)	Catch, pg	13.80	12.80	14.80	13.80
(ug/dscm)	Concentration, ug/dscm, as measured	3.03E-06	2.82E-06	3.24E-06	3.03E-06
(lb/hr)	Emission Rate, lb/hr	8.72E-10	8.05E-10	9.18E-10	8.65E-10
	1,2,3,4,7,8,9-HpCDF	ADL	BDL	ADL	DLL
(pg)	Catch, pg	1.97	2.10	2.52	2.20
(ug/dscm)	Concentration, ug/dscm, as measured	4.33E-07	4.62E-07	5.51E-07	4.82E-07
(lb/hr)	Emission Rate, lb/hr	1.24E-10	1.32E-10	1.56E-10	1.38E-10

Summary of Stack Gas Parameters and Test Results
AK Steel-Middletown, OH
CARB 428 - PCB/D/F
Combustion Stack

	RUN NUMBER	***C-CARB-1***	***C-CARB-2***	***C-CARB-3***	
	RUN DATE	***9/12/2016***	***9/13/2016***	***9/14/2016***	***Average***
	RUN TIME	***1005-1405***	***0955-1355***	***0955-1355***	
	EMISSIONS DATA				
	FURANS:				
	OCDF	ADL	ADL	ADL	ADL
(pg)	Catch, pg	10.70	10.00	14.50	11.73
(ug/dscm)	Concentration, ug/dscm, as measured	2.35E-06	2.20E-06	3.17E-06	2.57E-06
(lb/hr)	Emission Rate, lb/hr	6.76E-10	6.29E-10	8.99E-10	7.35E-10
	TOTAL FURANS	ADL	DLL	DLL	DLL
(ug/dscm)	Concentration, ug/dscm, as measured	1.75E-05	1.57E-05	1.77E-05	1.70E-05
(lb/hr)	Emission Rate, lb/hr	5.04E-09	4.48E-09	5.03E-09	4.85E-09

Summary of Stack Gas Parameters and Test Results
AK Steel-Middletown, OH
CARB 429 - PAH
Combustion Stack

	RUN NUMBER	C-CARB-1	C-CARB-2	C-CARB-3	
	RUN DATE	9/12/2016	9/13/2016	9/14/2016	Average
	RUN TIME	1005-1405	0955-1355	0955-1355	
	MEASURED DATA				
γ	Meter Box Correction Factor	1.005	1.005	1.005	1.005
ΔH	Avg Meter Orifice Pressure, in. H_2O	1.39	1.396	1.400	1.396
P_{bar}	Barometric Pressure, inches Hg	30.20	30.15	30.21	30.19
V_m	Sample Volume, ft^3	161.468	161.966	162.621	162.018
T_m	Average Meter Temperature, °F	80	81	81	81
P_{static}	Stack Static Pressure, inches H_2O	-0.94	-0.90	-0.90	-0.91
T_s	Average Stack Temperature, °F	360	362	357	360
V_{lc}	Condensate Collected, ml	332.5	361.0	416.9	370.1
CO_2	Carbon Dioxide content, % by volume	3.00	3.00	3.00	3.0
O_2	Oxygen content, % by volume	15.0	15.0	15.0	15.0
N_2	Nitrogen content, % by volume	82.0	82.0	82.0	82.0
C_p	Pitot Tube Coefficient	0.84	0.84	0.84	0.84
$\Delta p^{1/2}$	Average Square Root Dp, (in. $H_2O)^{1/2}$	0.1994	0.2000	0.2000	0.1998
	Circular Stack? 1=Y,0=N:	1	1	1	1.00
As	Diameter or Dimensions, inches	168.00	168.00	168.00	168.00
Θ	Sample Run Duration, minutes	240	240	240	240
D_n	Nozzle Diameter, inches	0.500	0.500	0.500	0.500
	CALCULATED DATA				
A_n	Nozzle Area, ft^2	0.00136	0.00136	0.00136	0.00136
$V_{m(std)}$	Standard Meter Volume, dscf	160.632	160.566	161.537	160.912
$V_{m(std)}$	Standard Meter Volume, dscm	4.549	4.547	4.574	4.557
P_s	Stack Pressure, inches Hg	30.13	30.08	30.14	30.12
B_{ws}	Moisture, % by volume	8.9	9.6	10.8	9.8
$B_{ws(sat)}$	Moisture (at saturation), % by volume	100.0	100.0	100.0	100.0
V_{wstd}	Standard Water Vapor Volume, ft^3	15.651	16.992	19.623	17.422
$1-B_{ws}$	Dry Mole Fraction	0.911	0.904	0.892	0.902
M_d	Molecular Weight (d.b.), lb/lb•mole	29.08	29.08	29.08	29.08
M_s	Molecular Weight (w.b.), lb/lb•mole	28.10	28.02	27.88	28.00
V_s	Stack Gas Velocity, ft/s	14.1	14.2	14.2	14.1
A	Stack Area, ft^2	153.94	153.94	153.94	153.94
Q_a	Stack Gas Volumetric flow, acfm	130,165	130,997	130,794	130,652
Q_s	Stack Gas Volumetric flow, dscfm	76,880	76,477	75,905	76,421
$Q_{s(cmm)}$	Stack Gas Volumetric flow, dscmm	2,177.0	2,165.6	2,149.4	2164.0
I	Isokinetic Sampling Ratio, %	98.3	98.8	100.1	99.1

Summary of Stack Gas Parameters and Test Results
AK Steel-Middletown, OH
CARB 429 - PAH
Combustion Stack

	RUN NUMBER	C-CARB-1	C-CARB-2	C-CARB-3	
	RUN DATE	9/12/2016	9/13/2016	9/14/2016	Average
	RUN TIME	1005-1405	0955-1355	0955-1355	
	EMISSIONS DATA				
	PAH:				
	Naphthalene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	731000.0	445000.0	1100000.0	758666.67
(ug/dscm)	Concentration, ug/dscm, as measured	1.61E+02	9.79E+01	2.40E+02	1.66E+02
(lb/hr)	Emission Rate, lb/hr	4.62E-02	2.80E-02	6.82E-02	4.75E-02
	Acenaphthylene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	69400.0	4760.0	105000.0	59720.00
(ug/dscm)	Concentration, ug/dscm, as measured	1.53E+01	1.05E+00	2.30E+01	1.31E+01
(lb/hr)	Emission Rate, lb/hr	4.38E-03	2.99E-04	6.51E-03	3.73E-03
	Acenaphthene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	997.0	485.0	1330.0	937.33
(ug/dscm)	Concentration, ug/dscm, as measured	2.19E-01	1.07E-01	2.91E-01	2.06E-01
(lb/hr)	Emission Rate, lb/hr	6.30E-05	3.05E-05	8.25E-05	5.87E-05
	Fluorene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	14400.0	4220.0	23400.0	14006.67
(ug/dscm)	Concentration, ug/dscm, as measured	3.17E+00	9.28E-01	5.12E+00	3.07E+00
(lb/hr)	Emission Rate, lb/hr	9.10E-04	2.65E-04	1.45E-03	8.75E-04
	Phenanthrene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	119000.0	16100.0	200000.0	111700.00
(ug/dscm)	Concentration, ug/dscm, as measured	2.62E+01	3.54E+00	4.37E+01	2.45E+01
(lb/hr)	Emission Rate, lb/hr	7.52E-03	1.01E-03	1.24E-02	6.98E-03
	Anthracene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	6660.0	932.0	14900.0	7497.33
(ug/dscm)	Concentration, ug/dscm, as measured	1.46E+00	2.05E-01	3.26E+00	1.64E+00
(lb/hr)	Emission Rate, lb/hr	4.21E-04	5.86E-05	9.24E-04	4.68E-04

( ) Not Detected. Value shown is the detection limit for that sample.
{ } Estimated Maximum Possible Concentration.

Summary of Stack Gas Parameters and Test Results
AK Steel-Middletown, OH
CARB 429 - PAH
Combustion Stack

	RUN NUMBER	C-CARB-1	C-CARB-2	C-CARB-3	
	RUN DATE	9/12/2016	9/13/2016	9/14/2016	Average
	RUN TIME	1005-1405	0955-1355	0955-1355	
	EMISSIONS DATA				
	PAH's:				
	Fluoranthene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	69200.0	5470.0	104000.0	59556.67
(ug/dscm)	Concentration, ug/dscm, as measured	1.52E+01	1.20E+00	2.27E+01	1.31E+01
(lb/hr)	Emission Rate, lb/hr	4.37E-03	3.44E-04	6.45E-03	3.72E-03
	Pyrene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	33600.0	1430.0	110000.0	48343.33
(ug/dscm)	Concentration, ug/dscm, as measured	7.39E+00	3.15E-01	2.40E+01	1.06E+01
(lb/hr)	Emission Rate, lb/hr	2.12E-03	8.99E-05	6.82E-03	3.01E-03
	Benzo (a) Anthracene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	2940.0	288.0	6640.0	3289.33
(ug/dscm)	Concentration, ug/dscm, as measured	6.46E-01	6.33E-02	1.45E+00	7.20E-01
(lb/hr)	Emission Rate, lb/hr	1.86E-04	1.81E-05	4.12E-04	2.05E-04
	Chrysene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	13100.0	1240.0	18800.0	11046.67
(ug/dscm)	Concentration, ug/dscm, as measured	2.88E+00	2.73E-01	4.11E+00	2.42E+00
(lb/hr)	Emission Rate, lb/hr	8.28E-04	7.80E-05	1.17E-03	6.91E-04
	Benzo (b) Fluoranthene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	8730.0	754.0	17200.0	8894.67
(ug/dscm)	Concentration, ug/dscm, as measured	1.92E+00	1.66E-01	3.76E+00	1.95E+00
(lb/hr)	Emission Rate, lb/hr	5.52E-04	4.74E-05	1.07E-03	5.55E-04

( ) Not Detected. Value shown is the detection limit for that sample.
{ } Estimated Maximum Possible Concentration.

Summary of Stack Gas Parameters and Test Results
AK Steel-Middletown, OH
CARB 429 - PAH
Combustion Stack

	RUN NUMBER	*C-CARB-1*	*C-CARB-2*	*C-CARB-3*	
	RUN DATE	*9/12/2016*	*9/13/2016*	*9/14/2016*	*Average*
	RUN TIME	*1005-1405*	*0955-1355*	*0955-1355*	
	EMISSIONS DATA				
	PAH's:				
	Benzo (k) Fluoranthene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	3380.0	192.0	7270.0	3614.00
(ug/dscm)	Concentration, ug/dscm, as measured	7.43E-01	4.22E-02	1.59E+00	7.92E-01
(lb/hr)	Emission Rate, lb/hr	2.14E-04	1.21E-05	4.51E-04	2.26E-04
	Benzo (a) Pyrene	ADL	BDL	ADL	ADL
(ng)	Catch, ng	75.1	8.1	339.0	140.73
(ug/dscm)	Concentration, ug/dscm, as measured	1.65E-02	1.78E-03	7.41E-02	3.08E-02
(lb/hr)	Emission Rate, lb/hr	4.74E-06	5.09E-07	2.10E-05	8.76E-06
	Perylene	BDL	BDL	ADL	ADL
(ng)	Catch, ng	6.0	6.0	35.4	15.80
(ug/dscm)	Concentration, ug/dscm, as measured	1.32E-03	1.32E-03	7.74E-03	3.46E-03
(lb/hr)	Emission Rate, lb/hr	3.79E-07	3.77E-07	2.20E-06	9.84E-07
	Indeno (1, 2, 3 - cd) Pyrene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	384.0	85.7	1010.0	493.23
(ug/dscm)	Concentration, ug/dscm, as measured	8.44E-02	1.88E-02	2.21E-01	1.08E-01
(lb/hr)	Emission Rate, lb/hr	2.43E-05	5.39E-06	6.26E-05	3.08E-05

( ) Not Detected. Value shown is the detection limit for that sample.
{ } Estimated Maximum Possible Concentration.

Summary of Stack Gas Parameters and Test Results
AK Steel-Middletown, OH
CARB 429 - PAH
Combustion Stack

	RUN NUMBER	***C-CARB-1***	***C-CARB-2***	***C-CARB-3***	
	RUN DATE	***9/12/2016***	***9/13/2016***	***9/14/2016***	***Average***
	RUN TIME	***1005-1405***	***0955-1355***	***0955-1355***	
	EMISSIONS DATA				
	PAH's:				
	Dibenzo (a, h) Anthracene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	317.0	54.5	655.0	342.17
(ug/dscm)	Concentration, ug/dscm, as measured	6.97E-02	1.20E-02	1.43E-01	7.50E-02
(lb/hr)	Emission Rate, lb/hr	2.00E-05	3.43E-06	4.06E-05	2.14E-05
	Benzo (ghi) Perylene	ADL	ADL	ADL	ADL
(ng)	Catch, ng	162.0	73.7	736.0	323.90
(ug/dscm)	Concentration, ug/dscm, as measured	3.56E-02	1.62E-02	1.61E-01	7.09E-02
(lb/hr)	Emission Rate, lb/hr	1.02E-05	4.63E-06	4.57E-05	2.02E-05
	Total PAH	ADL	ADL	ADL	ADL
(ng)	Catch, ng	1073351.1	481099.0	1711315.4	1088588.50
(ug/dscm)	Concentration, ug/dscm, as measured	2.36E+02	1.06E+02	3.74E+02	2.39E+02
(lb/hr)	Emission Rate, lb/hr	6.78E-02	3.02E-02	1.06E-01	6.81E-02
	Total PAH lbs/hr	1.49E-10	6.66E-11	2.34E-10	1.50E-10

{ } Estimated Maximum Possible Concentration.

APPENDIX A-9

FLOW

	Pushing Baghouse - Oxygen						
Date	Span	Pretest zero	Posttest zero	Pretest span	Posttest span	Conc. Measured	Cal. Correct %
8/23/2016	21.89	0.176	0.204	21.837	21.823	20.66	20.71
8/24/2016	21.89	0.18	0.204	21.783	21.729	20.64	20.75
8/25/2016	21.89	0.233	0.195	21.731	21.629	20.50	20.69
8/30/2016	21.89	0.277	0.23	21.841	21.65	20.55	20.67
8/31/2016	21.89	0.227	0.356	21.683	21.726	20.35	20.51
9/1/2016	21.89	0.259	0.382	21.659	21.71	20.62	20.80
9/6/2016	21.89	0.075	-0.018	21.769	22.045	20.78	20.76
9/7/2016	21.89	0.088	0.091	21.972	22.07	20.72	20.59
9/12/2016	21.89	-0.062	-0.046	21.932	21.91	20.74	20.71
9/12-13/16	21.89	-0.022	0.009	22.111	22.003	20.75	20.60
9/13/2016	21.89	0.232	-0.061	21.976	22.011	20.73	20.63
9/13-14/16	21.89	-0.076	-0.066	22.02	22.027	20.80	20.68
9/14/2016	21.89	0.006	-0.077	22.185	22.017	20.78	20.59
9/14-15/16	21.89	-0.079	0.049	22.152	22.227	20.85	20.57
9/15/2016	21.89	-0.084	-0.092	22.045	22.039	20.74	20.60

	Pushing Baghouse - Carbon Dioxide						
Date	Span	Pretest zero	Posttest zero	Pretest span	Posttest span	Conc. Measured	Cal. Correct %
8/23/2016	11.23	0.246	0.164	11.077	11.041	0.45	0.25
8/24/2016	11.23	0.193	0.209	11.077	10.968	0.41	0.22
8/25/2016	11.23	0.241	0.18	11.03	10.873	0.45	0.25
8/30/2016	11.23	0.206	0.16	11.081	10.99	0.35	0.17
8/31/2016	11.23	0.205	0.082	10.973	10.893	0.31	0.17
9/1/2016	11.23	0.151	0.204	10.982	10.954	0.31	0.14
9/6/2016	11.23	0.158	0.052	11.083	11.264	0.32	0.22
9/7/2016	11.23	0.164	0.083	11.021	11.111	0.32	0.20
9/12/2016	11.23	0.054	0.072	11.085	10.968	0.26	0.20
9/12-13/16	11.23	-0.007	0.079	11.139	10.967	0.20	0.17
9/13/2016	11.23	0.032	0.082	11.017	11.066	0.25	0.20
9/13-14/16	11.23	0.042	0.027	11.002	10.981	0.17	0.14
9/14/2016	11.23	0.063	0.07	11.199	11.081	0.28	0.22
9/14-15/16	11.23	-0.035	0.134	11.145	11.189	0.19	0.14
9/15/2016	11.23	0.007	0.044	11.071	11.028	0.29	0.27

	Pushing Baghouse - Carbon Monoxide							
Date	Span	Pretest zero	Posttest zero	Pretest span	Posttest span	Conc. Measured	Cal. Correct ppm	Dry Molecular Weight
8/23/2016	190.9	0.33	-2.94	185.5	182.47	29.39	31.62	28.87
8/24/2016	190.9	1.01	-1.2	186.87	183.35	20.89	21.63	28.86
8/25/2016	190.9	-0.78	-3.87	184.33	179.14	20.80	23.99	28.87
8/30/2016	190.9	-0.28	-3	190.25	181.3	20.29	22.33	28.85
8/31/2016	190.9	1.09	0.05	188.98	189.36	19.65	19.32	28.85
9/1/2016	190.9	0.92	0.22	189.05	184.44	21.03	20.98	28.85
9/6/2016	190.9	0.91	-0.51	189.87	184.81	23.01	23.27	28.87
9/7/2016	190.9	2.98	1.36	188.64	186.51	31.76	30.47	28.86
9/12/2016	190.9	6.26	7.92	193.18	192.91	35.33	28.99	28.86
9/12-13/16	190.9	-0.54	0.54	193.21	190.54	22.32	22.20	28.85
9/13/2016	190.9	1.07	1.88	191.5	192.07	30.36	28.97	28.86
9/13-14/16	190.9	2.29	1.11	192.02	190.64	24.77	23.22	28.85
9/14/2016	190.9	1.61	3.07	190.33	193.08	33.69	31.61	28.86
9/14-15/16	190.9	2.18	2.13	188.37	189.79	25.27	23.61	28.85
9/15/2016	190.9	2.4	3.76	192.46	192.69	30.58	27.70	28.87

		O2	CO2	CO
		%	%	ppm
8/23/2016	10:22:25	20.695	0.463	20.73
8/23/2016	10:23:25	20.54	0.62	53.68
8/23/2016	10:24:25	20.881	0.254	20.27
8/23/2016	10:34:25	20.573	0.61	34.24
8/23/2016	10:35:25	20.571	0.574	48.56
8/23/2016	10:36:25	20.905	0.229	6.5
8/23/2016	10:46:25	20.766	0.377	11.85
8/23/2016	10:47:25	20.499	0.67	44.94
8/23/2016	10:48:25	20.741	0.391	35
8/23/2016	11:14:25	20.7	0.406	20.47
8/23/2016	11:15:25	20.515	0.588	43.62
8/23/2016	11:16:25	20.746	0.336	27.46
8/23/2016	11:26:25	20.892	0.193	0.75
8/23/2016	11:27:25	20.675	0.431	20.49
8/23/2016	11:28:25	20.406	0.708	54.81
8/23/2016	11:29:24	20.693	0.41	34
8/23/2016	11:43:25	20.804	0.283	5.59
8/23/2016	11:44:25	20.461	0.659	47.88
8/23/2016	11:45:25	20.644	0.446	37.08
8/23/2016	12:01:25	20.687	0.424	21.9
8/23/2016	12:02:25	20.479	0.637	45.92
8/23/2016	12:03:25	20.763	0.33	29.06
8/23/2016	12:20:25	20.76	0.358	12.73
8/23/2016	12:21:25	20.505	0.621	58.49
8/23/2016	12:22:25	20.748	0.36	36.47
8/23/2016	12:39:25	20.892	0.199	0.28
8/23/2016	12:40:25	20.615	0.506	31.29
8/23/2016	12:41:25	20.571	0.556	45.41
8/23/2016	12:42:25	20.541	0.582	42.54
8/23/2016	12:43:25	20.54	0.595	45.63
8/23/2016	12:56:25	20.863	0.239	3.21
8/23/2016	12:57:25	20.695	0.42	22.56
8/23/2016	12:58:25	20.508	0.577	55.06
8/23/2016	12:59:25	20.542	0.568	42.68
8/23/2016	13:00:24	20.523	0.571	42.28
8/23/2016	13:17:25	20.626	0.489	36.36
8/23/2016	13:18:24	20.515	0.589	52.36
8/23/2016	13:19:25	20.503	0.612	46.4
8/23/2016	13:20:25	20.462	0.645	51.97
8/23/2016	13:34:25	20.858	0.233	3.6
8/23/2016	13:35:25	20.678	0.436	29.33
8/23/2016	13:36:24	20.574	0.555	39.22
8/23/2016	13:37:25	20.548	0.577	39.84
8/23/2016	13:38:25	20.541	0.564	41.59
8/23/2016	13:52:25	20.863	0.219	2.94
8/23/2016	13:53:25	20.618	0.507	26.53
8/23/2016	13:54:25	20.578	0.54	38.75
8/23/2016	13:55:25	20.826	0.272	18.4
8/23/2016	14:43:25	20.658	0.447	16.37
8/23/2016	14:44:25	20.443	0.652	49.21
8/23/2016	14:45:25	20.66	0.416	35.61
8/23/2016	14:46:25	20.862	0.21	1.52
8/23/2016	14:52:25	20.868	0.21	-0.5
8/23/2016	14:53:25	20.802	0.296	3.99
8/23/2016	14:54:25	20.586	0.528	36.79
8/23/2016	14:55:25	20.636	0.469	29.01
8/23/2016	14:56:25	20.866	0.213	1.83
8/23/2016	15:05:25	20.873	0.214	-1.46
8/23/2016	15:06:25	20.705	0.407	14.51
8/23/2016	15:07:25	20.488	0.627	45.53
8/23/2016	15:08:25	20.715	0.35	29.69
Average		20.66051	0.450295	29.39049

		O2	CO2	CO
		%	%	ppm
8/24/2016	10:28:42	20.557	0.511	22.32
8/24/2016	10:29:42	20.5	0.574	43.97
8/24/2016	10:30:42	20.57	0.502	36.61
8/24/2016	10:40:42	20.692	0.366	23.17
8/24/2016	10:41:42	20.602	0.477	22.38
8/24/2016	10:42:42	20.351	0.725	46.64
8/24/2016	10:43:42	20.398	0.685	41.11
8/24/2016	10:54:42	20.71	0.357	16.92
8/24/2016	10:55:42	20.606	0.468	26.64
8/24/2016	10:56:42	20.421	0.658	41.93
8/24/2016	10:57:42	20.466	0.619	39.48
8/24/2016	11:07:42	20.657	0.414	25.54
8/24/2016	11:08:42	20.793	0.254	6.05
8/24/2016	11:09:42	20.49	0.588	40.1
8/24/2016	11:10:42	20.442	0.617	51.4
8/24/2016	11:24:42	20.73	0.336	17.97
8/24/2016	11:25:42	20.476	0.616	42.11
8/24/2016	11:26:42	20.672	0.384	30.72
8/24/2016	11:27:42	20.8	0.25	3.32
8/24/2016	11:39:42	20.792	0.269	1.83
8/24/2016	11:40:42	20.456	0.637	34.51
8/24/2016	11:41:42	20.721	0.34	23.08
8/24/2016	11:58:42	20.801	0.244	1.44
8/24/2016	11:59:42	20.643	0.445	14.26
8/24/2016	12:00:42	20.462	0.608	41.65
8/24/2016	12:17:42	20.802	0.248	1.8
8/24/2016	12:18:42	20.54	0.559	28.15
8/24/2016	12:19:42	20.625	0.435	28.63
8/24/2016	12:20:42	20.796	0.262	3.98
8/24/2016	12:36:42	20.8	0.249	1.75
8/24/2016	12:37:42	20.622	0.45	18.73
8/24/2016	12:38:42	20.538	0.53	44.8
8/24/2016	12:39:42	20.796	0.26	6.18
8/24/2016	12:55:42	20.784	0.249	0.8
8/24/2016	12:56:42	20.776	0.245	1.22
8/24/2016	12:57:42	20.483	0.584	31.73
8/24/2016	12:58:42	20.738	0.284	17.45
8/24/2016	13:14:42	20.778	0.238	1.2
8/24/2016	13:15:42	20.543	0.51	31.32
8/24/2016	13:16:42	20.754	0.291	18
8/24/2016	13:17:42	20.782	0.24	2.99
8/24/2016	13:33:42	20.715	0.311	2.88
8/24/2016	13:34:41	20.451	0.59	37.43
8/24/2016	13:35:42	20.747	0.26	12.47
8/24/2016	13:36:42	20.773	0.23	0.67
8/24/2016	13:50:42	20.776	0.233	0.85
8/24/2016	13:51:42	20.656	0.387	8.59
8/24/2016	13:52:43	20.43	0.628	42.84
8/24/2016	13:53:42	20.758	0.265	16.54
8/24/2016	14:38:42	20.764	0.226	-0.2
8/24/2016	14:39:42	20.634	0.389	9.94
8/24/2016	14:40:42	20.521	0.501	39.73
8/24/2016	14:41:42	20.753	0.237	8.42
8/24/2016	14:55:42	20.768	0.241	-0.25
8/24/2016	14:56:42	20.504	0.518	25.11
8/24/2016	14:57:42	20.531	0.475	44.49
8/24/2016	14:58:42	20.761	0.234	3.63
8/24/2016	15:06:42	20.641	0.386	7.22
8/24/2016	15:07:42	20.306	0.694	45.33
8/24/2016	15:08:42	20.735	0.255	13.62
Average		20.63648	0.410633	20.8865

		O2	CO2	CO
		%	%	ppm
8/25/2016	10:29:03	20.644	0.338	2.88
8/25/2016	10:30:03	20.377	0.642	41.53
8/25/2016	10:31:03	20.332	0.684	39.79
8/25/2016	10:43:03	20.665	0.298	14.77
8/25/2016	10:44:03	20.551	0.441	15.18
8/25/2016	10:45:03	20.262	0.721	47.39
8/25/2016	10:46:03	20.282	0.717	42.41
8/25/2016	10:55:03	20.672	0.281	12.45
8/25/2016	10:56:03	20.368	0.636	26.92
8/25/2016	10:57:03	20.217	0.766	34.35
8/25/2016	10:58:03	20.187	0.81	43.81
8/25/2016	11:24:03	20.485	0.529	19.1
8/25/2016	11:25:04	20.203	0.788	37.82
8/25/2016	11:26:03	20.203	0.785	40.47
8/25/2016	11:34:03	20.518	0.474	25.25
8/25/2016	11:35:04	20.405	0.579	26.64
8/25/2016	11:36:03	20.182	0.79	34.5
8/25/2016	11:37:03	20.661	0.31	14.07
8/25/2016	11:46:03	20.73	0.229	-1.75
8/25/2016	11:47:03	20.447	0.546	19.65
8/25/2016	11:48:03	20.18	0.785	31.64
8/25/2016	11:49:03	20.582	0.375	19.19
8/25/2016	12:00:04	20.726	0.228	-1.72
8/25/2016	12:01:04	20.342	0.652	33.28
8/25/2016	12:02:03	20.42	0.551	32.39
8/25/2016	12:03:03	20.717	0.235	6.21
8/25/2016	12:19:03	20.722	0.221	-2.13
8/25/2016	12:20:03	20.651	0.287	0.43
8/25/2016	12:21:03	20.265	0.676	42.84
8/25/2016	12:22:03	20.507	0.406	33.06
8/25/2016	12:38:03	20.729	0.23	-1.64
8/25/2016	12:39:03	20.665	0.287	0.24
8/25/2016	12:40:03	20.341	0.63	38.71
8/25/2016	12:41:03	20.521	0.441	23.14
8/25/2016	12:57:03	20.715	0.209	-2.06
8/25/2016	12:58:03	20.595	0.348	4.78
8/25/2016	12:59:03	20.345	0.61	33.21
8/25/2016	13:00:03	20.532	0.411	17.39
8/25/2016	13:17:04	20.674	0.295	-0.05
8/25/2016	13:18:03	20.353	0.615	37.55
8/25/2016	13:19:03	20.438	0.526	36.85
8/25/2016	13:35:03	20.708	0.209	-1.75
8/25/2016	13:36:03	20.481	0.445	23.02
8/25/2016	13:37:03	20.44	0.507	48.44
8/25/2016	13:38:03	20.683	0.221	15.12
8/25/2016	13:50:03	20.703	0.193	-1.87
8/25/2016	13:51:03	20.549	0.367	9.14
8/25/2016	13:52:03	20.274	0.646	47.46
8/25/2016	13:53:03	20.621	0.28	20.94
8/25/2016	13:54:03	20.702	0.2	-1
8/25/2016	14:35:03	20.715	0.205	-2.83
8/25/2016	14:36:03	20.613	0.298	1.45
8/25/2016	14:37:03	20.284	0.668	42.92
8/25/2016	14:38:03	20.547	0.363	26.9
8/25/2016	14:39:03	20.697	0.189	-0.36
8/25/2016	14:50:03	20.517	0.387	11.81
8/25/2016	14:51:03	20.307	0.608	41.85
8/25/2016	14:52:03	20.667	0.227	12.9
8/25/2016	15:06:03	20.723	0.208	-3.01
8/25/2016	15:07:03	20.503	0.463	16.43
8/25/2016	15:08:03	20.348	0.621	43.27
8/25/2016	15:09:03	20.67	0.303	18.28
Average		20.50263	0.451452	20.80081

		O2	CO2	CO
		%	%	ppm
8/30/2016	10:25:51	20.739	0.155	0.67
8/30/2016	10:26:51	20.596	0.254	5.66
8/30/2016	10:27:51	20.303	0.546	42.95
8/30/2016	10:42:51	20.703	0.111	0.73
8/30/2016	10:43:51	20.533	0.283	12.57
8/30/2016	10:44:51	20.352	0.455	40.27
8/30/2016	10:45:51	20.681	0.117	14.21
8/30/2016	11:19:51	20.354	0.515	34.73
8/30/2016	11:20:51	20.497	0.368	40.79
8/30/2016	11:21:51	20.732	0.137	3.86
8/30/2016	11:39:50	20.581	0.244	4.26
8/30/2016	11:40:50	20.339	0.486	46.83
8/30/2016	11:41:50	20.51	0.376	34.2
8/30/2016	12:01:51	20.611	0.48	18.6
8/30/2016	12:02:51	20.442	0.605	41.67
8/30/2016	12:03:51	20.799	0.239	13.92
8/30/2016	12:11:51	20.625	0.369	11.07
8/30/2016	12:12:51	20.464	0.515	36.66
8/30/2016	12:13:50	20.773	0.269	16.86
8/30/2016	12:21:51	20.49	0.366	19.27
8/30/2016	12:22:50	20.39	0.426	32.36
8/30/2016	12:23:50	20.709	0.133	9.67
8/30/2016	12:31:51	20.686	0.29	0.81
8/30/2016	12:32:50	20.494	0.546	31.13
8/30/2016	12:33:50	20.519	0.399	29.49
8/30/2016	12:45:51	20.507	0.341	17.12
8/30/2016	12:46:51	20.335	0.497	36.92
8/30/2016	12:47:51	20.708	0.157	15.97
8/30/2016	12:58:50	20.766	0.164	-0.47
8/30/2016	12:59:50	20.473	0.321	18.98
8/30/2016	13:00:51	20.387	0.387	30.54
8/30/2016	13:01:51	20.47	0.462	32.56
8/30/2016	13:16:50	20.594	0.333	19.05
8/30/2016	13:17:50	20.363	0.418	36.09
8/30/2016	13:18:50	20.37	0.538	37.06
8/30/2016	13:19:50	20.367	0.595	48.64
8/30/2016	13:37:51	20.433	0.574	33.95
8/30/2016	13:38:51	20.409	0.6	38.03
8/30/2016	13:45:51	20.681	0.232	17.05
8/30/2016	13:46:51	20.766	0.164	1.06
8/30/2016	13:48:51	20.579	0.274	9.1
8/30/2016	13:49:51	20.339	0.454	31.01
8/30/2016	13:50:50	20.334	0.465	31.02
8/30/2016	14:42:50	20.596	0.422	20.92
8/30/2016	14:43:50	20.458	0.553	39.19

8/30/2016	14:44:50	20.763	0.214	20.12
8/30/2016	14:59:51	20.361	0.605	36.31
8/30/2016	15:00:51	20.647	0.28	25.82
8/30/2016	15:08:50	20.732	0.255	-2.01
8/30/2016	15:09:50	20.362	0.616	25.57
8/30/2016	15:10:51	20.522	0.406	25.58
8/30/2016	15:24:51	20.766	0.187	-2.34
8/30/2016	15:25:50	20.465	0.511	23
8/30/2016	15:26:50	20.475	0.454	29.62
8/30/2016	15:27:50	20.763	0.169	3.09
8/30/2016	15:42:50	20.675	0.291	0.58
8/30/2016	15:43:50	20.417	0.552	38.61
8/30/2016	15:44:50	20.707	0.233	8.23
8/30/2016	15:59:50	20.541	0.428	12.55
8/30/2016	16:00:50	20.413	0.55	31.71
8/30/2016	16:01:50	20.726	0.158	4.49
8/30/2016	16:16:51	20.604	0.273	1.39
8/30/2016	16:17:50	20.368	0.52	34.82
8/30/2016	16:18:50	20.582	0.288	20.73
8/30/2016	16:19:50	20.705	0.156	-1.32
8/30/2016	16:33:51	20.619	0.218	0.18
8/30/2016	16:34:50	20.305	0.506	36.52
8/30/2016	16:35:50	20.545	0.254	23.75
8/30/2016	16:51:51	20.607	0.272	2.6
8/30/2016	16:52:50	20.438	0.39	33.53
8/30/2016	16:53:50	20.528	0.237	24.03
8/30/2016	17:08:51	20.622	0.243	0.46
8/30/2016	17:09:51	20.376	0.454	30.77
8/30/2016	17:10:50	20.442	0.214	22.43
8/30/2016	17:25:51	20.537	0.269	6.1
8/30/2016	17:26:50	20.53	0.332	30.29
8/30/2016	17:27:50	20.697	0.158	1.6
8/30/2016	17:37:50	20.668	0.116	-1.02
8/30/2016	17:38:50	20.702	0.141	-2.25
Average		20.54515	0.349177	20.2857

		O2	CO2	CO
		%	%	ppm
8/31/2016	10:21:00	20.593	0.116	1.59
8/31/2016	10:22:00	20.413	0.294	11.38
8/31/2016	10:23:00	20.047	0.66	45.74
8/31/2016	10:24:01	20.109	0.624	49.26
8/31/2016	10:36:01	20.502	0.2	23.81
8/31/2016	10:37:01	20.355	0.355	17.02
8/31/2016	10:38:01	20.051	0.655	35.86
8/31/2016	10:39:00	20.045	0.671	41.02
8/31/2016	10:50:00	20.44	0.248	14.77
8/31/2016	10:51:00	19.979	0.7	41.19
8/31/2016	10:52:01	20.006	0.677	41.74
8/31/2016	11:05:01	20.342	0.346	20.06
8/31/2016	11:06:00	19.939	0.732	44.54
8/31/2016	11:07:00	20.031	0.643	34.75
8/31/2016	11:24:00	20.398	0.316	14.32
8/31/2016	11:25:01	20.022	0.64	41.29
8/31/2016	11:26:01	20.542	0.111	15.2
8/31/2016	11:27:01	20.568	0.092	1.91
8/31/2016	11:42:01	20.436	0.224	6.99
8/31/2016	11:43:01	19.876	0.73	67.72
8/31/2016	11:44:01	20.535	0.113	26.14
8/31/2016	11:45:01	20.586	0.099	1.37
8/31/2016	12:01:01	20.569	0.084	0.81
8/31/2016	12:02:01	20.134	0.512	37.9
8/31/2016	12:03:01	20.272	0.378	43.05
8/31/2016	12:04:01	20.563	0.086	5.35
8/31/2016	12:21:01	20.587	0.171	1.14
8/31/2016	12:22:01	20.107	0.629	32.76
8/31/2016	12:23:00	20.425	0.248	24.31
8/31/2016	12:24:00	20.634	0.151	0.88
8/31/2016	12:40:01	20.441	0.412	12.88
8/31/2016	12:41:01	20.202	0.489	35.34
8/31/2016	12:42:00	20.607	0.134	6.84
8/31/2016	12:58:00	20.387	0.282	9.06
8/31/2016	12:59:00	20.092	0.558	39.28
8/31/2016	13:00:00	20.515	0.117	17.47
8/31/2016	13:01:01	20.595	0.097	-0.33
8/31/2016	13:17:00	20.69	0.198	0.65
8/31/2016	13:18:01	20.414	0.475	27.95
8/31/2016	13:19:01	20.433	0.467	47.73
8/31/2016	13:20:01	20.711	0.229	6.12
8/31/2016	13:36:01	20.366	0.446	19.26
8/31/2016	13:37:01	20.413	0.332	34.08
8/31/2016	13:38:01	20.553	0.08	4.07
8/31/2016	13:39:01	20.535	0.043	0.47
8/31/2016	13:46:01	20.482	0.163	4.56
8/31/2016	13:47:01	20.201	0.613	43.8
8/31/2016	13:48:01	20.527	0.138	16.02
8/31/2016	13:49:01	20.605	0.14	0.51
8/31/2016	14:49:01	20.538	0.072	0.62
8/31/2016	14:50:00	20.338	0.119	23.25
8/31/2016	14:51:00	20.219	0.059	2.56
8/31/2016	14:52:00	20.182	0.067	2.26
8/31/2016	15:00:00	20.156	0.069	0.59
8/31/2016	15:01:00	20.154	0.078	0.46
8/31/2016	15:02:01	20.154	0.067	1.25
Average		20.35029	0.311589	19.65393

		O2 %	CO2 %	CO ppm
9/1/2016	10:20:45	20.677	0.092	3.81
9/1/2016	10:21:45	20.381	0.429	37.07
9/1/2016	10:22:45	20.415	0.399	40.14
9/1/2016	10:35:45	20.573	0.315	24.5
9/1/2016	10:36:45	20.35	0.566	46.47
9/1/2016	10:37:44	20.273	0.628	53.71
9/1/2016	10:47:45	20.7	0.271	32.28
9/1/2016	10:48:45	20.431	0.545	38.56
9/1/2016	10:49:45	20.397	0.548	45.94
9/1/2016	11:18:44	20.669	0.116	8.61
9/1/2016	11:19:44	20.559	0.249	11.78
9/1/2016	11:20:45	20.26	0.548	50.97
9/1/2016	11:30:45	20.698	0.091	9.39
9/1/2016	11:31:44	20.336	0.458	45.56
9/1/2016	11:32:44	20.538	0.284	31.01
9/1/2016	11:42:45	20.701	0.079	3.17
9/1/2016	11:43:45	20.453	0.362	44.68
9/1/2016	11:44:44	20.591	0.192	28.78
9/1/2016	12:00:45	20.716	0.199	4.37
9/1/2016	12:01:45	20.337	0.469	51.72
9/1/2016	12:02:45	20.762	0.21	20.46
9/1/2016	12:03:45	20.801	0.157	3.73
9/1/2016	12:19:44	20.713	0.08	2.71
9/1/2016	12:20:44	20.393	0.402	42.49
9/1/2016	12:21:45	20.618	0.261	32.64
9/1/2016	12:22:45	20.772	0.145	3.34
9/1/2016	12:38:44	20.697	0.295	7.76
9/1/2016	12:39:44	20.438	0.472	53.43
9/1/2016	12:40:45	20.723	0.113	14.55
9/1/2016	12:41:45	20.746	0.105	2.16
9/1/2016	13:16:44	20.686	0.124	3.29
9/1/2016	13:17:45	20.35	0.435	44.26
9/1/2016	13:18:45	20.594	0.155	24.54
9/1/2016	13:35:44	20.589	0.349	12.43
9/1/2016	13:36:44	20.418	0.392	46.14
9/1/2016	13:37:45	20.716	0.097	5.07
9/1/2016	13:38:45	20.72	0.083	1.98
9/1/2016	13:45:45	20.72	0.134	2.1
9/1/2016	13:46:45	20.372	0.555	39.5
9/1/2016	13:47:45	20.684	0.122	12.37
9/1/2016	13:48:45	20.696	0.104	3.08
9/1/2016	14:41:44	20.823	0.183	1.77
9/1/2016	14:42:45	20.486	0.623	30.39
9/1/2016	14:43:45	20.561	0.424	39.32
9/1/2016	14:44:45	20.778	0.142	4.54

9/1/2016	14:52:45	20.698	0.444	16.92
9/1/2016	14:53:45	20.763	0.346	29.19
9/1/2016	14:54:44	20.866	0.247	2.7
9/1/2016	15:13:45	20.874	0.248	1.68
9/1/2016	15:14:45	20.872	0.246	0.94
9/1/2016	15:15:44	20.838	0.213	1.19
9/1/2016	15:16:44	20.874	0.241	1.19
9/1/2016	15:25:45	20.574	0.585	22.09
9/1/2016	15:26:45	20.529	0.563	36.19
9/1/2016	15:27:45	20.829	0.209	5.38
9/1/2016	15:43:45	20.815	0.261	1.2
9/1/2016	15:44:45	20.418	0.705	47.46
9/1/2016	15:45:44	20.699	0.402	20.41
9/1/2016	15:46:44	20.818	0.236	1.48
9/1/2016	16:01:45	20.757	0.169	1.7
9/1/2016	16:02:44	20.697	0.233	3.03
9/1/2016	16:03:44	20.282	0.753	53.65
9/1/2016	16:04:44	20.693	0.314	21.51
9/1/2016	16:16:45	20.753	0.239	2.38
9/1/2016	16:17:44	20.361	0.749	46.45
9/1/2016	16:18:44	20.685	0.407	22.91
9/1/2016	16:19:45	20.785	0.204	2.97
Average		20.61778	0.313672	21.03269

		O2	CO2	CO
		%	%	ppm
9/6/2016	15:25:00	20.898	0.221	3.96
9/6/2016	15:26:00	20.438	0.631	67.99
9/6/2016	15:27:01	20.813	0.324	45.47
9/6/2016	15:28:01	20.93	0.151	5.92
9/6/2016	15:42:00	20.943	0.152	1.95
9/6/2016	15:43:00	20.827	0.197	7.5
9/6/2016	15:44:00	20.448	0.675	62.7
9/6/2016	15:59:00	20.931	0.144	2.04
9/6/2016	16:00:00	20.803	0.329	12.35
9/6/2016	16:01:00	20.427	0.649	61.05
9/6/2016	16:16:01	20.936	0.145	2.34
9/6/2016	16:17:01	20.674	0.409	29.71
9/6/2016	16:18:00	20.438	0.605	70.34
9/6/2016	16:33:00	20.973	0.173	2.34
9/6/2016	16:34:00	20.94	0.167	2.28
9/6/2016	16:35:00	20.545	0.554	36.7
9/6/2016	16:52:00	20.915	0.256	5.21
9/6/2016	16:53:01	20.464	0.692	47.04
9/6/2016	16:54:00	20.824	0.234	29.07
9/6/2016	16:55:01	20.966	0.187	4.26
9/6/2016	17:08:00	20.961	0.162	2.05
9/6/2016	17:09:00	20.795	0.342	11.4
9/6/2016	17:10:00	20.588	0.36	43.08
9/6/2016	17:11:00	20.963	0.191	6.71
9/6/2016	17:25:00	20.956	0.156	1.54
9/6/2016	17:26:00	20.585	0.5	45.29
9/6/2016	17:27:00	20.961	0.134	19.79
9/6/2016	17:35:00	21.02	0.153	1.82
9/6/2016	17:36:00	20.612	0.42	23.13
9/6/2016	17:37:01	20.886	0.257	35.24
Average		20.782	0.319	23.009

		O2	CO2	CO
		%	%	ppm
9/7/2016	10:51:58	20.527	0.445	33.88
9/7/2016	10:52:58	20.341	0.601	68.04
9/7/2016	10:53:58	20.431	0.538	67.66
9/7/2016	11:04:58	20.737	0.227	25.12
9/7/2016	11:05:58	20.425	0.537	54.72
9/7/2016	11:06:58	20.443	0.519	59.71
9/7/2016	11:16:58	20.696	0.26	27.46
9/7/2016	11:17:58	20.363	0.577	56.24
9/7/2016	11:18:58	20.39	0.574	61.32
9/7/2016	11:19:58	20.175	0.764	75.98
9/7/2016	11:29:58	20.745	0.236	16.21
9/7/2016	11:30:58	20.444	0.526	65.35
9/7/2016	11:31:58	20.416	0.561	63.14
9/7/2016	11:41:58	20.44	0.543	44.58
9/7/2016	11:42:57	20.653	0.287	60.66
9/7/2016	11:43:58	20.926	0.039	8.42
9/7/2016	11:54:58	20.512	0.55	41.55
9/7/2016	11:55:58	20.715	0.203	52.08
9/7/2016	11:56:58	20.913	0.021	7.67
9/7/2016	15:06:58	20.771	0.433	24.31
9/7/2016	15:07:58	20.568	0.583	63.63
9/7/2016	15:08:57	20.919	0.054	14.42
9/7/2016	15:09:57	20.92	0.032	4.55
9/7/2016	15:20:58	20.728	0.233	14.36
9/7/2016	15:21:58	20.382	0.561	53.59
9/7/2016	15:22:58	20.865	0.011	21.62
9/7/2016	15:23:58	20.879	0.005	4.67
9/7/2016	15:34:58	20.431	0.528	56.42
9/7/2016	15:35:58	20.953	0.157	27.96
9/7/2016	15:36:58	20.983	0.102	3.69
9/7/2016	15:47:58	20.485	0.629	40.7
9/7/2016	15:48:58	20.625	0.263	44.1
9/7/2016	15:49:57	20.894	0.037	8.19
9/7/2016	16:01:58	20.6	0.635	45.38
9/7/2016	16:02:58	20.762	0.415	44.45
9/7/2016	16:03:58	21.069	0.214	7.81
9/7/2016	16:16:58	20.691	0.597	52.3
9/7/2016	16:17:58	21.049	0.217	17.78
9/7/2016	16:18:58	20.999	0.124	4.15
9/7/2016	16:29:58	20.709	0.526	28.33
9/7/2016	16:30:58	20.71	0.363	49.34
9/7/2016	16:31:58	21.007	0.171	7.93
9/7/2016	16:43:58	20.753	0.547	25.47
9/7/2016	16:44:57	20.713	0.568	55.2
9/7/2016	16:45:58	21.067	0.216	10.23
9/7/2016	16:57:58	20.545	0.443	32.53
9/7/2016	16:58:58	20.843	0.041	29.5
9/7/2016	16:59:58	20.885	0.015	4.26
9/7/2016	17:12:58	20.578	0.515	37.88
9/7/2016	17:13:58	20.862	0.042	17.13
9/7/2016	17:14:58	20.967	0.096	4.99
9/7/2016	17:15:58	21.063	0.194	3.21
9/7/2016	17:25:58	20.789	0.356	13.38
9/7/2016	17:26:58	20.732	0.467	44.77
9/7/2016	17:27:58	21.039	0.203	9.03
9/7/2016	17:28:58	21.042	0.172	3.43
9/7/2016	17:40:58	20.66	0.238	38.33
9/7/2016	17:41:58	20.865	0.02	7.01
9/7/2016	17:42:58	20.858	-0.001	8.24
Average		20.72122	0.322542	31.76373

		O2 %	CO2 %	CO ppm
9/12/2016	13:36:12	20.733	0.25	21.59
9/12/2016	13:37:12	20.452	0.505	85.35
9/12/2016	13:38:12	20.891	0.068	35.28
9/12/2016	13:51:12	20.917	0.032	8.54
9/12/2016	13:52:12	20.404	0.572	64.01
9/12/2016	13:53:12	20.645	0.304	60.85
9/12/2016	14:39:12	20.999	0.082	8.92
9/12/2016	14:40:12	20.792	0.325	22.41
9/12/2016	14:41:12	20.548	0.508	78.96
9/12/2016	14:51:12	21.007	0.116	8.33
9/12/2016	14:52:12	20.723	0.277	40.71
9/12/2016	14:53:12	20.776	0.361	63.68
9/12/2016	15:07:12	20.994	0.112	8.51
9/12/2016	15:08:12	20.846	0.154	13.98
9/12/2016	15:09:12	20.652	0.512	61.29
9/12/2016	15:25:12	20.929	0.043	8.26
9/12/2016	15:26:12	20.602	0.352	47.18
9/12/2016	15:27:12	20.7	0.23	50.53
9/12/2016	15:42:12	20.905	0.028	9.11
9/12/2016	15:43:12	20.742	0.208	23.69
9/12/2016	15:44:12	20.591	0.423	55.75
9/12/2016	15:59:12	20.937	0.064	8.64
9/12/2016	16:00:12	20.797	0.198	15.63
9/12/2016	16:01:12	20.534	0.443	64.78
9/12/2016	16:16:12	20.919	0.059	8.91
9/12/2016	16:17:12	20.891	0.09	9.36
9/12/2016	16:18:12	20.334	0.598	66.26
9/12/2016	16:19:12	20.299	0.685	83.2
9/12/2016	16:34:12	20.903	0.106	21.91
9/12/2016	16:35:12	20.545	0.407	50.78
9/12/2016	16:36:12	20.427	0.521	68.42
9/12/2016	16:51:13	20.863	0.069	14.92
9/12/2016	16:52:12	20.893	0.048	10.72
9/12/2016	16:53:13	20.547	0.41	43.61
9/12/2016	16:54:12	20.58	0.334	65
9/12/2016	17:10:12	20.894	0.032	9.36
9/12/2016	17:11:12	20.66	0.321	41.66
9/12/2016	17:12:12	20.776	0.142	43.92
9/12/2016	17:25:12	20.909	0.06	9.08
9/12/2016	17:26:12	20.679	0.282	23.5
9/12/2016	17:27:13	20.527	0.408	50.53
9/12/2016	17:38:12	20.966	0.111	8.93
9/12/2016	17:39:12	20.81	0.25	17.89
9/12/2016	17:40:12	20.846	0.196	40.73
Average		20.736	0.256727	35.33341

		O2	CO2	CO
		%	%	ppm
9/12/2016	23:05:40	20.757	0.151	7.88
9/12/2016	23:06:40	20.526	0.39	45.52
9/12/2016	23:07:40	20.84	0.045	24.4
9/12/2016	23:23:40	20.742	0.175	10.55
9/12/2016	23:24:40	20.575	0.338	45.55
9/12/2016	23:25:40	20.87	0.012	15.53
9/12/2016	23:42:40	20.743	0.163	10.89
9/12/2016	23:43:40	20.712	0.183	43.41
9/12/2016	23:44:40	20.87	0.019	13.89
9/13/2016	0:03:41	20.899	0.006	2.37
9/13/2016	0:04:41	20.825	0.083	3.75
9/13/2016	0:05:40	20.525	0.385	52.49
9/13/2016	0:06:40	20.76	0.128	45.35
9/13/2016	0:19:40	20.895	0.004	2.26
9/13/2016	0:20:40	20.538	0.369	33.28
9/13/2016	0:21:40	20.477	0.423	56.75
9/13/2016	0:22:40	20.877	0.016	14.38
9/13/2016	0:38:40	21.013	0.111	1.6
9/13/2016	0:39:40	20.745	0.361	18.25
9/13/2016	0:40:40	20.375	0.523	63.26
9/13/2016	0:41:40	20.879	0.012	18.96
9/13/2016	0:57:40	21.069	0.18	1.45
9/13/2016	0:58:41	20.625	0.502	36.87
9/13/2016	0:59:41	20.434	0.58	61.86
9/13/2016	1:00:40	21.002	0.129	14.77
9/13/2016	1:01:40	21.029	0.14	1.17
9/13/2016	1:16:40	20.987	0.249	2.53
9/13/2016	1:17:40	20.724	0.503	41.1
9/13/2016	1:18:41	20.984	0.119	8.78
9/13/2016	1:35:40	20.876	0.017	2.53
9/13/2016	1:36:40	20.509	0.421	39.55
9/13/2016	1:37:40	20.848	0.043	19.91
9/13/2016	1:45:41	20.88	0.019	2.38
9/13/2016	1:46:40	20.425	0.526	43.36
9/13/2016	1:47:40	20.615	0.279	57.17
9/13/2016	1:48:41	20.875	0.02	5.65
9/13/2016	1:49:41	20.881	0.027	2.57
9/13/2016	2:49:40	20.888	0.024	1.99
9/13/2016	2:50:40	20.606	0.338	26.46
9/13/2016	2:51:40	20.636	0.282	52.91
9/13/2016	2:52:40	20.881	0.039	9.92
9/13/2016	2:53:40	20.886	0.029	3.41
9/13/2016	3:00:40	20.88	0.032	2.58
9/13/2016	3:01:40	20.407	0.527	43.09
9/13/2016	3:02:41	20.771	0.117	33.12

9/13/2016	3:03:41	20.871	0.029	3.56
9/13/2016	3:10:40	20.775	0.152	5.08
9/13/2016	3:11:40	20.46	0.472	51.49
9/13/2016	3:12:40	20.788	0.114	23.67
9/13/2016	3:13:40	20.874	0.023	3.88
9/13/2016	3:27:40	20.878	0.02	1.96
9/13/2016	3:28:40	20.755	0.175	7.2
9/13/2016	3:29:40	20.385	0.532	59.51
9/13/2016	3:30:40	20.826	0.069	27.66
9/13/2016	3:31:40	20.875	0.027	2.49
9/13/2016	3:42:40	20.801	0.122	3.74
9/13/2016	3:43:40	20.398	0.53	49.39
9/13/2016	3:44:40	20.73	0.178	35.96
9/13/2016	3:45:40	20.876	0.019	2.79
9/13/2016	3:57:40	20.819	0.099	2.97
9/13/2016	3:58:41	20.424	0.602	48.89
9/13/2016	3:59:41	20.881	0.186	28.03
9/13/2016	4:00:41	20.931	0.08	2.33
Average		20.7541	0.197905	22.31825

		O2	CO2	CO
		%	%	ppm
9/13/2016	13:39:03	20.99	0.053	4.34
9/13/2016	13:40:03	20.703	0.336	16.73
9/13/2016	13:41:03	20.629	0.395	45.21
9/13/2016	14:29:03	20.971	0.019	3.67
9/13/2016	14:30:03	20.494	0.52	56.18
9/13/2016	14:31:03	20.576	0.436	57.29
9/13/2016	14:39:03	20.974	0.023	4.06
9/13/2016	14:40:03	20.746	0.272	25
9/13/2016	14:41:03	20.533	0.471	52.23
9/13/2016	14:42:03	20.901	0.063	27.41
9/13/2016	14:57:03	20.966	0.003	4.18
9/13/2016	14:58:03	20.811	0.177	10.04
9/13/2016	14:59:03	20.563	0.442	52.49
9/13/2016	15:00:03	20.812	0.161	35.25
9/13/2016	15:21:03	21.009	0.046	3.89
9/13/2016	15:22:04	20.824	0.223	12.08
9/13/2016	15:23:03	20.568	0.434	50.07
9/13/2016	15:24:03	20.809	0.148	33.56
9/13/2016	15:33:03	20.952	0.009	4.55
9/13/2016	15:34:03	20.946	0.008	5.55
9/13/2016	15:35:03	20.656	0.32	31.69
9/13/2016	15:36:03	20.597	0.392	47.73
9/13/2016	15:50:03	20.781	0.197	32.78
9/13/2016	15:51:03	20.695	0.28	31.19
9/13/2016	15:52:03	20.459	0.519	60.3
9/13/2016	16:06:03	20.875	0.171	8.98
9/13/2016	16:07:03	20.308	0.667	69.43
9/13/2016	16:08:03	20.588	0.365	63.04
9/13/2016	16:21:03	20.896	0.094	9.94
9/13/2016	16:22:03	20.297	0.673	64.51
9/13/2016	16:23:03	20.626	0.333	49.31
9/13/2016	16:24:03	20.95	0.019	8.32
9/13/2016	16:42:03	20.879	0.101	5.57
9/13/2016	16:43:03	20.301	0.679	55.1
9/13/2016	16:44:03	20.679	0.34	46.95
9/13/2016	16:51:03	20.953	0.016	4.98
9/13/2016	16:52:03	20.569	0.413	31.7
9/13/2016	16:53:03	20.564	0.4	52.4
9/13/2016	16:54:03	20.939	0.013	11.36
9/13/2016	17:00:03	20.957	0.017	5.61
9/13/2016	17:01:03	20.599	0.385	33.53
9/13/2016	17:02:03	20.632	0.324	57.98
9/13/2016	17:09:03	20.948	0.005	4.31
9/13/2016	17:10:03	20.7	0.253	25.33
9/13/2016	17:11:03	20.586	0.324	87.34
9/13/2016	17:21:03	20.95	0.007	4.23
9/13/2016	17:22:04	20.62	0.355	32.67
9/13/2016	17:23:03	20.704	0.249	48.01
9/13/2016	17:30:03	20.963	0.02	5.04
9/13/2016	17:31:03	20.886	0.108	6.09
9/13/2016	17:32:03	20.514	0.475	48.91
Average		20.73427	0.250059	30.3551

		O2	CO2	CO
		%	%	ppm
9/13/2016	22:32:18	20.958	0.004	3.85
9/13/2016	22:33:18	20.607	0.379	34.13
9/13/2016	22:34:18	20.388	0.575	70.52
9/13/2016	22:35:18	20.938	0.018	23.93
9/13/2016	22:36:17	20.954	0.017	5.09
9/13/2016	22:44:18	20.957	0.016	5
9/13/2016	22:45:18	20.949	0.017	4.4
9/13/2016	22:46:18	20.465	0.529	44.77
9/13/2016	22:47:18	20.668	0.285	53.21
9/13/2016	22:48:18	20.946	0.022	7.18
9/13/2016	23:03:18	20.954	0.011	4.49
9/13/2016	23:04:18	20.895	0.073	4.73
9/13/2016	23:05:18	20.386	0.61	52.85
9/13/2016	23:06:17	20.813	0.143	53.1
9/13/2016	23:22:18	20.955	0.016	11.29
9/13/2016	23:23:18	20.709	0.285	24.22
9/13/2016	23:24:18	20.487	0.492	58.1
9/13/2016	23:25:18	20.876	0.079	35.49
9/13/2016	23:26:18	20.95	0.007	4.79
9/13/2016	23:41:18	20.956	0.004	4.07
9/13/2016	23:42:17	20.68	0.311	23.66
9/13/2016	23:43:17	20.358	0.604	63.19
9/13/2016	23:44:18	20.905	0.048	33.44
9/13/2016	23:45:17	20.952	0.011	4.56
9/14/2016	0:00:17	20.953	0.005	3.92
9/14/2016	0:01:18	20.605	0.384	28.32
9/14/2016	0:02:18	20.532	0.414	63.58
9/14/2016	0:03:18	20.948	0.018	11.22
9/14/2016	0:04:18	20.952	0	4.1
9/14/2016	0:20:18	20.526	0.482	42.24
9/14/2016	0:21:18	20.814	0.155	41.84
9/14/2016	0:22:18	20.951	0.018	5.01
9/14/2016	0:40:18	20.956	0.022	5.29
9/14/2016	0:41:18	20.617	0.363	35.82
9/14/2016	0:42:17	20.656	0.312	69.11
9/14/2016	0:43:17	20.954	0.017	12.66
9/14/2016	0:44:17	20.956	0.021	3.81
9/14/2016	0:57:17	20.836	0.146	8.15
9/14/2016	0:58:17	20.488	0.481	65.44
9/14/2016	0:59:18	20.912	0.036	32.25
9/14/2016	1:00:18	20.948	0.009	4.28
9/14/2016	1:16:18	20.952	0.014	4.14
9/14/2016	1:17:18	20.619	0.368	35.52
9/14/2016	1:18:17	20.471	0.517	63.82
9/14/2016	1:19:17	20.9	0.046	32.7

9/14/2016	1:35:17	20.958	0.007	3.88
9/14/2016	1:36:18	20.735	0.243	19.45
9/14/2016	1:37:18	20.78	0.173	57.6
9/14/2016	1:38:18	20.943	0.015	8.21
9/14/2016	1:39:18	20.952	0.006	3.92
9/14/2016	1:45:17	20.951	0.003	3.92
9/14/2016	1:46:18	20.583	0.409	32.67
9/14/2016	1:47:18	20.726	0.243	51.77
9/14/2016	1:48:18	20.933	0.007	9.3
9/14/2016	2:47:18	20.956	0.009	3.84
9/14/2016	2:48:18	20.656	0.323	26.74
9/14/2016	2:49:18	20.547	0.451	61.64
9/14/2016	2:50:18	20.921	0.029	27.95
9/14/2016	2:58:17	20.92	0.046	4.43
9/14/2016	2:59:17	20.518	0.478	44.4
9/14/2016	3:00:18	20.749	0.218	39.17
9/14/2016	3:01:18	20.939	0.006	6.16
9/14/2016	3:08:17	20.956	0.007	3.7
9/14/2016	3:09:17	20.774	0.203	12.72
9/14/2016	3:10:17	20.572	0.404	59.38
9/14/2016	3:11:17	20.936	0.013	23.87
9/14/2016	3:24:17	20.947	0.011	4.11
9/14/2016	3:25:17	20.453	0.518	40.25
9/14/2016	3:26:18	20.764	0.183	48.9
9/14/2016	3:27:18	20.942	0.025	5.88
9/14/2016	3:42:18	20.952	0.009	3.82
9/14/2016	3:43:18	20.523	0.47	43.74
9/14/2016	3:44:18	20.823	0.123	52.03
9/14/2016	3:45:17	20.944	0.016	4.88
9/14/2016	3:59:18	20.956	0.011	3.97
9/14/2016	4:00:18	20.898	0.073	4.41
9/14/2016	4:01:18	20.556	0.428	46.83
9/14/2016	4:02:18	20.845	0.117	36.93
9/14/2016	4:03:18	20.947	0.01	4.81
9/14/2016	4:16:18	20.986	0.033	3.82
9/14/2016	4:17:18	20.966	0.011	3.56
9/14/2016	4:18:18	20.927	0.193	5.82
9/14/2016	4:19:17	20.685	0.551	55.85
9/14/2016	4:20:17	20.984	0.146	30.1
9/14/2016	4:33:18	21.002	0.062	3.56
9/14/2016	4:34:18	20.564	0.442	33.03
9/14/2016	4:35:18	20.847	0.134	30.6
9/14/2016	4:36:18	20.95	0.004	4.59
Average		20.80361	0.173261	24.76693

		O2	CO2	CO
		%	%	ppm
9/14/2016	13:13:45	20.883	0.267	17.26
9/14/2016	13:14:45	20.453	0.712	73.1
9/14/2016	13:15:45	20.854	0.29	58.81
9/14/2016	13:25:45	21.044	0.36	10.19
9/14/2016	13:26:45	20.925	0.502	31.97
9/14/2016	13:27:45	21.175	0.204	12.19
9/14/2016	14:24:45	20.987	0.055	4.65
9/14/2016	14:25:45	20.596	0.474	45.54
9/14/2016	14:26:45	20.632	0.391	54.03
9/14/2016	14:27:44	21.004	0.067	15.63
9/14/2016	14:34:45	20.997	0.044	4.48
9/14/2016	14:35:45	20.631	0.434	35.26
9/14/2016	14:36:44	20.579	0.456	51.58
9/14/2016	14:37:44	20.966	0.067	24.47
9/14/2016	14:48:44	20.969	0.019	4.63
9/14/2016	14:49:44	20.612	0.405	40.67
9/14/2016	14:50:44	20.67	0.342	42.92
9/14/2016	14:51:45	20.96	0.019	14.67
9/14/2016	15:04:44	20.97	0.011	4.61
9/14/2016	15:05:44	20.49	0.531	50.12
9/14/2016	15:06:44	20.584	0.417	45.38
9/14/2016	15:22:45	20.725	0.281	19.53
9/14/2016	15:23:45	20.551	0.494	59.71
9/14/2016	15:24:45	20.886	0.089	29.13
9/14/2016	15:47:44	20.967	0.029	4.42
9/14/2016	15:48:44	20.543	0.488	44.21
9/14/2016	15:49:44	20.61	0.428	51.2
9/14/2016	15:50:44	20.978	0.047	16.72
9/14/2016	15:58:44	20.793	0.189	12.93
9/14/2016	15:59:45	20.441	0.572	66.7
9/14/2016	16:00:45	20.839	0.176	37.72
9/14/2016	16:13:44	21.019	0.078	5.69
9/14/2016	16:14:44	20.639	0.388	39.97
9/14/2016	16:15:44	20.57	0.523	59.98
9/14/2016	16:16:44	20.965	0.128	28.47
9/14/2016	16:35:44	20.781	0.395	25.25
9/14/2016	16:36:44	20.679	0.466	66.59
9/14/2016	16:37:44	20.988	0.126	29.84
9/14/2016	16:48:44	21.017	0.067	4.63
9/14/2016	16:49:44	20.831	0.273	14.35
9/14/2016	16:50:44	20.549	0.474	70.08
9/14/2016	16:51:45	20.88	0.139	39.27
9/14/2016	17:05:44	20.738	0.264	18.8
9/14/2016	17:06:44	20.632	0.363	67.62
9/14/2016	17:07:45	20.91	0.074	30.27
9/14/2016	17:22:45	20.886	0.117	6.49
9/14/2016	17:23:44	20.546	0.452	67.42
9/14/2016	17:24:44	20.79	0.198	51.15
9/14/2016	17:35:44	20.961	0.037	4.78
9/14/2016	17:36:44	20.554	0.498	50.23
9/14/2016	17:37:44	20.695	0.3	52.96
Average		20.78322	0.278824	33.69157

		O2	CO2	CO
		%	%	ppm
9/14/2016	23:03:22	20.996	0.015	4.52
9/14/2016	23:04:22	20.762	0.279	18.17
9/14/2016	23:05:23	20.659	0.371	48.56
9/14/2016	23:06:23	20.986	0.017	15.79
9/14/2016	23:22:22	21.013	0.013	4.28
9/14/2016	23:23:22	20.775	0.276	18.29
9/14/2016	23:24:22	20.532	0.509	64.37
9/14/2016	23:25:22	20.964	0.045	33.86
9/14/2016	23:42:23	21.018	0.014	4.24
9/14/2016	23:43:22	20.685	0.363	24.87
9/14/2016	23:44:22	20.672	0.366	58.98
9/14/2016	23:45:22	21.005	0.019	16.66
9/15/2016	0:00:23	21.02	0.024	4.2
9/15/2016	0:01:23	20.691	0.362	26.32
9/15/2016	0:02:23	20.564	0.462	59.73
9/15/2016	0:03:23	21.005	0.028	15.91
9/15/2016	0:04:22	21.012	0.016	5.12
9/15/2016	0:19:22	21.017	0.015	4.44
9/15/2016	0:20:22	20.502	0.551	37.68
9/15/2016	0:21:22	20.362	0.675	49.38
9/15/2016	0:22:22	20.918	0.099	35.92
9/15/2016	0:23:22	21.015	0.025	5.39
9/15/2016	0:39:22	21.018	0.012	4.01
9/15/2016	0:40:22	20.748	0.321	31.48
9/15/2016	0:41:22	20.697	0.367	40.63
9/15/2016	0:42:22	20.754	0.293	45.19
9/15/2016	0:43:22	20.999	0.035	16.62
9/15/2016	0:57:22	20.866	0.178	10.48
9/15/2016	0:58:22	20.649	0.399	48.57
9/15/2016	0:59:22	20.944	0.087	31.91
9/15/2016	1:00:22	21.017	0.019	4.73
9/15/2016	1:16:22	21.022	0.019	3.9
9/15/2016	1:17:22	20.915	0.129	9.03
9/15/2016	1:18:22	20.632	0.423	49.14
9/15/2016	1:19:22	20.875	0.16	38.25
9/15/2016	1:20:22	21.02	0.021	5.18
9/15/2016	1:35:22	20.975	0.071	3.95
9/15/2016	1:36:22	20.726	0.32	45.64
9/15/2016	1:37:22	21.009	0.016	13.52
9/15/2016	1:38:22	21.017	0.015	5
9/15/2016	1:45:22	20.699	0.357	26.35
9/15/2016	1:46:22	20.751	0.292	47.2
9/15/2016	1:47:22	20.847	0.18	29.33
9/15/2016	1:48:22	20.878	0.146	22.84
9/15/2016	3:18:22	20.998	0.029	8.35
9/15/2016	3:19:23	20.982	0.053	5.25
9/15/2016	3:20:23	20.649	0.398	45.67
9/15/2016	3:21:22	20.749	0.299	61.28
9/15/2016	3:22:22	21.005	0.014	28
Average		20.84927	0.187694	25.26898

		O2	CO2	CO
		%	%	ppm
9/15/2016	13:08:32	20.742	0.288	26.75
9/15/2016	13:09:32	20.604	0.428	66.36
9/15/2016	13:18:32	21.004	0.028	4.92
9/15/2016	13:19:32	20.67	0.376	35.56
9/15/2016	13:20:32	20.543	0.498	52.23
9/15/2016	13:32:32	20.861	0.245	12.26
9/15/2016	13:33:32	20.438	0.622	51.95
9/15/2016	13:34:32	20.807	0.223	37.99
9/15/2016	13:41:32	20.993	0.025	5.39
9/15/2016	13:42:32	20.509	0.575	43.76
9/15/2016	13:43:32	20.639	0.493	42.29
9/15/2016	14:36:32	20.815	0.212	11
9/15/2016	14:37:32	20.515	0.502	59.74
9/15/2016	14:38:32	20.791	0.225	40.64
9/15/2016	14:48:32	20.904	0.119	6.97
9/15/2016	14:49:31	20.408	0.584	64.6
9/15/2016	14:50:31	20.751	0.244	50.07
9/15/2016	15:04:32	20.992	0.012	5.61
9/15/2016	15:05:32	20.532	0.495	40.15
9/15/2016	15:06:32	20.359	0.684	59.94
9/15/2016	15:21:32	20.983	0.032	5.61
9/15/2016	15:22:32	20.448	0.624	53.76
9/15/2016	15:23:32	20.512	0.537	48.2
9/15/2016	15:39:32	21.022	0.053	5.47
9/15/2016	15:40:32	20.774	0.257	18.89
9/15/2016	15:41:32	20.608	0.403	45.25
9/15/2016	15:42:32	20.885	0.12	24.18
9/15/2016	15:56:32	21.023	0.064	5.28
9/15/2016	15:57:32	20.596	0.462	35.86
9/15/2016	15:58:32	20.455	0.582	51.99
9/15/2016	16:13:32	20.984	0.023	5.48
9/15/2016	16:14:32	20.704	0.305	22.24
9/15/2016	16:15:32	20.601	0.415	52.66
9/15/2016	16:16:32	20.845	0.153	27.02
9/15/2016	16:31:32	20.883	0.23	9.64
9/15/2016	16:32:32	20.463	0.58	57.94
9/15/2016	16:33:32	20.777	0.23	33
9/15/2016	16:48:32	20.968	0.012	5.71
9/15/2016	16:49:32	20.927	0.062	6.02
9/15/2016	16:50:32	20.542	0.467	48.08
9/15/2016	17:05:32	20.978	0.046	5.84
9/15/2016	17:06:32	20.74	0.296	20.62
9/15/2016	17:07:32	20.522	0.51	53.82
9/15/2016	17:08:32	20.872	0.114	32.32
9/15/2016	17:09:32	20.967	0.049	7.51
9/15/2016	17:22:32	20.968	0.022	6.33
9/15/2016	17:23:32	20.773	0.281	25.91
9/15/2016	17:24:32	20.678	0.357	41.07
9/15/2016	17:35:32	20.972	0.028	5.75
9/15/2016	17:36:32	20.663	0.351	32.14
9/15/2016	17:37:32	20.586	0.436	47.72
Average		20.73718	0.293706	30.57824

	Oxygen						
Date	Span	Pretest zero	Posttest zero	Pretest span	Posttest span	Conc. Measured	Cal. Correct %
8/29/2016	21.89	0.294	0.253	21.827	21.744	15.33	15.32
9/6/2016	21.89	0.075	0.047	21.769	21.956	15.01	15.01
9/7/2016	21.89	0.088	-0.063	21.972	21.68	14.17	14.21
9/8/2016	21.89	0.074	0.076	21.981	21.918	13.72	13.65
9/12/2016	21.89	0.085	-0.098	22.179	21.879	14.72	14.63
9/13/2016	21.89	0.072	-0.129	21.925	21.936	14.38	14.37
9/14/2016	21.89	-0.101	-0.139	21.749	21.957	14.08	14.14
9/15/2016	21.89	-0.022	-0.139	21.963	22.005	12.46	12.44

	Carbon Dioxide						
Date	Span	Pretest zero	Posttest zero	Pretest span	Posttest span	Conc. Measured	Cal. Correct %
8/29/2016	11.23	0.182	0.163	11.052	10.94	2.90	2.83
9/6/2016	11.23	0.158	0.134	11.083	11.242	3.08	2.99
9/7/2016	11.23	0.164	0.045	11.021	10.714	3.61	3.66
9/8/2016	11.23	0.164	0.199	11.117	10.979	3.84	3.78
9/12/2016	11.23	0.146	0.018	11.218	10.946	3.45	3.44
9/13/2016	11.23	0.172	0.045	10.994	11.074	3.59	3.58
9/14/2016	11.23	0.022	0.01	10.844	11.003	3.64	3.73
9/15/2016	11.23	0.015	0.022	10.99	11.093	3.93	3.99

	Carbon Monoxide							
Date	Span	Pretest zero	Posttest zero	Pretest span	Posttest span	Conc. Measured	Cal. Correct ppm	Dry Molecular Weight
8/29/2016	190.9	0.19	0.99	186.74	186.18	68.23	69.47	29.07
9/6/2016	190.9	0.91	0.04	189.87	185.75	59.98	60.63	29.08
9/7/2016	190.9	2.98	3.68	188.64	186.11	67.79	66.86	29.15
9/8/2016	190.9	3.3	2.54	191.97	188.12	84.29	83.01	29.15
9/12/2016	190.9	5.26	7.2	192.03	193.01	91.08	86.95	29.14
9/13/2016	190.9	1.02	1	189	190.45	69.86	69.65	29.15
9/14/2016	190.9	3.12	2.02	190.33	190.33	76.08	74.74	29.16
9/15/2016	190.9	1.99	2	189.26	190.79	73.28	72.37	29.14

		O2	CO2	CO
		%	%	ppm
8/29/2016	10:24:32	14.677	3.214	28.65
8/29/2016	10:25:32	14.668	3.224	28.45
8/29/2016	10:26:32	14.63	3.246	28.12
8/29/2016	10:27:32	14.605	3.254	28.16
8/29/2016	10:28:32	14.605	3.23	28.08
8/29/2016	10:29:32	14.672	3.248	27.9
8/29/2016	10:30:32	14.656	3.252	28.1
8/29/2016	10:31:32	14.7	3.235	27.79
8/29/2016	10:32:32	14.621	3.262	28.17
8/29/2016	10:33:32	14.631	3.246	27.97
8/29/2016	10:34:32	15.729	2.664	25.91
8/29/2016	10:35:32	16.523	2.318	78.84
8/29/2016	10:36:32	15.152	3.041	98.16
8/29/2016	10:37:32	15.119	3.064	83.34
8/29/2016	10:38:32	15.026	3.062	76.28
8/29/2016	10:39:32	15.062	3.04	73.2
8/29/2016	10:40:32	15.161	3.008	70.05
8/29/2016	10:41:32	15.372	2.913	67.28
8/29/2016	10:42:32	15.595	2.856	66.02
8/29/2016	10:43:32	15.72	2.745	65.22
8/29/2016	10:44:32	15.728	2.752	63.26
8/29/2016	10:45:32	15.725	2.756	62.69
8/29/2016	10:46:32	15.668	2.728	62.2
8/29/2016	10:47:32	15.504	2.836	63.68
8/29/2016	10:48:32	15.116	3.014	70.81
8/29/2016	10:49:32	15.145	2.998	72.12
8/29/2016	10:50:32	15.366	2.911	65.04
8/29/2016	10:51:32	15.302	2.914	63.61
8/29/2016	10:52:32	15.163	3.004	64.51
8/29/2016	10:53:32	15.072	3.04	65.01
8/29/2016	10:54:32	15.068	3.036	66.02
8/29/2016	10:55:32	15.296	2.941	64.88
8/29/2016	10:56:32	15.448	2.911	66.39
8/29/2016	10:57:32	15.628	2.799	65.68
8/29/2016	10:58:32	15.687	2.783	65.64
8/29/2016	10:59:32	15.644	2.755	67.31
8/29/2016	11:00:32	15.69	2.761	73.68
8/29/2016	11:01:32	15.591	2.798	77.48
8/29/2016	11:02:32	15.698	2.684	81.22
8/29/2016	11:03:32	17.206	1.965	63.86
8/29/2016	11:04:32	15.343	3.039	78.63
8/29/2016	11:05:32	14.84	3.281	59.58
8/29/2016	11:06:32	14.808	3.266	49.92
8/29/2016	11:07:32	14.754	3.235	54.7
8/29/2016	11:08:32	14.868	3.197	61.26

8/29/2016	11:09:32	14.936	3.167	53
8/29/2016	11:10:32	14.982	3.102	67.47
8/29/2016	11:11:32	14.97	3.117	71.14
8/29/2016	11:12:32	15.022	3.071	53.79
8/29/2016	11:13:32	14.98	3.093	45.64
8/29/2016	11:14:32	14.857	3.138	45.45
8/29/2016	11:15:32	14.748	3.174	47.36
8/29/2016	11:16:32	14.813	3.202	43.58
8/29/2016	11:17:31	14.73	3.187	41.73
8/29/2016	11:18:32	14.721	3.133	39.01
8/29/2016	11:19:32	14.885	2.982	34.73
8/29/2016	11:20:32	15.023	2.997	32.31
8/29/2016	11:21:32	15.116	2.958	30.23
8/29/2016	11:22:32	15.126	2.958	28.67
8/29/2016	11:23:32	15.126	2.971	29.27
8/29/2016	11:35:32	16.976	2.128	104.06
8/29/2016	11:36:32	15.605	2.832	112.29
8/29/2016	11:37:32	15.501	2.899	95.17
8/29/2016	11:38:32	15.425	2.891	87.51
8/29/2016	11:39:32	15.524	2.832	81.23
8/29/2016	11:40:32	15.475	2.854	82.05
8/29/2016	11:41:32	15.715	2.773	80.04
8/29/2016	11:42:32	15.895	2.667	68.23
8/29/2016	11:43:32	15.632	2.748	66.47
8/29/2016	11:44:32	15.3	2.927	83.21
8/29/2016	11:45:32	15.193	2.949	94.55
8/29/2016	11:46:32	15.251	2.942	97.09
8/29/2016	11:47:31	15.534	2.868	96.21
8/29/2016	11:48:32	15.634	2.841	90.92
8/29/2016	11:49:32	15.686	2.739	85.53
8/29/2016	11:50:32	15.723	2.811	78.53
8/29/2016	11:51:32	15.626	2.822	86.43
8/29/2016	11:52:32	15.544	2.861	96.4
8/29/2016	11:53:32	15.504	2.833	97.57
8/29/2016	11:54:32	15.594	2.777	94.09
8/29/2016	11:55:32	15.637	2.734	87.58
8/29/2016	11:56:32	15.7	2.736	80.89
8/29/2016	11:57:32	15.708	2.691	67.56
8/29/2016	11:58:31	15.857	2.662	65.2
8/29/2016	11:59:32	15.824	2.659	63.48
8/29/2016	12:00:32	15.852	2.638	63.27
8/29/2016	12:01:32	15.8	2.611	59.31
8/29/2016	12:02:32	16.002	2.549	59.48
8/29/2016	12:03:32	17.522	1.835	51.54
8/29/2016	12:04:32	15.772	2.806	74.86
8/29/2016	12:05:32	15.521	2.862	51.18
8/29/2016	12:06:32	15.557	2.926	45.15

8/29/2016	12:07:31	15.576	2.823	37.98
8/29/2016	12:08:32	15.498	2.819	34.45
8/29/2016	12:09:32	15.367	2.857	32.48
8/29/2016	12:10:32	15.295	2.855	30.85
8/29/2016	12:11:32	15.349	2.816	29.48
8/29/2016	12:12:32	15.531	2.748	28.41
8/29/2016	12:13:32	15.635	2.669	27.44
8/29/2016	12:14:32	15.693	2.653	26.72
8/29/2016	12:15:32	15.638	2.671	26.47
8/29/2016	12:16:32	15.689	2.632	25.89
8/29/2016	12:17:32	15.711	2.603	24.95
8/29/2016	12:18:32	15.68	2.652	24.63
8/29/2016	12:19:32	15.602	2.68	30.52
8/29/2016	12:20:32	15.606	2.724	74.18
8/29/2016	12:21:32	15.596	2.781	113.59
8/29/2016	12:22:32	15.567	2.768	88.41
8/29/2016	12:23:32	15.418	2.78	84.8
8/29/2016	12:24:32	15.5	2.706	92.96
8/29/2016	12:25:32	15.521	2.761	79.32
8/29/2016	12:26:32	15.448	2.769	61.45
8/29/2016	12:27:32	15.269	2.866	69.09
8/29/2016	12:28:32	15.325	2.808	58.45
8/29/2016	12:29:32	15.528	2.717	40.35
8/29/2016	12:30:32	15.401	2.753	34.94
8/29/2016	12:31:32	15.38	2.794	31.55
8/29/2016	12:32:32	15.395	2.835	30.48
8/29/2016	12:33:32	15.446	2.839	29.32
8/29/2016	12:34:32	16.748	2.225	23.16
8/29/2016	12:45:32	15.955	2.557	152.84
8/29/2016	12:46:32	15.819	2.567	270.18
8/29/2016	12:47:32	15.945	2.602	309.18
8/29/2016	12:48:32	15.834	2.703	226.78
8/29/2016	12:49:32	15.72	2.657	150.74
8/29/2016	12:50:32	15.801	2.571	140
8/29/2016	12:51:32	15.619	2.648	239.05
8/29/2016	12:52:32	15.054	2.911	285.18
8/29/2016	12:53:32	15.121	2.889	244.18
8/29/2016	12:54:32	15.155	2.864	194.13
8/29/2016	12:55:32	15.089	2.892	168.97
8/29/2016	12:56:32	15.197	2.862	145.04
8/29/2016	12:57:32	15.122	2.888	128.76
8/29/2016	12:58:32	15.169	2.929	116.91
8/29/2016	12:59:32	15.042	2.986	125.56
8/29/2016	13:00:31	15.126	3.02	122.46
8/29/2016	13:01:31	15.101	2.912	106.04
8/29/2016	13:02:32	15.478	2.7	85.74
8/29/2016	13:03:32	17.031	1.962	68.54

8/29/2016	13:04:32	15.346	3.026	107.11
8/29/2016	13:05:32	15.125	3.061	55.34
8/29/2016	13:06:32	15.051	3.08	44.53
8/29/2016	13:07:32	14.906	3.165	38.93
8/29/2016	13:08:32	14.799	3.174	34.88
8/29/2016	13:09:32	14.799	3.145	32.32
8/29/2016	13:10:32	14.932	3.173	30.7
8/29/2016	13:11:32	15.081	3.016	29.53
8/29/2016	13:12:32	15.014	3.062	28.27
8/29/2016	13:13:32	14.968	3.233	27.84
8/29/2016	13:14:32	14.834	3.246	27.53
8/29/2016	13:15:32	14.866	3.142	27
8/29/2016	13:16:32	14.895	3.065	26.15
8/29/2016	13:17:32	15.046	3.004	25.6
8/29/2016	13:18:32	15.129	2.963	25.56
8/29/2016	13:19:32	15.214	2.955	26.08
8/29/2016	13:20:32	15.092	3.003	25.53
8/29/2016	13:21:32	14.977	3.1	25.97
8/29/2016	13:22:32	14.841	3.165	26.31
8/29/2016	13:23:32	14.742	3.111	26.64
8/29/2016	13:24:32	14.745	3.115	39.8
8/29/2016	13:25:32	14.796	3.168	40.91
8/29/2016	13:26:32	14.898	3.008	31.31
8/29/2016	13:27:32	14.998	2.977	25.69
8/29/2016	13:28:32	15.013	2.97	24.66
8/29/2016	13:29:32	15.103	3.011	24.39
8/29/2016	13:30:32	14.975	3.032	24.77
8/29/2016	13:31:32	14.844	3.071	24.94
8/29/2016	13:32:32	14.846	3.092	24.85
8/29/2016	13:33:32	14.677	3.155	25.21
8/29/2016	13:34:32	16.083	2.414	22.41
8/29/2016	13:35:32	16.38	2.332	72.76
8/29/2016	13:36:32	14.789	3.193	126.32
8/29/2016	13:37:32	14.762	3.216	129.76
8/29/2016	13:38:32	14.884	3.237	127.22
8/29/2016	13:39:32	14.99	3.112	87.01
8/29/2016	13:40:32	15.035	3.019	68.95
8/29/2016	13:41:32	15.132	2.983	63.47
8/29/2016	13:42:32	15.094	2.989	61.27
8/29/2016	13:43:32	15.035	3.094	65.43
8/29/2016	13:44:32	14.965	3.161	61.23
Average		15.32721	2.896894	68.23394

		O2 %	CO2 %	CO ppm
9/6/2016	10:02:01	14.171	3.458	80.87
9/6/2016	10:03:00	14.751	3.022	78.13
9/6/2016	10:04:00	16.212	2.353	63.11
9/6/2016	10:05:00	14.599	3.425	83.2
9/6/2016	10:06:00	14.072	3.557	70.98
9/6/2016	10:07:00	13.851	3.692	61.04
9/6/2016	10:08:00	13.839	3.707	53.8
9/6/2016	10:09:00	13.783	3.705	48.37
9/6/2016	10:10:00	13.889	3.603	44.67
9/6/2016	10:11:00	13.838	3.584	42.32
9/6/2016	10:12:00	13.877	3.579	40.08
9/6/2016	10:13:01	14.006	3.612	38.56
9/6/2016	10:14:01	13.894	3.617	37.75
9/6/2016	10:15:01	13.919	3.543	36.33
9/6/2016	10:16:00	13.878	3.596	35.81
9/6/2016	10:17:00	13.884	3.636	35.02
9/6/2016	10:18:00	13.781	3.587	34.49
9/6/2016	10:19:00	13.644	3.659	34.43
9/6/2016	10:20:00	13.687	3.585	33.26
9/6/2016	10:21:00	13.683	3.602	33.2
9/6/2016	10:22:00	13.685	3.593	32.82
9/6/2016	10:23:01	13.715	3.588	31.94
9/6/2016	10:24:01	13.678	3.587	31.88
9/6/2016	10:25:01	13.727	3.597	32.05
9/6/2016	10:26:01	13.652	3.623	31.71
9/6/2016	10:27:00	13.82	3.518	31.59
9/6/2016	10:28:00	13.703	3.598	31.61
9/6/2016	10:29:00	13.715	3.631	31.74
9/6/2016	10:30:00	13.67	3.611	31.8
9/6/2016	10:31:00	13.694	3.514	31.32
9/6/2016	10:32:00	13.7	3.517	30.82
9/6/2016	10:33:00	13.71	3.582	31.07
9/6/2016	10:34:00	13.717	3.6	30.57
9/6/2016	10:35:00	14.653	2.945	28.14
9/6/2016	10:36:00	16.253	2.258	88.67
9/6/2016	10:37:01	14.557	3.273	120.09
9/6/2016	10:38:01	14.1	3.372	103.08
9/6/2016	10:39:01	14	3.377	94.66
9/6/2016	10:40:01	14.145	3.338	90.14
9/6/2016	10:41:00	14.212	3.291	86.53
9/6/2016	10:42:00	14.309	3.215	83.36
9/6/2016	10:43:00	14.561	3.109	80.57
9/6/2016	10:44:00	14.653	3.053	78.67
9/6/2016	10:45:00	14.669	3.049	78.67
9/6/2016	10:46:00	14.718	3.035	77.59

9/6/2016	10:47:00	14.794	3.002	75.57
9/6/2016	10:48:00	14.756	3.011	75.67
9/6/2016	10:49:00	14.773	2.998	76.43
9/6/2016	10:50:00	14.779	3.025	77.08
9/6/2016	10:51:01	14.501	3.155	79.01
9/6/2016	10:52:01	14.441	3.171	79.02
9/6/2016	10:53:01	14.473	3.144	77.92
9/6/2016	10:54:01	14.491	3.139	77.59
9/6/2016	10:55:00	14.516	3.123	78.13
9/6/2016	10:56:00	14.433	3.147	76.23
9/6/2016	10:57:00	14.413	3.147	76.93
9/6/2016	10:58:00	14.553	3.097	88.87
9/6/2016	10:59:00	14.492	3.112	106.52
9/6/2016	11:00:00	14.415	3.146	111.89
9/6/2016	11:01:01	14.399	3.139	90.21
9/6/2016	11:02:01	14.36	3.131	80.01
9/6/2016	11:03:00	14.386	3.141	76.56
9/6/2016	11:04:00	16.35	2.049	59.46
9/6/2016	11:05:00	15.295	2.929	82.93
9/6/2016	11:06:00	14.148	3.395	71.56
9/6/2016	11:07:00	14.103	3.388	58.45
9/6/2016	11:08:00	14.103	3.321	50.37
9/6/2016	11:09:00	14.375	3.182	45.64
9/6/2016	11:10:01	14.705	3.001	40.81
9/6/2016	11:11:01	14.883	2.922	38.65
9/6/2016	11:12:01	14.968	2.881	35.83
9/6/2016	11:13:01	15.106	2.835	34.75
9/6/2016	11:14:00	15.16	2.815	32.99
9/6/2016	11:15:00	15.107	2.825	32.29
9/6/2016	11:16:00	15.19	2.805	31.97
9/6/2016	11:17:00	15.173	2.808	30.96
9/6/2016	11:18:00	15.164	2.827	31.22
9/6/2016	11:19:00	15.27	2.877	30.01
9/6/2016	11:20:00	15.289	2.873	29.92
9/6/2016	11:21:00	15.125	2.948	29.76
9/6/2016	11:22:00	15.126	2.917	29.78
9/6/2016	11:23:01	15.143	2.896	29.2
9/6/2016	11:24:01	15.058	2.936	29.4
9/6/2016	11:25:00	15.021	2.933	29.38
9/6/2016	11:26:00	15.002	2.924	33.54
9/6/2016	11:27:00	14.919	2.969	88.14
9/6/2016	11:28:00	14.884	2.98	178.42
9/6/2016	11:29:00	14.875	2.965	217.08
9/6/2016	11:30:00	14.932	2.986	213.22
9/6/2016	11:31:00	14.903	2.955	174.71
9/6/2016	11:32:00	14.85	3.062	126.19
9/6/2016	11:33:00	14.623	3.124	105.86

9/6/2016	11:34:01	14.531	3.147	78.42
9/6/2016	11:35:01	15.155	2.741	51.7
9/6/2016	11:36:01	16.801	2.236	85.58
9/6/2016	11:37:01	15.524	2.991	164.07
9/6/2016	11:38:00	14.965	3.178	105.62
9/6/2016	11:39:00	14.702	3.252	120.71
9/6/2016	11:40:00	14.684	3.108	131.25
9/6/2016	11:41:00	15.003	3.144	100.75
9/6/2016	11:42:00	15.133	3.011	81.48
9/6/2016	11:43:00	15.121	3.061	75.79
9/6/2016	11:44:00	15.011	3.006	75.61
9/6/2016	11:45:00	14.936	3.033	74.39
9/6/2016	11:46:00	14.838	3.06	74.31
9/6/2016	11:47:00	14.849	3.068	72.62
9/6/2016	11:48:00	14.91	3.052	73.67
9/6/2016	11:49:00	14.989	3.161	73.22
9/6/2016	11:50:00	14.986	3.142	72.32
9/6/2016	11:51:00	14.964	3.049	70.95
9/6/2016	11:52:01	15.056	3.053	70.86
9/6/2016	11:53:01	14.952	3	69.76
9/6/2016	11:54:01	14.935	2.991	70.39
9/6/2016	11:55:01	14.956	2.995	69.9
9/6/2016	11:56:01	14.92	2.996	70.01
9/6/2016	11:57:01	14.865	3.053	71.18
9/6/2016	11:58:01	14.705	3.113	72.56
9/6/2016	11:59:01	14.53	3.175	72.43
9/6/2016	12:00:01	14.416	3.237	74.5
9/6/2016	12:01:01	14.532	3.404	73.67
9/6/2016	12:02:01	14.314	3.49	74.8
9/6/2016	12:03:01	14.425	3.43	73.95
9/6/2016	12:04:01	15.698	2.615	61.46
9/6/2016	12:05:01	15.927	2.746	72.73
9/6/2016	12:06:00	14.195	3.544	73.84
9/6/2016	12:07:00	14.187	3.595	65.27
9/6/2016	12:08:01	14.194	3.592	67.92
9/6/2016	12:09:00	14.133	3.517	61.57
9/6/2016	12:10:00	14.079	3.546	46.47
9/6/2016	12:11:00	14.192	3.579	43.1
9/6/2016	12:12:00	14.301	3.525	40.24
9/6/2016	12:13:00	14.352	3.49	38.96
9/6/2016	12:14:00	14.246	3.55	38.43
9/6/2016	12:15:00	13.957	3.683	36.16
9/6/2016	12:16:00	13.906	3.682	34.33
9/6/2016	12:17:00	14.078	3.6	32.93
9/6/2016	12:18:01	14.414	3.438	32.4
9/6/2016	12:19:01	14.611	3.296	31.83
9/6/2016	12:20:01	14.734	3.288	30.84

9/6/2016	12:21:01	14.951	3.162	30.54
9/6/2016	12:22:01	15.226	3.05	30.16
9/6/2016	12:23:01	15.2	3.05	29.62
9/6/2016	12:24:01	15.277	2.953	29.38
9/6/2016	12:25:00	15.387	3.009	28.88
9/6/2016	12:26:00	15.188	3.03	40.26
9/6/2016	12:27:00	15.276	3.063	74.53
9/6/2016	12:28:00	15.336	3.011	117.97
9/6/2016	12:29:00	15.262	3.063	152.63
9/6/2016	12:30:00	15.279	3.053	97.8
9/6/2016	12:31:00	15.201	3.091	56.07
9/6/2016	12:32:00	15.058	3.106	39.81
9/6/2016	12:33:00	15.014	3.177	36.59
9/6/2016	12:34:00	14.94	3.222	29.49
9/6/2016	12:35:01	15.24	2.923	27.71
9/6/2016	12:36:00	16.904	2.071	59.41
9/6/2016	12:37:00	16.079	2.834	119.09
9/6/2016	12:38:00	15.384	3.016	92.2
9/6/2016	12:39:00	15.166	3.033	82.43
9/6/2016	12:40:00	15.056	3.112	78.5
9/6/2016	12:41:01	15.017	3.055	76.08
9/6/2016	12:42:01	14.995	3.134	74.5
9/6/2016	12:43:00	14.973	3.126	73.52
9/6/2016	12:44:01	14.953	3.147	74.53
9/6/2016	12:45:01	15.017	3.17	73.8
9/6/2016	12:46:01	14.844	3.102	73.67
9/6/2016	12:47:01	14.783	3.049	75.11
9/6/2016	12:48:01	18.833	0.608	42.8
9/6/2016	12:49:01	20.297	0.025	2.44
9/6/2016	12:50:01	20.28	0.025	3.13
9/6/2016	12:51:01	20.265	0.021	3.55
9/6/2016	12:52:01	20.259	0.018	4.66
9/6/2016	12:53:01	20.26	0.013	5.47
9/6/2016	12:54:00	20.258	0.024	7.24
9/6/2016	12:55:00	20.322	0.09	8.42
9/6/2016	12:56:00	20.262	0.022	8.76
9/6/2016	12:57:00	20.374	0.139	8.12
9/6/2016	12:58:00	20.388	0.143	8.22
9/6/2016	12:59:00	20.32	0.078	9.32
9/6/2016	13:08:00	15.195	3.571	27.38
9/6/2016	13:09:00	14.772	3.466	43.29
9/6/2016	13:10:01	14.565	3.491	40.71
9/6/2016	13:11:01	14.564	3.458	38.93
9/6/2016	13:12:01	16.956	2.016	23.82
9/6/2016	13:13:01	16.818	1.893	28.36
9/6/2016	13:14:01	14.469	3.629	28.82
9/6/2016	13:15:00	14.208	3.591	34.09

9/6/2016	13:16:00	14.168	3.632	33.13
9/6/2016	13:17:00	14.354	3.638	33.34
9/6/2016	13:18:00	14.343	3.599	33.04
9/6/2016	13:19:00	14.315	3.501	32.46
9/6/2016	13:20:00	14.201	3.587	46.03
9/6/2016	13:21:00	14.227	3.62	63.26
9/6/2016	13:22:01	14.268	3.757	72.22
9/6/2016	13:23:01	14.186	3.724	63.88
9/6/2016	13:24:01	14.228	3.604	35.87
9/6/2016	13:25:01	14.265	3.558	31.62
9/6/2016	13:26:01	14.311	3.678	31.64
9/6/2016	13:27:00	14.364	3.653	31.41
9/6/2016	13:28:00	14.286	3.686	30.78
9/6/2016	13:29:00	14.28	3.631	31.07
9/6/2016	13:30:00	14.086	3.654	31.21
9/6/2016	13:31:01	14.026	3.786	30.77
9/6/2016	13:32:01	13.834	3.776	31.01
9/6/2016	13:33:01	13.843	3.914	35.75
9/6/2016	13:34:00	14.426	3.571	64.79
9/6/2016	13:35:00	16.754	2.356	88.47
9/6/2016	13:36:00	15.508	3.28	249.17
9/6/2016	13:37:00	15.011	3.448	120.06
9/6/2016	13:38:00	14.987	3.42	91.7
9/6/2016	13:39:00	14.954	3.409	84.59
9/6/2016	13:40:00	14.895	3.43	80.93
9/6/2016	13:41:00	14.815	3.468	79.05
9/6/2016	13:42:00	14.779	3.493	77.76
9/6/2016	13:43:00	14.665	3.518	76.27
9/6/2016	13:44:01	14.762	3.494	76.48
9/6/2016	13:45:01	14.702	3.55	76.64
9/6/2016	13:46:01	14.609	3.53	76.61
9/6/2016	13:47:01	14.488	3.599	76.58
9/6/2016	13:48:01	14.311	3.641	76.53
9/6/2016	13:49:01	14.38	3.657	92.73
9/6/2016	13:50:01	14.421	3.525	147.42
9/6/2016	13:51:00	14.675	3.526	155.41
9/6/2016	13:52:00	14.714	3.428	124.04
9/6/2016	13:53:00	14.576	3.507	104.85
9/6/2016	13:54:01	14.517	3.572	95.56
9/6/2016	13:55:01	14.377	3.691	92.71
9/6/2016	13:56:00	14.29	3.741	86.43
9/6/2016	13:57:01	14.284	3.712	82.23
9/6/2016	13:58:01	14.296	3.668	79.61
9/6/2016	13:59:01	14.118	3.711	79.26
9/6/2016	14:00:01	13.953	3.752	79.66
9/6/2016	14:01:00	13.76	3.889	81.61
9/6/2016	14:02:00	14.038	3.741	79.18

9/6/2016	14:03:00	14.772	3.35	77.03
9/6/2016	14:04:00	16.292	2.546	65.25
9/6/2016	14:05:00	14.698	3.744	84.6
9/6/2016	14:06:00	13.982	3.884	70.16
9/6/2016	14:07:00	13.939	3.858	58.76
9/6/2016	14:08:00	14.049	3.801	51.99
9/6/2016	14:09:00	14.372	3.608	45.95
9/6/2016	14:10:00	14.433	3.595	42.53
9/6/2016	14:11:00	14.33	3.658	40.86
9/6/2016	14:12:00	14.442	3.653	38.89
9/6/2016	14:13:00	14.381	3.715	37
9/6/2016	14:14:00	14.25	3.721	36.42
9/6/2016	14:15:01	14.191	3.741	36.16
9/6/2016	14:16:01	14.214	3.654	35.21
9/6/2016	14:17:01	14.296	3.687	34.22
9/6/2016	14:18:01	14.253	3.775	34.25
9/6/2016	14:19:01	14.275	3.728	33.51
9/6/2016	14:20:00	14.192	3.644	32.32
9/6/2016	14:21:00	14.245	3.707	32.39
9/6/2016	14:22:01	14.335	3.683	32.38
9/6/2016	14:23:01	14.3	3.682	31.86
9/6/2016	14:24:01	14.287	3.669	31.88
9/6/2016	14:25:00	14.135	3.721	31.99
9/6/2016	14:26:00	14.294	3.668	31.77
9/6/2016	14:27:00	14.243	3.71	31.05
9/6/2016	14:28:00	16.299	1.961	28.18
9/6/2016	14:29:01	20.703	0.217	17.59
9/6/2016	14:30:00	20.653	0.132	14.08
9/6/2016	14:31:00	20.612	0.106	12.47
9/6/2016	14:32:00	20.664	0.165	11.63
9/6/2016	14:33:00	20.624	0.129	10.46
9/6/2016	14:34:00	20.586	0.08	6.38
Average		15.00631	3.080245	59.97525

		O2	CO2	CO
		%	%	ppm
9/7/2016	8:35:58	15.617	3.275	136.01
9/7/2016	8:36:58	15.22	3.294	114.12
9/7/2016	8:37:57	15.089	3.349	113.85
9/7/2016	8:38:58	14.992	3.304	104.93
9/7/2016	8:39:58	14.898	3.301	103.05
9/7/2016	8:40:58	14.705	3.398	106.38
9/7/2016	8:41:58	14.599	3.439	100.47
9/7/2016	8:42:58	14.663	3.375	94.12
9/7/2016	8:43:58	14.686	3.353	98.54
9/7/2016	8:44:58	14.624	3.377	97.15
9/7/2016	8:45:58	14.569	3.405	106.55
9/7/2016	8:46:58	14.552	3.407	94.43
9/7/2016	8:47:58	14.515	3.425	92.24
9/7/2016	8:48:58	14.497	3.518	95.82
9/7/2016	8:49:58	14.42	3.504	90.9
9/7/2016	8:50:58	14.618	3.49	95.34
9/7/2016	8:51:58	14.617	3.465	95.65
9/7/2016	8:52:58	14.453	3.529	95.29
9/7/2016	8:53:58	14.417	3.577	93.92
9/7/2016	8:54:58	14.3	3.645	98.26
9/7/2016	8:55:58	14.24	3.635	101.4
9/7/2016	8:56:58	14.142	3.672	105.02
9/7/2016	8:57:58	14.085	3.672	112.42
9/7/2016	8:58:57	14.053	3.686	103.55
9/7/2016	8:59:57	14.105	3.65	113.35
9/7/2016	9:00:58	14.055	3.653	107.9
9/7/2016	9:01:58	14.04	3.671	106.14
9/7/2016	9:02:58	15.832	2.66	90.34
9/7/2016	9:03:58	15.437	3.055	84.59
9/7/2016	9:04:58	13.83	3.946	86.02
9/7/2016	9:05:58	13.742	3.896	71.24
9/7/2016	9:06:58	13.694	3.906	60.41
9/7/2016	9:07:58	13.762	3.962	53.98
9/7/2016	9:08:58	13.708	3.972	49.89
9/7/2016	9:09:58	13.766	3.95	46.47
9/7/2016	9:10:58	13.828	3.858	43.58
9/7/2016	9:11:58	13.934	3.809	42.49
9/7/2016	9:12:58	13.916	3.865	41.49
9/7/2016	9:13:58	13.993	3.775	40.63
9/7/2016	9:14:57	14.17	3.758	39.19
9/7/2016	9:15:58	14.113	3.725	38.57
9/7/2016	9:16:58	14.101	3.696	37.58
9/7/2016	9:17:58	13.979	3.75	37.12
9/7/2016	9:18:58	13.764	3.785	36.87
9/7/2016	9:19:58	13.72	3.828	36.92

9/7/2016	9:20:58	13.682	3.883	36.92
9/7/2016	9:21:58	13.669	3.861	36.29
9/7/2016	9:22:58	13.675	3.952	36.24
9/7/2016	9:23:58	13.743	3.888	36.09
9/7/2016	9:24:58	13.736	3.953	35.87
9/7/2016	9:25:58	13.722	3.923	35.56
9/7/2016	9:26:58	13.626	3.87	35.53
9/7/2016	9:27:58	13.633	3.862	35.81
9/7/2016	9:28:58	13.647	3.866	35.67
9/7/2016	9:29:58	13.527	3.901	36.01
9/7/2016	9:30:58	13.72	3.787	35.82
9/7/2016	9:31:58	13.731	3.786	35.06
9/7/2016	9:32:58	13.731	3.78	35.18
9/7/2016	9:33:58	14.214	3.526	34.62
9/7/2016	9:34:58	16.415	2.399	46.12
9/7/2016	9:35:57	15.078	3.394	135.08
9/7/2016	9:36:57	14.355	3.626	116.39
9/7/2016	9:37:58	14.254	3.594	104.86
9/7/2016	9:38:58	14.124	3.564	98.91
9/7/2016	9:39:58	14.156	3.526	94.41
9/7/2016	9:40:58	14.188	3.493	92.21
9/7/2016	9:41:58	14.145	3.51	89.23
9/7/2016	9:42:58	14.203	3.496	90.83
9/7/2016	9:43:58	14.176	3.516	92.75
9/7/2016	9:44:58	14.177	3.494	90.88
9/7/2016	9:45:58	14.193	3.474	89.38
9/7/2016	9:46:58	14.189	3.557	89.48
9/7/2016	9:47:58	14.16	3.462	89.46
9/7/2016	9:48:58	14.215	3.452	87.74
9/7/2016	9:49:58	14.298	3.434	88.54
9/7/2016	9:50:58	14.259	3.416	86.61
9/7/2016	9:51:58	14.278	3.429	86.3
9/7/2016	9:52:58	14.188	3.488	85.99
9/7/2016	9:53:58	14.231	3.559	86.98
9/7/2016	9:54:58	14.152	3.52	85.21
9/7/2016	9:55:58	14.077	3.541	84.66
9/7/2016	9:56:58	14.031	3.536	82.92
9/7/2016	9:59:57	14.082	3.659	65.02
9/7/2016	10:00:58	13.9	3.625	83.02
9/7/2016	10:01:58	13.885	3.612	84.36
9/7/2016	10:02:58	16.127	2.421	72.58
9/7/2016	10:03:58	14.675	3.468	86.61
9/7/2016	10:04:58	13.942	3.846	81.15
9/7/2016	10:05:58	14.003	3.792	66.26
9/7/2016	10:06:58	13.897	3.808	57.11
9/7/2016	10:07:58	13.977	3.787	51.63
9/7/2016	10:08:58	13.922	3.838	47.09

9/7/2016	10:09:58	13.855	3.905	45.62
9/7/2016	10:10:58	13.796	3.879	43.25
9/7/2016	10:11:58	13.591	3.952	42.53
9/7/2016	10:12:58	13.498	3.965	42.05
9/7/2016	10:13:58	13.518	3.897	40.66
9/7/2016	10:14:58	13.725	3.748	39.39
9/7/2016	10:15:58	13.851	3.697	38.12
9/7/2016	10:16:58	13.961	3.647	37.02
9/7/2016	10:17:58	13.868	3.787	37.19
9/7/2016	10:18:58	13.865	3.731	36.64
9/7/2016	10:19:58	13.979	3.62	35.82
9/7/2016	10:20:58	13.954	3.637	35.05
9/7/2016	10:21:58	13.974	3.639	34.44
9/7/2016	10:22:58	13.953	3.649	35.02
9/7/2016	10:23:58	14.082	3.585	33.95
9/7/2016	10:24:58	13.99	3.654	33.91
9/7/2016	10:25:58	13.832	3.725	34.47
9/7/2016	10:26:58	13.806	3.755	34.49
9/7/2016	10:27:58	13.739	3.758	35.07
9/7/2016	10:28:58	13.745	3.775	33.86
9/7/2016	10:29:58	13.641	3.825	34.6
9/7/2016	10:30:58	13.598	3.828	34.78
9/7/2016	10:31:58	13.665	3.792	34.23
9/7/2016	10:32:58	13.547	3.832	34.25
9/7/2016	10:33:57	14.775	3.18	31.77
9/7/2016	10:34:57	16.296	2.44	76.23
Average		14.17095	3.613059	67.78839

		O2	CO2	CO
		%	%	ppm
9/8/2016	9:35:53	13.87	3.865	138.42
9/8/2016	9:36:52	13.475	3.915	116.61
9/8/2016	9:37:52	13.347	3.981	106.73
9/8/2016	9:38:52	13.338	3.973	100.67
9/8/2016	9:39:52	13.247	4.042	97.82
9/8/2016	9:40:52	13.403	3.988	95.17
9/8/2016	9:41:52	13.466	3.967	93.84
9/8/2016	9:42:53	13.275	3.981	93.36
9/8/2016	9:43:53	13.262	4.048	91.99
9/8/2016	9:44:53	13.189	4.025	91.49
9/8/2016	9:45:52	13.142	4.012	91.39
9/8/2016	9:46:52	13.095	4.014	91.44
9/8/2016	9:47:53	13.107	3.97	90.48
9/8/2016	9:48:53	13.071	3.989	90.85
9/8/2016	9:49:53	13.181	3.967	92.31
9/8/2016	9:50:53	13.171	3.964	91.24
9/8/2016	9:51:53	13.19	3.941	91.62
9/8/2016	9:52:53	13.158	3.943	91.05
9/8/2016	9:53:53	13.115	3.963	89.91
9/8/2016	9:54:53	13.086	3.965	89.61
9/8/2016	9:55:53	13.137	4.004	89.36
9/8/2016	9:56:53	13.134	4.009	88.95
9/8/2016	9:57:53	13.146	3.988	88.77
9/8/2016	9:58:53	13.267	3.95	90.17
9/8/2016	9:59:52	13.21	3.958	89.07
9/8/2016	10:00:52	13.253	3.955	89.51
9/8/2016	10:01:52	13.237	3.955	89.7
9/8/2016	10:02:52	14.661	3.144	83.94
9/8/2016	10:03:52	14.549	3.429	87.74
9/8/2016	10:04:52	12.895	4.265	91.27
9/8/2016	10:05:53	12.683	4.273	75.77
9/8/2016	10:06:53	12.711	4.232	64.88
9/8/2016	10:07:53	12.722	4.269	58.74
9/8/2016	10:08:53	12.758	4.328	53.59
9/8/2016	10:09:53	12.729	4.215	50.64
9/8/2016	10:10:53	12.727	4.22	48.43
9/8/2016	10:11:53	12.715	4.205	46.24
9/8/2016	10:12:53	12.736	4.237	45.2
9/8/2016	10:13:53	12.808	4.199	44.45
9/8/2016	10:14:53	12.723	4.175	43.06
9/8/2016	10:15:52	12.765	4.157	42.84
9/8/2016	10:16:53	12.72	4.151	41.86
9/8/2016	10:17:53	12.784	4.149	41.21
9/8/2016	10:18:53	12.786	4.151	41.32
9/8/2016	10:19:53	12.771	4.142	40.58

9/8/2016	10:20:53	12.778	4.171	40.72
9/8/2016	10:21:53	12.843	4.239	40.19
9/8/2016	10:22:53	12.767	4.146	39.68
9/8/2016	10:23:53	12.739	4.15	39.96
9/8/2016	10:24:53	12.841	4.202	39.05
9/8/2016	10:25:53	12.864	4.345	39.3
9/8/2016	10:26:53	12.791	4.22	39.23
9/8/2016	10:27:52	12.815	4.203	38.79
9/8/2016	10:28:52	12.756	4.276	38.95
9/8/2016	10:29:52	12.875	4.267	38.39
9/8/2016	10:30:52	12.866	4.221	38.96
9/8/2016	10:31:52	12.944	4.226	38.19
9/8/2016	10:32:52	12.86	4.129	38.36
9/8/2016	10:33:52	13.118	4.084	38.33
9/8/2016	10:34:52	15.739	2.639	63.8
9/8/2016	10:35:52	13.958	3.754	138.16
9/8/2016	10:36:52	13.525	3.85	114.77
9/8/2016	10:37:53	13.433	3.854	104.12
9/8/2016	10:38:53	13.352	3.841	97.97
9/8/2016	10:39:53	13.356	3.853	96.04
9/8/2016	10:40:53	13.415	3.809	93.78
9/8/2016	10:41:53	13.6	3.714	91.54
9/8/2016	10:42:53	13.597	3.758	91.54
9/8/2016	10:43:53	13.711	3.835	89.66
9/8/2016	10:44:53	13.674	3.889	89.35
9/8/2016	10:45:53	13.622	3.813	88.14
9/8/2016	10:46:53	13.519	3.819	87.66
9/8/2016	10:47:53	13.514	3.775	88.98
9/8/2016	10:48:53	13.521	3.771	88.13
9/8/2016	10:49:53	13.865	3.69	91.22
9/8/2016	10:50:53	14.187	3.638	99
9/8/2016	10:51:53	14.399	3.515	119.08
9/8/2016	10:52:53	14.559	3.403	112.43
9/8/2016	10:53:53	14.511	3.446	102.18
9/8/2016	10:54:52	14.426	3.528	95.95
9/8/2016	10:55:52	14.266	3.625	97.13
9/8/2016	10:56:52	14.098	3.747	99.78
9/8/2016	10:57:52	13.945	3.798	93.25
9/8/2016	10:58:52	13.825	3.858	90.82
9/8/2016	10:59:52	13.872	3.813	87.36
9/8/2016	11:00:52	13.842	3.797	86.33
9/8/2016	11:01:52	13.75	3.816	85.13
9/8/2016	11:02:52	14.989	3.125	81.91
9/8/2016	11:03:52	15.176	3.362	83.84
9/8/2016	11:04:52	13.727	4.099	104.82
9/8/2016	11:05:52	13.617	4.077	106.14
9/8/2016	11:06:52	13.745	3.968	90.69

9/8/2016	11:07:52	13.879	3.858	63.89
9/8/2016	11:08:53	13.89	3.745	51.73
9/8/2016	11:09:53	13.881	3.687	48.04
9/8/2016	11:10:53	13.914	3.742	46.12
9/8/2016	11:11:53	13.835	3.912	44.59
9/8/2016	11:12:53	13.722	3.961	43.28
9/8/2016	11:13:53	13.45	3.979	42.57
9/8/2016	11:14:53	13.39	4.039	40.89
9/8/2016	11:15:53	13.453	4.005	40.46
9/8/2016	11:16:53	13.335	4.082	40.26
9/8/2016	11:17:52	13.214	4.129	65.65
9/8/2016	11:18:52	13.102	4.016	68.57
9/8/2016	11:19:52	13.388	4.005	86.71
9/8/2016	11:20:52	13.588	3.928	122.62
9/8/2016	11:21:52	13.824	3.885	80.1
9/8/2016	11:22:52	13.715	3.883	50.53
9/8/2016	11:23:52	13.527	3.838	43.88
9/8/2016	11:24:52	13.353	3.932	40.5
9/8/2016	11:25:52	13.333	4.123	39.87
9/8/2016	11:26:52	13.354	4.069	37.9
9/8/2016	11:27:53	13.435	4.057	37.38
9/8/2016	11:28:52	13.425	4.065	36.54
9/8/2016	11:29:52	13.337	4.105	36.92
9/8/2016	11:30:52	13.261	4.1	36.32
9/8/2016	11:31:52	13.346	4.114	51.68
9/8/2016	11:32:52	13.374	4.01	156.86
9/8/2016	11:33:52	13.763	3.835	191.63
9/8/2016	11:34:52	16.125	2.604	162.34
9/8/2016	11:35:52	14.66	3.551	210.11
9/8/2016	11:36:53	14.316	3.616	125.34
9/8/2016	11:37:53	14.284	3.619	106.91
9/8/2016	11:38:53	14.228	3.639	98.5
9/8/2016	11:39:53	14.107	3.643	95.28
9/8/2016	11:40:53	14.073	3.683	93.39
9/8/2016	11:41:52	14.124	3.696	90.28
9/8/2016	11:42:52	14.101	3.689	89.12
9/8/2016	11:43:52	14.118	3.683	87.13
9/8/2016	11:44:52	14.043	3.759	88.82
9/8/2016	11:45:52	13.864	3.8	102.18
9/8/2016	11:46:52	13.892	3.778	157.71
9/8/2016	11:47:53	13.812	3.861	253
9/8/2016	11:48:53	13.859	3.83	300.06
9/8/2016	11:49:53	13.898	3.792	253.48
9/8/2016	11:50:53	13.875	3.792	187.83
9/8/2016	11:51:53	13.854	3.772	135.21
9/8/2016	11:52:53	13.859	3.801	108.72
9/8/2016	11:53:53	13.65	3.909	96.05

9/8/2016	11:54:53	13.672	3.931	90.06
9/8/2016	11:55:53	13.677	3.886	86.95
9/8/2016	11:56:52	13.736	3.846	85.38
9/8/2016	11:57:53	13.762	3.789	84.48
9/8/2016	11:58:53	13.847	3.777	83.64
9/8/2016	11:59:53	13.976	3.74	100.67
9/8/2016	12:00:53	14.035	3.71	134.46
9/8/2016	12:01:53	14.039	3.631	179.56
9/8/2016	12:02:53	15.43	2.868	165.96
9/8/2016	12:03:53	15.163	3.316	188.29
9/8/2016	12:04:52	13.839	3.976	125.6
9/8/2016	12:05:53	13.66	4.032	77.14
9/8/2016	12:06:52	13.433	4.125	63.92
9/8/2016	12:07:52	13.267	4.202	56.4
9/8/2016	12:08:52	13.201	4.194	50.67
9/8/2016	12:09:52	13.365	4.124	47.18
9/8/2016	12:10:52	13.53	4.039	45.43
9/8/2016	12:11:52	13.781	3.934	43.02
9/8/2016	12:12:52	13.765	3.869	41.81
9/8/2016	12:13:52	13.773	3.923	40.76
9/8/2016	12:14:52	13.822	3.868	39.37
9/8/2016	12:15:52	13.826	3.81	38.74
9/8/2016	12:16:52	13.83	3.838	38.4
9/8/2016	12:17:53	13.903	3.819	37.27
9/8/2016	12:18:53	13.944	3.805	37.21
9/8/2016	12:19:52	13.906	3.784	36.8
9/8/2016	12:20:53	13.98	3.802	36
9/8/2016	12:21:53	13.961	3.814	36.09
9/8/2016	12:22:53	13.857	3.873	35.75
9/8/2016	12:23:53	13.765	3.921	36
9/8/2016	12:24:53	13.893	3.793	36.01
9/8/2016	12:25:53	14.003	3.81	35.34
9/8/2016	12:26:53	13.795	3.878	61.5
9/8/2016	12:27:53	13.766	3.851	151.41
9/8/2016	12:28:53	13.754	3.85	260.44
9/8/2016	12:29:52	13.652	3.893	324.19
9/8/2016	12:30:52	13.808	3.844	271.57
9/8/2016	12:31:52	13.733	3.874	160.78
9/8/2016	12:32:52	13.632	3.959	113.77
9/8/2016	12:33:52	13.63	3.901	88.14
9/8/2016	12:34:52	16.112	2.623	88.5
9/8/2016	12:35:52	14.325	3.743	196.24
9/8/2016	12:36:53	13.812	3.871	144.15
9/8/2016	12:37:53	13.735	3.885	124.66
9/8/2016	12:38:53	13.882	3.787	113.52
9/8/2016	12:39:53	13.984	3.722	100.65
9/8/2016	12:40:53	14.086	3.662	93.99

9/8/2016	12:41:53	14.205	3.626	90.99
9/8/2016	12:42:53	14.266	3.602	88.41
9/8/2016	12:43:52	14.13	3.688	88.28
9/8/2016	12:44:53	13.965	3.764	100.11
9/8/2016	12:45:53	13.831	3.84	107.42
9/8/2016	12:46:53	13.673	3.935	105.07
9/8/2016	12:47:53	13.694	3.87	101.13
9/8/2016	12:48:53	13.731	3.863	95.53
9/8/2016	12:49:53	13.633	3.823	91.91
9/8/2016	12:50:53	13.746	3.837	88.24
9/8/2016	12:51:52	13.792	3.835	85.52
9/8/2016	12:52:53	13.734	3.772	84.51
9/8/2016	12:53:52	13.715	3.824	83.96
9/8/2016	12:54:52	13.843	3.811	117.23
9/8/2016	12:55:52	13.801	3.903	174.4
9/8/2016	12:56:52	13.721	3.927	191.11
9/8/2016	12:57:52	13.683	3.843	168.45
9/8/2016	12:58:53	13.86	3.84	124.27
9/8/2016	12:59:53	13.814	3.898	96.97
9/8/2016	13:00:53	13.806	3.872	92.47
9/8/2016	13:01:53	13.761	3.872	91.41
9/8/2016	13:02:52	14.934	3.192	90.2
9/8/2016	13:03:52	14.836	3.481	89.85
9/8/2016	13:04:53	13.35	4.323	87.45
9/8/2016	13:05:52	13.15	4.116	71.2
9/8/2016	13:06:52	13.133	4.148	60.89
9/8/2016	13:07:53	13.282	4.111	54.1
9/8/2016	13:08:52	13.154	4.066	50.12
9/8/2016	13:09:52	13.254	3.982	47.44
9/8/2016	13:10:53	13.317	3.982	45.41
9/8/2016	13:11:53	13.187	4.025	43.74
9/8/2016	13:12:53	13.275	4.054	43.79
9/8/2016	13:13:53	13.121	4.078	71.76
9/8/2016	13:14:53	13.131	4.115	88.84
9/8/2016	13:15:53	13.195	4.073	104.74
9/8/2016	13:16:53	13.211	4.108	89.65
9/8/2016	13:17:53	13.416	4.036	53.92
9/8/2016	13:18:53	13.43	4.074	39.37
9/8/2016	13:19:52	13.441	4.097	38.78
9/8/2016	13:20:52	13.189	4.246	38.53
9/8/2016	13:21:53	13.072	4.316	38.61
9/8/2016	13:22:52	13.169	4.199	38.34
9/8/2016	13:23:52	13.227	4.193	37.45
9/8/2016	13:24:52	13.164	4.121	37.53
9/8/2016	13:25:52	13.128	4.242	38.98
9/8/2016	13:26:52	13.133	4.278	37.81
9/8/2016	13:27:52	13.093	4.22	37.15

9/8/2016	13:28:53	13.105	4.247	36.97
9/8/2016	13:29:53	13.137	4.255	36.42
9/8/2016	13:30:53	13.144	4.262	36.47
9/8/2016	13:31:53	13.119	4.274	36.66
9/8/2016	13:32:53	12.93	4.372	36.37
9/8/2016	13:33:53	13.019	4.298	36.81
9/8/2016	13:34:53	15.783	2.81	65.51
9/8/2016	13:35:53	13.84	4.073	135.3
9/8/2016	13:36:53	13.402	4.146	113.51
9/8/2016	13:37:53	13.352	4.189	103.94
9/8/2016	13:38:53	13.355	4.18	98.81
9/8/2016	13:39:53	13.139	4.107	93.57
9/8/2016	13:40:53	13.058	4.131	91.47
9/8/2016	13:41:53	13.051	4.164	95.17
9/8/2016	13:42:53	13.116	4.182	93.57
9/8/2016	13:43:53	13.196	4.035	89.57
9/8/2016	13:44:53	13.51	3.982	87.19
9/8/2016	13:55:52	13.183	4.195	86.43
9/8/2016	13:56:52	13.004	4.227	86.67
9/8/2016	13:57:52	13.069	4.218	87.86
9/8/2016	13:58:52	13.012	4.228	87.45
9/8/2016	13:59:52	13.258	4.1	86.06
9/8/2016	14:00:52	13.56	3.976	83.9
9/8/2016	14:01:52	13.789	3.842	82.27
9/8/2016	14:02:52	15.045	3.146	77.73
9/8/2016	14:03:52	14.987	3.456	82.68
9/8/2016	14:04:52	13.454	4.221	85.04
9/8/2016	14:05:52	13.124	4.348	70.86
9/8/2016	14:06:53	13.129	4.348	61.52
9/8/2016	14:07:53	13.044	4.364	55.49
9/8/2016	14:08:53	12.933	4.402	50.89
9/8/2016	14:09:52	12.81	4.454	48.41
9/8/2016	14:10:52	12.889	4.393	45.88
9/8/2016	14:11:53	13.057	4.273	43.54
9/8/2016	14:12:53	12.989	4.267	42.45
9/8/2016	14:13:53	12.952	4.312	41.13
9/8/2016	14:14:53	13.001	4.283	40.05
9/8/2016	14:15:53	13.165	4.267	39.51
9/8/2016	14:16:53	13.092	4.291	38.71
9/8/2016	14:17:53	13.163	4.262	38.2
9/8/2016	14:18:53	13.083	4.18	38.39
9/8/2016	14:19:53	12.968	4.22	37.72
9/8/2016	14:20:53	13.064	4.154	37.64
9/8/2016	14:21:53	13.035	4.169	37.36
9/8/2016	14:22:53	13.028	4.195	36.85
9/8/2016	14:23:53	12.997	4.188	37.28
9/8/2016	14:24:52	13.091	4.159	37.08

9/8/2016	14:25:52	13.084	4.163	36.88
9/8/2016	14:26:52	13.11	4.225	37.08
9/8/2016	14:27:52	13.084	4.187	36.52
9/8/2016	14:28:52	13.064	4.241	36.14
9/8/2016	14:29:53	13.063	4.22	36.48
9/8/2016	14:30:53	13.137	4.207	36.29
9/8/2016	14:31:53	13.144	4.252	35.99
9/8/2016	14:32:52	13.035	4.152	36.66
9/8/2016	14:33:52	13.142	4.072	36.01
9/8/2016	14:34:52	15.89	2.667	63.79
9/8/2016	14:35:52	14.194	3.753	131.41
9/8/2016	14:36:52	13.803	3.821	107.11
9/8/2016	14:37:52	13.646	3.874	97.57
9/8/2016	14:38:52	13.619	3.868	92.12
9/8/2016	14:39:52	13.727	3.824	88.96
9/8/2016	14:40:53	13.696	3.83	86.91
9/8/2016	14:41:53	13.691	3.807	86.56
9/8/2016	14:42:53	13.662	3.824	84.93
9/8/2016	14:43:53	13.646	3.809	84.51
9/8/2016	14:44:53	13.682	3.869	83.53
9/8/2016	14:45:53	13.698	3.796	82.52
9/8/2016	14:46:53	13.736	3.843	83.06
9/8/2016	14:47:53	13.626	3.767	82.62
9/8/2016	14:48:53	13.659	3.757	82.47
9/8/2016	14:49:53	13.702	3.722	82.87
9/8/2016	14:50:53	13.616	3.758	82.34
9/8/2016	14:51:53	13.655	3.729	81.92
9/8/2016	14:52:53	13.565	3.757	82.09
9/8/2016	14:53:53	13.625	3.75	81.73
9/8/2016	14:54:53	13.666	3.736	82.11
9/8/2016	14:55:53	13.687	3.776	82.42
9/8/2016	14:56:53	13.549	3.816	82.71
9/8/2016	14:57:53	13.55	3.783	83.76
9/8/2016	14:58:52	13.679	3.711	82.13
9/8/2016	14:59:52	13.712	3.69	80.98
9/8/2016	15:00:52	13.732	3.673	80.76
9/8/2016	15:01:52	13.691	3.698	81.06
9/8/2016	15:02:52	14.874	3.027	78.84
9/8/2016	15:03:52	14.776	3.37	95.71
9/8/2016	15:04:53	13.581	3.987	93.44
9/8/2016	15:05:53	13.892	3.789	69.62
9/8/2016	15:06:53	14.291	3.573	59.61
9/8/2016	15:07:53	14.163	3.576	52.8
9/8/2016	15:08:53	14.075	3.586	49.11
9/8/2016	15:09:52	13.821	3.725	46.9
9/8/2016	15:10:53	13.601	3.817	44.67
9/8/2016	15:11:53	13.545	3.851	43.09

9/8/2016	15:12:52	13.658	3.837	41.86
9/8/2016	15:13:52	13.651	3.812	40.63
9/8/2016	15:14:52	13.691	3.857	39.93
9/8/2016	15:15:52	13.605	3.821	39.58
9/8/2016	15:16:52	13.554	3.906	38.79
9/8/2016	15:17:52	13.424	3.913	38.47
9/8/2016	15:18:52	13.354	3.919	38.4
9/8/2016	15:19:52	13.351	3.961	37.61
9/8/2016	15:20:53	13.485	3.986	37.7
9/8/2016	15:21:53	13.417	3.956	37.69
9/8/2016	15:22:53	13.392	3.942	37.2
9/8/2016	15:23:53	13.485	4.031	37.22
9/8/2016	15:24:53	13.494	4.065	36.61
9/8/2016	15:25:53	13.367	4.012	36.55
9/8/2016	15:26:53	13.261	4.003	36.96
9/8/2016	15:27:53	13.228	3.972	36.45
9/8/2016	15:28:52	13.301	3.928	39.14
9/8/2016	15:29:52	13.462	3.928	46.92
9/8/2016	15:30:52	13.627	3.831	40.96
9/8/2016	15:31:52	13.813	3.881	37.45
9/8/2016	15:32:52	13.687	3.824	36.82
9/8/2016	15:33:52	13.793	3.751	35.52
9/8/2016	15:34:53	16.232	2.469	63.57
9/8/2016	15:35:53	14.493	3.543	127.64
9/8/2016	15:36:53	13.884	3.767	104.81
9/8/2016	15:37:53	13.801	3.805	95.18
9/8/2016	15:38:53	13.824	3.821	90.73
9/8/2016	15:39:53	13.789	3.802	87.42
9/8/2016	15:40:53	13.771	3.748	87.07
9/8/2016	15:41:52	13.811	3.876	86.69
9/8/2016	15:42:52	13.729	3.808	85.36
9/8/2016	15:43:52	13.593	3.852	136.48
9/8/2016	15:44:53	13.512	4.03	221.06
9/8/2016	15:45:52	13.344	4.065	236.33
9/8/2016	15:46:53	13.526	3.873	196.29
9/8/2016	15:47:53	13.949	3.774	133.49
9/8/2016	15:48:53	14.244	3.674	109.56
9/8/2016	15:49:53	14.1	3.654	98.68
9/8/2016	15:50:53	13.753	3.726	93.12
9/8/2016	15:51:53	13.317	3.936	93.22
9/8/2016	15:52:53	12.996	4.081	100.13
9/8/2016	15:53:53	12.994	4.114	103.1
9/8/2016	15:54:53	13.296	4.125	99.47
9/8/2016	15:55:52	13.397	4.009	92.58
9/8/2016	15:56:53	13.742	3.95	86.62
9/8/2016	15:57:52	13.795	3.908	84.21
9/8/2016	15:58:52	13.803	3.899	83.88

9/8/2016	15:59:52	13.753	3.91	82.75
9/8/2016	16:00:52	13.724	3.895	81.88
9/8/2016	16:01:52	13.865	3.865	82.43
9/8/2016	16:02:52	15.164	3.122	77.52
9/8/2016	16:03:52	15.381	3.272	82.67
9/8/2016	16:04:52	13.951	4.012	85.3
9/8/2016	16:05:53	14.588	3.576	70.86
9/8/2016	16:06:53	15.535	3.085	59.5
9/8/2016	16:07:52	16.032	2.863	51.99
9/8/2016	16:08:52	16.242	2.707	47.64
9/8/2016	16:09:53	16.347	2.666	43.96
9/8/2016	16:10:53	16.29	2.483	39.45
9/8/2016	16:11:53	16.233	2.411	36.69
9/8/2016	16:12:53	16.296	2.339	35.11
9/8/2016	16:13:53	16.354	2.287	33.08
9/8/2016	16:14:53	16.378	2.289	31.99
9/8/2016	16:15:53	16.389	2.308	31.66
9/8/2016	16:16:53	16.459	2.428	31.32
9/8/2016	16:17:52	16.488	2.502	30.54
9/8/2016	16:18:52	16.499	2.513	30.64
9/8/2016	16:19:52	16.497	2.521	30.6
9/8/2016	16:20:52	16.47	2.55	30.45
9/8/2016	16:21:53	16.392	2.576	30.84
9/8/2016	16:22:53	16.359	2.466	30.52
9/8/2016	16:23:53	16.299	2.502	30.49
9/8/2016	16:24:53	16.013	2.553	31.13
9/8/2016	16:25:53	15.527	2.736	30.75
9/8/2016	16:26:52	15.374	3.03	30.81
9/8/2016	16:27:52	15.269	3.057	31.28
9/8/2016	16:28:52	15.032	3.173	31.27
9/8/2016	16:29:52	14.672	3.345	31.97
9/8/2016	16:30:52	14.387	3.508	32.79
9/8/2016	16:31:52	14.163	3.558	32.88
9/8/2016	16:32:52	14.093	3.61	33.4
9/8/2016	16:33:52	14.015	3.709	32.96
9/8/2016	16:34:53	16.095	2.612	60.69
9/8/2016	16:35:53	13.808	3.754	192.24
9/8/2016	16:36:53	13.584	3.787	212.84
9/8/2016	16:37:53	13.451	3.825	206.19
9/8/2016	16:38:53	13.327	3.865	214.08
9/8/2016	16:39:53	13.22	3.913	207.16
9/8/2016	16:40:53	13.156	3.947	211.6
9/8/2016	16:41:53	13.121	3.951	213.67
9/8/2016	16:42:53	13.105	4.047	211
9/8/2016	16:43:53	12.985	4.117	277.1
9/8/2016	16:44:53	12.999	4.175	243.2
9/8/2016	16:45:53	12.934	4.12	240.42

9/8/2016	16:46:53	12.798	4.075	252.81
9/8/2016	16:47:53	12.836	4.16	257.53
9/8/2016	16:48:53	12.811	4.152	258.72
9/8/2016	16:49:52	12.923	4.028	244.52
9/8/2016	16:50:53	12.908	3.996	228.19
9/8/2016	16:51:53	12.834	4.014	227.59
9/8/2016	16:52:52	12.77	4.058	222.78
9/8/2016	16:53:52	12.695	4.103	232.4
9/8/2016	16:54:52	12.82	4.196	245.48
Average		13.71907	3.836523	84.2874

		O2	CO2	CO
		%	%	ppm
9/12/2016	10:05:12	14.148	3.961	98.71
9/12/2016	10:06:12	14.087	3.892	83.76
9/12/2016	10:07:12	14.259	3.81	73.15
9/12/2016	10:08:12	14.339	3.778	66.2
9/12/2016	10:09:12	14.13	3.81	62.23
9/12/2016	10:10:12	14.138	3.939	59.06
9/12/2016	10:11:12	14.108	3.872	56.82
9/12/2016	10:12:12	14.246	3.688	54.79
9/12/2016	10:13:12	14.376	3.747	52.98
9/12/2016	10:14:12	14.348	3.689	51.41
9/12/2016	10:15:12	14.407	3.672	50.22
9/12/2016	10:16:12	14.502	3.753	49.35
9/12/2016	10:17:12	14.415	3.751	48.28
9/12/2016	10:18:12	14.497	3.708	47.75
9/12/2016	10:19:12	14.552	3.759	47.23
9/12/2016	10:20:12	14.448	3.753	46.85
9/12/2016	10:21:12	14.321	3.739	46.15
9/12/2016	10:22:12	14.324	3.702	45.89
9/12/2016	10:23:12	14.384	3.735	45.72
9/12/2016	10:24:12	14.362	3.667	45.35
9/12/2016	10:25:12	14.347	3.674	45.02
9/12/2016	10:26:12	14.406	3.657	44.8
9/12/2016	10:27:12	14.516	3.645	45.03
9/12/2016	10:28:12	14.413	3.654	45.3
9/12/2016	10:29:12	14.437	3.657	45.1
9/12/2016	10:30:12	14.372	3.644	44.91
9/12/2016	10:31:12	14.27	3.666	44.87
9/12/2016	10:32:12	14.118	3.763	45.31
9/12/2016	10:33:12	14.137	3.782	45.32
9/12/2016	10:34:12	14.833	3.439	44.26
9/12/2016	10:35:12	16.909	2.374	102.59
9/12/2016	10:36:12	15.265	3.259	144.69
9/12/2016	10:37:12	14.958	3.319	123.72
9/12/2016	10:38:12	14.992	3.246	113.53
9/12/2016	10:39:12	14.988	3.248	107.99
9/12/2016	10:40:12	14.918	3.288	104.82
9/12/2016	10:41:12	14.818	3.385	104.84
9/12/2016	10:42:12	14.662	3.449	104.81
9/12/2016	10:43:12	14.689	3.397	105.7
9/12/2016	10:44:12	14.712	3.386	104.46
9/12/2016	10:45:12	14.694	3.402	103.95
9/12/2016	10:46:12	14.801	3.347	102.18
9/12/2016	10:47:12	15.01	3.221	99.59
9/12/2016	10:48:12	15.184	3.155	99.13
9/12/2016	10:49:12	15.203	3.14	98.18

9/12/2016	10:50:12	15.139	3.176	100.91
9/12/2016	10:51:12	15.038	3.225	103.04
9/12/2016	10:52:13	14.958	3.26	103.64
9/12/2016	10:53:12	14.903	3.281	103.5
9/12/2016	10:54:12	14.91	3.275	103.6
9/12/2016	10:55:12	14.981	3.271	106.67
9/12/2016	10:56:12	14.943	3.276	108.14
9/12/2016	10:57:12	14.926	3.301	110.66
9/12/2016	10:58:12	14.777	3.374	114.54
9/12/2016	10:59:12	14.63	3.457	120.9
9/12/2016	11:00:12	14.407	3.553	123.1
9/12/2016	11:01:12	14.376	3.557	121.77
9/12/2016	11:02:12	14.457	3.528	117.14
9/12/2016	11:03:12	16.233	2.502	101.69
9/12/2016	11:04:12	14.928	3.508	180.54
9/12/2016	11:05:12	14.029	3.879	196.75
9/12/2016	11:06:12	13.986	3.811	232.28
9/12/2016	11:07:12	13.917	3.827	229.38
9/12/2016	11:08:12	13.998	3.784	208.24
9/12/2016	11:09:12	13.959	3.822	177.36
9/12/2016	11:10:12	13.967	3.802	151.46
9/12/2016	11:11:12	13.97	3.817	135.27
9/12/2016	11:12:13	13.962	3.835	124.69
9/12/2016	11:13:12	13.881	3.856	117.91
9/12/2016	11:14:12	13.818	3.898	111.65
9/12/2016	11:15:12	13.869	3.837	104.29
9/12/2016	11:16:12	13.885	3.833	95.28
9/12/2016	11:17:12	13.872	3.853	88.93
9/12/2016	11:18:12	14.111	3.74	79.71
9/12/2016	11:19:12	14.298	3.652	70.05
9/12/2016	11:20:12	14.323	3.639	83.5
9/12/2016	11:21:12	14.369	3.607	99.19
9/12/2016	11:22:12	14.395	3.601	146.18
9/12/2016	11:23:12	14.438	3.615	171.15
9/12/2016	11:24:12	14.371	3.647	102.91
9/12/2016	11:25:12	14.46	3.599	71.91
9/12/2016	11:26:12	14.46	3.595	61.27
9/12/2016	11:27:12	14.308	3.691	57.37
9/12/2016	11:28:12	14.133	3.771	56.29
9/12/2016	11:29:12	14.07	3.772	55.3
9/12/2016	11:30:12	14.148	3.745	54.1
9/12/2016	11:31:13	14.257	3.669	53.12
9/12/2016	11:32:12	14.401	3.63	51.78
9/12/2016	11:33:12	14.427	3.604	51.03
9/12/2016	11:34:12	14.926	3.297	50.03
9/12/2016	11:35:12	16.85	2.323	109.98
9/12/2016	11:36:12	15.251	3.25	147.17

9/12/2016	11:37:12	15.081	3.24	124.01
9/12/2016	11:38:12	15.081	3.222	114.92
9/12/2016	11:39:12	15.096	3.219	109.83
9/12/2016	11:40:12	15.147	3.193	113.71
9/12/2016	11:41:12	15.102	3.215	115.52
9/12/2016	11:42:12	15.032	3.246	116.8
9/12/2016	11:43:13	15.056	3.23	135.89
9/12/2016	11:44:12	15.125	3.203	134.76
9/12/2016	11:45:12	15.109	3.208	122.04
9/12/2016	11:46:12	15.109	3.203	115.07
9/12/2016	11:47:12	15.098	3.242	105.79
9/12/2016	11:48:12	14.982	3.291	103.77
9/12/2016	11:49:12	14.949	3.308	102.07
9/12/2016	11:50:12	14.945	3.267	100.52
9/12/2016	11:51:12	14.961	3.287	100.19
9/12/2016	11:52:12	14.939	3.292	99.93
9/12/2016	11:53:12	14.984	3.266	100.24
9/12/2016	11:54:12	14.929	3.289	99.33
9/12/2016	11:55:12	14.924	3.284	99.33
9/12/2016	11:56:12	15.015	3.238	98.75
9/12/2016	11:57:12	15.147	3.18	97.32
9/12/2016	11:58:12	15.273	3.093	96.16
9/12/2016	11:59:12	15.364	3.069	95.05
9/12/2016	12:00:12	15.42	3.031	94.26
9/12/2016	12:01:12	15.324	3.084	95.03
9/12/2016	12:02:13	15.222	3.133	95.88
9/12/2016	12:03:12	16.693	2.291	87.12
9/12/2016	12:04:12	15.401	3.291	97.49
9/12/2016	12:05:12	14.532	3.643	96.65
9/12/2016	12:06:12	14.404	3.664	89.16
9/12/2016	12:07:13	14.376	3.651	72.45
9/12/2016	12:08:12	14.38	3.629	66.19
9/12/2016	12:09:12	14.529	3.556	62.19
9/12/2016	12:10:12	14.717	3.473	59.17
9/12/2016	12:11:12	14.744	3.469	56.9
9/12/2016	12:12:12	14.682	3.516	55.3
9/12/2016	12:13:12	14.537	3.581	54.39
9/12/2016	12:14:12	14.422	3.634	53.66
9/12/2016	12:15:12	14.338	3.654	53.02
9/12/2016	12:16:12	14.3	3.683	52.44
9/12/2016	12:17:12	14.372	3.65	51.42
9/12/2016	12:18:12	14.254	3.701	50.68
9/12/2016	12:19:12	14.185	3.738	50.28
9/12/2016	12:20:12	14.243	3.698	49.99
9/12/2016	12:21:12	14.406	3.631	49.42
9/12/2016	12:22:12	14.572	3.529	48.58
9/12/2016	12:23:12	14.62	3.507	47.83

9/12/2016	12:24:12	14.6	3.527	47.6
9/12/2016	12:25:12	14.571	3.525	47.17
9/12/2016	12:26:12	14.662	3.515	46.98
9/12/2016	12:27:12	14.624	3.533	47.28
9/12/2016	12:28:12	14.614	3.547	47.51
9/12/2016	12:29:12	14.622	3.535	46.86
9/12/2016	12:30:12	14.638	3.519	46.49
9/12/2016	12:31:12	14.55	3.544	46.15
9/12/2016	12:32:12	14.529	3.559	46.3
9/12/2016	12:33:12	14.397	3.639	46.66
9/12/2016	12:34:12	14.825	3.361	46.42
9/12/2016	12:35:12	16.786	2.354	111.15
9/12/2016	12:36:12	15.125	3.333	153.84
9/12/2016	12:37:12	14.937	3.328	130.83
9/12/2016	12:38:12	14.946	3.325	119.32
9/12/2016	12:39:12	14.978	3.289	112.37
9/12/2016	12:40:12	15.042	3.271	109.67
9/12/2016	12:41:12	14.972	3.298	107.83
9/12/2016	12:42:12	15.008	3.285	110.64
9/12/2016	12:43:12	14.91	3.335	114.57
9/12/2016	12:44:12	14.877	3.331	116.71
9/12/2016	12:45:12	14.839	3.356	116.17
9/12/2016	12:46:12	14.815	3.356	111.63
9/12/2016	12:47:12	14.896	3.31	109.69
9/12/2016	12:48:13	14.933	3.318	109.6
9/12/2016	12:49:12	14.827	3.356	110.81
9/12/2016	12:50:12	14.795	3.385	111.55
9/12/2016	12:51:12	14.816	3.367	110.4
9/12/2016	12:52:12	14.841	3.359	108.83
9/12/2016	12:53:12	14.948	3.319	106.44
9/12/2016	12:54:12	14.948	3.305	104.82
9/12/2016	12:55:12	15.007	3.287	103.22
9/12/2016	12:56:12	14.997	3.277	100.9
9/12/2016	12:57:12	15.058	3.262	100.43
9/12/2016	12:58:12	15.052	3.272	99.48
9/12/2016	12:59:12	15.117	3.239	99
9/12/2016	13:00:12	15.09	3.245	98.7
9/12/2016	13:01:12	15.006	3.287	99.7
9/12/2016	13:02:12	14.984	3.294	99.75
9/12/2016	13:03:12	16.527	2.446	93.37
9/12/2016	13:04:12	15.305	3.357	139.74
Average		14.71607	3.452994	91.08028

		O2	CO2	CO
		%	%	ppm
9/13/2016	9:55:03	13.656	3.843	89.44
9/13/2016	9:56:03	13.719	3.838	89.3
9/13/2016	9:57:03	13.742	3.847	88.38
9/13/2016	9:58:03	13.765	3.894	88.22
9/13/2016	9:59:03	13.798	3.821	88.44
9/13/2016	10:00:03	13.882	3.782	88.35
9/13/2016	10:01:03	13.834	3.785	89.09
9/13/2016	10:02:03	13.828	3.78	89.93
9/13/2016	10:03:03	13.872	3.742	89.46
9/13/2016	10:04:03	15.877	2.743	80.82
9/13/2016	10:05:03	14.494	3.708	95.52
9/13/2016	10:06:03	13.825	3.907	87.53
9/13/2016	10:07:03	14.126	3.708	71.58
9/13/2016	10:08:03	14.432	3.52	61.21
9/13/2016	10:09:03	14.575	3.429	55.05
9/13/2016	10:10:03	14.509	3.447	50.98
9/13/2016	10:11:03	14.481	3.483	48.17
9/13/2016	10:12:03	14.514	3.466	45.93
9/13/2016	10:13:03	14.491	3.472	44.48
9/13/2016	10:14:03	14.516	3.468	43.43
9/13/2016	10:15:04	14.521	3.465	42.35
9/13/2016	10:16:04	14.438	3.51	41.64
9/13/2016	10:17:04	14.489	3.474	40.92
9/13/2016	10:18:03	14.633	3.378	40.01
9/13/2016	10:19:04	14.663	3.367	39.36
9/13/2016	10:20:03	14.673	3.411	38.78
9/13/2016	10:21:03	14.7	3.391	38.49
9/13/2016	10:22:03	14.694	3.401	38.09
9/13/2016	10:23:03	14.834	3.453	37.7
9/13/2016	10:24:03	14.712	3.409	37.56
9/13/2016	10:25:03	14.653	3.391	37.34
9/13/2016	10:26:03	14.703	3.382	37.26
9/13/2016	10:27:03	14.855	3.467	37.03
9/13/2016	10:28:03	14.71	3.374	36.74
9/13/2016	10:29:03	14.671	3.382	36.61
9/13/2016	10:30:04	14.7	3.396	36.36
9/13/2016	10:31:03	14.747	3.341	36.34
9/13/2016	10:32:03	14.748	3.368	36.31
9/13/2016	10:33:03	14.738	3.417	36.19
9/13/2016	10:34:03	14.73	3.392	36.1
9/13/2016	10:35:03	15.434	2.95	35.01
9/13/2016	10:36:03	16.925	2.346	95.29
9/13/2016	10:37:03	15.321	3.161	122.33
9/13/2016	10:38:03	15.104	3.183	104.2
9/13/2016	10:39:03	15.09	3.268	95.87

9/13/2016	10:40:03	15.057	3.249	91.82
9/13/2016	10:41:04	14.96	3.201	88.88
9/13/2016	10:42:03	15.049	3.23	87.18
9/13/2016	10:43:03	14.996	3.287	86.96
9/13/2016	10:44:03	14.939	3.332	86.63
9/13/2016	10:45:03	14.85	3.405	86.23
9/13/2016	10:46:03	14.823	3.4	86.82
9/13/2016	10:47:03	14.73	3.415	86.44
9/13/2016	10:48:03	14.769	3.387	86.69
9/13/2016	10:49:03	14.748	3.381	86.2
9/13/2016	10:50:03	14.76	3.36	85.98
9/13/2016	10:51:03	14.737	3.358	87.03
9/13/2016	10:52:03	14.72	3.369	90.27
9/13/2016	10:53:03	14.753	3.325	95.09
9/13/2016	10:54:03	14.891	3.275	95.19
9/13/2016	10:55:03	14.935	3.23	93.11
9/13/2016	10:56:03	15.01	3.224	92.51
9/13/2016	10:57:03	14.971	3.22	89.5
9/13/2016	10:58:03	14.994	3.198	86.8
9/13/2016	10:59:03	14.921	3.249	86.06
9/13/2016	11:00:03	14.749	3.329	86.33
9/13/2016	11:01:03	14.637	3.381	86.64
9/13/2016	11:02:03	14.639	3.398	87.16
9/13/2016	11:03:03	14.593	3.39	85.72
9/13/2016	11:04:03	16.46	2.42	77.16
9/13/2016	11:05:03	15.036	3.448	89.55
9/13/2016	11:06:03	14.307	3.724	81.16
9/13/2016	11:07:03	14.101	3.769	68.52
9/13/2016	11:08:03	13.974	3.808	60.14
9/13/2016	11:09:03	14.006	3.762	54.48
9/13/2016	11:10:03	14.128	3.74	50.33
9/13/2016	11:11:03	14.168	3.7	47.59
9/13/2016	11:12:03	14.224	3.679	45.61
9/13/2016	11:13:03	14.144	3.727	44.36
9/13/2016	11:14:03	14.092	3.778	43.62
9/13/2016	11:15:03	13.952	3.821	43.1
9/13/2016	11:16:03	13.886	3.837	42.46
9/13/2016	11:17:03	14.054	3.784	41.67
9/13/2016	11:18:03	14.148	3.736	41.03
9/13/2016	11:19:03	14.212	3.723	40.5
9/13/2016	11:20:03	14.045	3.782	39.99
9/13/2016	11:21:03	13.957	3.83	39.64
9/13/2016	11:22:03	13.924	3.848	43.14
9/13/2016	11:23:03	13.976	3.85	49.79
9/13/2016	11:24:03	13.976	3.84	75.45
9/13/2016	11:25:03	14.08	3.819	67.18
9/13/2016	11:26:03	14.037	3.826	55.59

9/13/2016	11:27:03	14.033	3.859	43.95
9/13/2016	11:28:03	13.964	3.885	39.23
9/13/2016	11:29:03	13.858	3.947	38.97
9/13/2016	11:30:03	13.762	3.991	39.18
9/13/2016	11:31:03	13.767	4.012	39.19
9/13/2016	11:32:03	13.813	3.975	39.18
9/13/2016	11:33:03	13.787	3.993	38.99
9/13/2016	11:34:03	13.787	3.99	38.86
9/13/2016	11:35:03	14.513	3.562	41.43
9/13/2016	11:36:03	16.282	2.71	133.51
9/13/2016	11:37:03	14.505	3.625	200.86
9/13/2016	11:38:03	14.349	3.615	155.51
9/13/2016	11:39:03	14.345	3.593	121.83
9/13/2016	11:40:03	14.455	3.593	101.39
9/13/2016	11:41:04	14.402	3.668	99.92
9/13/2016	11:42:03	14.337	3.687	99.52
9/13/2016	11:43:03	14.259	3.741	96.22
9/13/2016	11:44:03	14.229	3.755	93.78
9/13/2016	11:45:03	14.14	3.774	92.15
9/13/2016	11:46:03	14	3.795	91.64
9/13/2016	11:47:03	13.933	3.82	92.39
9/13/2016	11:48:03	13.891	3.827	96.46
9/13/2016	11:49:03	14.01	3.774	91.32
9/13/2016	11:50:03	14.137	3.695	87.87
9/13/2016	11:51:03	14.343	3.598	86.37
9/13/2016	11:52:04	14.458	3.524	85.17
9/13/2016	11:53:03	14.442	3.53	85.28
9/13/2016	11:54:03	14.321	3.618	87.49
9/13/2016	11:55:03	14.163	3.686	89.1
9/13/2016	11:56:03	14.09	3.742	88.42
9/13/2016	11:57:03	14.173	3.764	88.94
9/13/2016	11:58:03	14.162	3.761	87.87
9/13/2016	11:59:03	14.21	3.719	88.15
9/13/2016	12:00:03	14.105	3.777	87.94
9/13/2016	12:01:03	14.005	3.801	87.85
9/13/2016	12:02:03	14.044	3.78	87.11
9/13/2016	12:03:03	14.235	3.647	85.53
9/13/2016	12:04:03	16.202	2.614	76.75
9/13/2016	12:05:03	14.837	3.609	99.3
9/13/2016	12:06:03	14.248	3.843	84.16
9/13/2016	12:07:03	14.112	3.844	70.52
9/13/2016	12:08:03	14.043	3.84	61.41
9/13/2016	12:09:03	14.032	3.854	55.67
9/13/2016	12:10:03	13.985	3.871	51.94
9/13/2016	12:11:03	13.842	3.948	49.31
9/13/2016	12:12:03	13.757	3.983	47.56
9/13/2016	12:13:03	13.665	4.002	45.71

9/13/2016	12:14:03	13.631	4.033	44.83
9/13/2016	12:15:03	13.538	4.068	44.15
9/13/2016	12:16:03	13.607	4.026	43.28
9/13/2016	12:17:03	13.741	3.966	42.17
9/13/2016	12:18:03	13.838	3.918	41.36
9/13/2016	12:19:03	14.052	3.795	40.44
9/13/2016	12:20:03	14.123	3.788	39.94
9/13/2016	12:21:03	13.963	3.813	39.94
9/13/2016	12:22:04	14.006	3.821	39.82
9/13/2016	12:23:04	14.023	3.805	39.39
9/13/2016	12:24:03	14.027	3.788	39.14
9/13/2016	12:25:03	14.039	3.796	38.93
9/13/2016	12:26:03	14.046	3.761	38.53
9/13/2016	12:27:03	14.072	3.774	38.29
9/13/2016	12:28:03	14.015	3.803	38.17
9/13/2016	12:29:03	13.872	3.858	38.46
9/13/2016	12:30:03	13.736	3.936	38.92
9/13/2016	12:31:03	13.66	3.947	38.84
9/13/2016	12:32:03	13.584	3.98	38.79
9/13/2016	12:33:03	13.484	4.019	38.75
9/13/2016	12:34:03	13.548	4.018	38.84
9/13/2016	12:35:03	14.286	3.555	38.24
9/13/2016	12:36:04	16.189	2.7	104.27
9/13/2016	12:37:04	14.554	3.613	132.91
9/13/2016	12:38:03	14.555	3.513	109.01
9/13/2016	12:39:03	14.622	3.429	97.12
9/13/2016	12:40:03	14.657	3.408	92.96
9/13/2016	12:41:03	14.704	3.402	92.38
9/13/2016	12:42:03	14.723	3.376	91.06
9/13/2016	12:43:03	14.829	3.317	90.19
9/13/2016	12:44:03	14.71	3.38	89.3
9/13/2016	12:45:03	14.624	3.418	89.78
9/13/2016	12:46:03	14.586	3.444	89.48
9/13/2016	12:47:03	14.552	3.471	88.65
9/13/2016	12:48:03	14.42	3.549	89.26
9/13/2016	12:49:03	14.168	3.648	88.63
9/13/2016	12:50:03	14.083	3.703	89.2
9/13/2016	12:51:04	14.063	3.702	89.01
9/13/2016	12:52:03	14.053	3.714	88.31
9/13/2016	12:53:03	14.182	3.642	87.13
9/13/2016	12:54:03	14.326	3.567	86.03
9/13/2016	12:55:03	14.482	3.494	84.18
9/13/2016	12:56:03	14.672	3.393	84
9/13/2016	12:57:03	14.596	3.443	84.04
9/13/2016	12:58:03	14.607	3.414	85.16
Average		14.38272	3.591592	69.86234

		O2	CO2	CO
		%	%	ppm
9/14/2016	9:55:44	13.946	3.625	93
9/14/2016	9:56:44	13.947	3.602	92.93
9/14/2016	9:57:45	13.99	3.585	93.51
9/14/2016	9:58:45	13.982	3.573	92.42
9/14/2016	9:59:45	14.024	3.637	93.19
9/14/2016	10:00:45	13.972	3.592	93.32
9/14/2016	10:01:45	14.039	3.57	93.42
9/14/2016	10:02:45	14.076	3.563	93.29
9/14/2016	10:03:44	15.288	2.894	88.73
9/14/2016	10:04:44	15.255	3.152	90.01
9/14/2016	10:05:44	13.622	3.935	94.1
9/14/2016	10:06:44	13.534	3.925	78.54
9/14/2016	10:07:45	13.463	3.934	67.07
9/14/2016	10:08:45	13.495	3.912	59.97
9/14/2016	10:09:45	13.453	3.895	55.26
9/14/2016	10:10:45	13.443	3.913	51.37
9/14/2016	10:11:45	13.419	3.932	49.65
9/14/2016	10:12:45	13.404	3.906	47.11
9/14/2016	10:13:45	13.48	3.874	45.82
9/14/2016	10:14:45	13.45	3.89	45.05
9/14/2016	10:15:45	13.502	3.91	43.61
9/14/2016	10:16:44	13.444	3.922	43.17
9/14/2016	10:17:44	13.549	3.984	42.73
9/14/2016	10:18:44	13.433	3.889	42.01
9/14/2016	10:19:44	13.395	3.891	41.49
9/14/2016	10:20:45	13.414	3.88	41.16
9/14/2016	10:21:45	13.393	3.88	40.74
9/14/2016	10:22:45	13.381	3.906	40.23
9/14/2016	10:23:45	13.408	3.919	40.18
9/14/2016	10:24:45	13.399	3.908	40.23
9/14/2016	10:25:45	13.415	3.878	39.77
9/14/2016	10:26:45	13.364	3.899	39.34
9/14/2016	10:27:45	13.318	3.929	39.42
9/14/2016	10:28:45	13.395	3.901	39.68
9/14/2016	10:29:44	13.331	3.914	39.37
9/14/2016	10:30:44	13.259	3.942	39.32
9/14/2016	10:31:44	13.337	3.918	39.44
9/14/2016	10:32:44	13.474	3.881	48.8
9/14/2016	10:33:45	13.529	3.845	90.15
9/14/2016	10:34:45	13.716	3.734	105.88
9/14/2016	10:35:45	16.462	2.285	108.27
9/14/2016	10:36:45	14.882	3.288	195.59
9/14/2016	10:37:45	14.546	3.334	123.22
9/14/2016	10:38:45	14.571	3.312	107.6
9/14/2016	10:39:45	14.677	3.257	113.29

9/14/2016	10:40:45	14.691	3.257	108.73
9/14/2016	10:41:45	14.66	3.275	102.11
9/14/2016	10:42:44	14.502	3.343	97.55
9/14/2016	10:43:44	14.386	3.41	94.78
9/14/2016	10:44:44	14.36	3.392	92.13
9/14/2016	10:45:44	14.329	3.419	91.21
9/14/2016	10:46:45	14.231	3.479	90.87
9/14/2016	10:47:45	14.206	3.49	94
9/14/2016	10:48:45	14.281	3.456	98.66
9/14/2016	10:49:45	14.421	3.36	98.31
9/14/2016	10:50:45	14.553	3.334	102.24
9/14/2016	10:51:45	14.622	3.284	93.03
9/14/2016	10:52:44	14.548	3.345	88.83
9/14/2016	10:53:44	14.51	3.361	88.77
9/14/2016	10:54:44	14.505	3.355	89.12
9/14/2016	10:55:45	14.453	3.394	90.61
9/14/2016	10:56:45	14.38	3.447	90.82
9/14/2016	10:57:45	14.26	3.501	92.16
9/14/2016	10:58:45	14.128	3.573	92.47
9/14/2016	10:59:44	14.11	3.561	91.51
9/14/2016	11:00:44	14.025	3.62	91
9/14/2016	11:01:44	13.99	3.621	91.06
9/14/2016	11:02:45	14.087	3.589	90.99
9/14/2016	11:03:45	15.389	2.857	86.04
9/14/2016	11:04:45	15.533	3.032	87.91
9/14/2016	11:05:45	14.036	3.831	91.26
9/14/2016	11:06:45	13.808	3.841	76.56
9/14/2016	11:07:45	13.666	3.874	65.88
9/14/2016	11:08:44	13.602	3.885	58.69
9/14/2016	11:09:44	13.524	3.908	54.14
9/14/2016	11:10:44	13.525	3.913	51.07
9/14/2016	11:11:45	13.475	3.926	48.92
9/14/2016	11:12:45	13.464	3.942	47.02
9/14/2016	11:13:45	13.391	3.957	45.56
9/14/2016	11:14:45	13.301	4.014	44.69
9/14/2016	11:15:44	13.205	4.045	43.69
9/14/2016	11:16:44	13.149	4.068	43.01
9/14/2016	11:17:44	13.128	4.065	42.13
9/14/2016	11:18:44	13.346	3.961	41.36
9/14/2016	11:19:45	13.591	3.848	40.74
9/14/2016	11:20:45	13.811	3.744	40
9/14/2016	11:21:45	13.97	3.653	38.99
9/14/2016	11:22:45	14.14	3.6	38.28
9/14/2016	11:23:45	14.212	3.559	38.03
9/14/2016	11:24:44	14.143	3.617	38.07
9/14/2016	11:25:44	14.111	3.629	37.87
9/14/2016	11:26:44	14.098	3.635	37.5

9/14/2016	11:27:44	14.06	3.632	37.41
9/14/2016	11:28:45	14.064	3.638	38.84
9/14/2016	11:29:45	14.072	3.66	42.12
9/14/2016	11:30:45	14.109	3.636	44.5
9/14/2016	11:31:45	14.056	3.679	46.44
9/14/2016	11:32:45	13.909	3.771	48.18
9/14/2016	11:33:44	13.745	3.842	48.14
9/14/2016	11:34:44	13.847	3.776	47.38
9/14/2016	11:35:44	16.371	2.408	74.04
9/14/2016	11:36:44	14.601	3.549	144.92
9/14/2016	11:37:45	14.14	3.667	121.89
9/14/2016	11:38:45	14.111	3.652	111.69
9/14/2016	11:39:45	14.179	3.624	104.26
9/14/2016	11:40:45	14.288	3.534	98.07
9/14/2016	11:41:45	14.415	3.495	95.51
9/14/2016	11:42:44	14.459	3.476	91.81
9/14/2016	11:43:44	14.545	3.426	90.84
9/14/2016	11:44:44	14.518	3.42	89.92
9/14/2016	11:45:44	14.488	3.418	87.57
9/14/2016	11:46:45	14.538	3.386	86.14
9/14/2016	11:47:45	14.522	3.407	85.71
9/14/2016	11:48:45	14.486	3.416	88.19
9/14/2016	11:49:45	14.392	3.483	89.03
9/14/2016	11:50:45	14.281	3.54	91.96
9/14/2016	11:51:44	14.263	3.571	89.94
9/14/2016	11:52:44	14.208	3.603	89.11
9/14/2016	11:53:44	14.155	3.643	90.06
9/14/2016	11:54:45	14.057	3.676	89.77
9/14/2016	11:55:45	14.058	3.664	88.27
9/14/2016	11:56:45	14.192	3.591	87.19
9/14/2016	11:57:45	14.348	3.511	85.9
9/14/2016	11:58:45	14.504	3.426	85.2
9/14/2016	11:59:44	14.7	3.347	85.35
9/14/2016	12:00:44	14.689	3.353	87.65
9/14/2016	12:01:44	14.763	3.335	90.1
9/14/2016	12:02:44	14.647	3.392	89.77
9/14/2016	12:03:44	15.664	2.784	85.37
9/14/2016	12:04:45	15.751	2.961	104.33
9/14/2016	12:05:45	14.479	3.627	103.67
9/14/2016	12:06:45	14.257	3.675	83.29
9/14/2016	12:07:45	14.205	3.689	72.84
9/14/2016	12:08:45	14.042	3.781	66.01
9/14/2016	12:09:44	13.834	3.858	60.95
9/14/2016	12:10:44	13.785	3.879	56.61
9/14/2016	12:11:44	13.805	3.856	53.04
9/14/2016	12:12:44	13.74	3.873	50.2
9/14/2016	12:13:45	13.683	3.889	47.93

9/14/2016	12:14:45	13.551	3.95	46.14
9/14/2016	12:15:45	13.414	3.992	44.55
9/14/2016	12:16:45	13.466	4.001	43.49
9/14/2016	12:17:44	13.497	3.994	42.88
9/14/2016	12:18:45	13.597	3.931	42.14
9/14/2016	12:19:45	13.742	3.891	41.27
9/14/2016	12:20:44	13.727	3.887	43.2
9/14/2016	12:21:44	13.699	3.903	47.17
9/14/2016	12:22:45	13.71	3.905	51.88
9/14/2016	12:23:45	13.762	3.869	50.37
9/14/2016	12:24:45	13.801	3.84	46.96
9/14/2016	12:25:45	13.774	3.872	44.04
9/14/2016	12:26:45	13.741	3.917	42.3
9/14/2016	12:27:45	13.557	3.982	41.44
9/14/2016	12:28:45	13.411	4.083	41.13
9/14/2016	12:29:45	13.451	4.051	40.22
9/14/2016	12:30:44	13.639	3.922	39.49
9/14/2016	12:31:44	13.729	3.874	39.1
9/14/2016	12:32:44	13.867	3.805	38.69
9/14/2016	12:33:44	13.969	3.747	37.98
9/14/2016	12:34:44	14.076	3.714	38
9/14/2016	12:35:44	16.544	2.359	65.38
9/14/2016	12:36:44	14.933	3.391	137.97
9/14/2016	12:37:44	14.488	3.524	114.13
9/14/2016	12:38:45	14.447	3.506	118.95
9/14/2016	12:39:45	14.511	3.449	134.05
9/14/2016	12:40:45	14.533	3.46	175.1
9/14/2016	12:41:45	14.457	3.468	236.53
9/14/2016	12:42:45	14.402	3.496	229.4
9/14/2016	12:43:44	14.545	3.45	177.52
9/14/2016	12:44:44	14.424	3.512	149.81
9/14/2016	12:45:44	14.356	3.565	136.38
9/14/2016	12:46:44	14.208	3.644	119.31
9/14/2016	12:47:44	14.047	3.715	107.66
9/14/2016	12:48:45	13.997	3.728	100.74
9/14/2016	12:49:45	14.124	3.658	95.57
9/14/2016	12:50:45	14.3	3.573	92.78
9/14/2016	12:51:45	14.346	3.563	90.3
9/14/2016	12:52:45	14.349	3.547	88.89
9/14/2016	12:53:44	14.315	3.563	87.44
9/14/2016	12:54:44	14.388	3.535	86.71
Average		14.07584	3.638556	76.08328

		O2	CO2	CO
		%	%	ppm
9/15/2016	9:45:32	12.177	4.055	86.87
9/15/2016	9:46:32	12.124	4.08	86.07
9/15/2016	9:47:32	12.155	4.13	84.78
9/15/2016	9:48:32	12.14	4.131	84.29
9/15/2016	9:49:32	12.098	4.104	82.89
9/15/2016	9:50:32	12.079	4.09	81.67
9/15/2016	9:51:32	12.08	4.081	81.24
9/15/2016	9:52:32	12.067	4.075	82.4
9/15/2016	9:53:32	12.041	4.073	82.94
9/15/2016	9:54:32	12.062	4.08	83.15
9/15/2016	9:55:32	12.045	4.099	83.53
9/15/2016	9:56:32	12.004	4.104	86.5
9/15/2016	9:57:32	12.048	4.083	84.46
9/15/2016	9:58:32	12.062	4.074	82.15
9/15/2016	9:59:32	12.092	4.051	80.78
9/15/2016	10:00:32	12.1	4.041	79.4
9/15/2016	10:01:32	12.132	4.03	76.99
9/15/2016	10:02:32	12.17	4.034	77.9
9/15/2016	10:03:32	12.926	3.654	76.87
9/15/2016	10:04:31	14.425	3.117	68.26
9/15/2016	10:05:32	11.976	4.253	77.69
9/15/2016	10:06:32	12.201	4.114	62.97
9/15/2016	10:07:31	12.335	4.015	51.28
9/15/2016	10:08:31	12.428	3.972	44.4
9/15/2016	10:09:32	12.499	3.976	40.05
9/15/2016	10:10:32	12.537	3.988	36.63
9/15/2016	10:11:32	12.505	4.008	34.5
9/15/2016	10:12:32	12.36	3.964	33.68
9/15/2016	10:13:32	12.409	3.917	32.31
9/15/2016	10:14:32	12.512	3.923	31.25
9/15/2016	10:15:32	12.488	3.982	30.79
9/15/2016	10:16:32	12.487	3.867	30.31
9/15/2016	10:17:32	12.551	3.828	29.61
9/15/2016	10:18:31	12.468	3.866	29.5
9/15/2016	10:19:32	12.419	3.89	29.57
9/15/2016	10:20:32	12.44	3.892	28.93
9/15/2016	10:21:32	12.451	3.881	28.91
9/15/2016	10:22:32	12.429	4.017	29.03
9/15/2016	10:23:32	12.429	3.959	28.58
9/15/2016	10:24:32	12.37	3.914	28.59
9/15/2016	10:25:32	12.335	3.911	28.89
9/15/2016	10:26:32	12.382	3.905	28.32
9/15/2016	10:27:32	12.383	3.9	28.33
9/15/2016	10:28:32	12.336	3.914	28.69
9/15/2016	10:29:32	12.347	3.917	28.32

9/15/2016	10:30:32	12.314	3.922	28.29
9/15/2016	10:31:32	12.333	3.911	29.32
9/15/2016	10:32:32	12.304	3.929	29.39
9/15/2016	10:33:32	12.226	4.011	28.92
9/15/2016	10:34:32	12.198	3.99	29.08
9/15/2016	10:35:32	15.069	2.629	36.22
9/15/2016	10:36:32	13.627	3.521	100.25
9/15/2016	10:37:32	13.107	3.67	95.83
9/15/2016	10:38:32	12.909	3.804	95.86
9/15/2016	10:39:32	12.912	3.71	90.65
9/15/2016	10:40:32	13.022	3.619	75.45
9/15/2016	10:41:32	12.956	3.643	76.03
9/15/2016	10:42:32	12.973	3.638	75.48
9/15/2016	10:43:32	12.991	3.624	74.5
9/15/2016	10:44:32	12.961	3.624	72.87
9/15/2016	10:45:32	12.972	3.621	71.4
9/15/2016	10:46:32	13.147	3.551	67.99
9/15/2016	10:47:32	13.366	3.438	63.4
9/15/2016	10:48:32	13.577	3.319	60.19
9/15/2016	10:49:32	13.567	3.348	59.21
9/15/2016	10:50:32	13.539	3.43	62.2
9/15/2016	10:51:32	13.475	3.419	83.35
9/15/2016	10:52:32	13.432	3.43	101.54
9/15/2016	10:53:32	13.368	3.437	104.3
9/15/2016	10:54:32	13.373	3.55	92.29
9/15/2016	10:55:32	13.422	3.506	69.9
9/15/2016	10:56:32	13.346	3.476	60.74
9/15/2016	10:57:33	13.2	3.519	61.12
9/15/2016	10:58:32	13.033	3.623	62.66
9/15/2016	10:59:32	12.879	3.677	62.88
9/15/2016	11:00:32	12.74	3.771	64.05
9/15/2016	11:01:32	12.663	3.785	64.42
9/15/2016	11:02:32	12.651	3.792	62.76
9/15/2016	11:03:31	13.296	3.467	69.89
9/15/2016	11:04:32	14.628	2.961	143.28
9/15/2016	11:05:31	12.168	4.179	156.36
9/15/2016	11:06:32	12.259	4.128	63.11
9/15/2016	11:07:32	12.306	4.114	50.29
9/15/2016	11:08:32	12.317	4.05	44.13
9/15/2016	11:09:32	12.218	4.072	40.44
9/15/2016	11:10:32	11.967	4.19	37.84
9/15/2016	11:11:32	11.935	4.184	35.98
9/15/2016	11:12:32	11.936	4.191	34.43
9/15/2016	11:13:32	11.902	4.218	33.71
9/15/2016	11:14:32	11.984	4.176	32.44
9/15/2016	11:15:32	12.111	4.132	31.45
9/15/2016	11:16:32	11.981	4.211	31.18

9/15/2016	11:17:32	11.922	4.174	31.16
9/15/2016	11:18:32	12.133	4.07	29.88
9/15/2016	11:19:32	12.186	4.04	29.75
9/15/2016	11:20:32	12.288	3.999	29.15
9/15/2016	11:21:31	12.208	4.028	28.81
9/15/2016	11:22:32	12.252	3.995	28.85
9/15/2016	11:23:32	12.066	4.106	28.47
9/15/2016	11:24:32	12.086	4.104	28.43
9/15/2016	11:25:32	12.137	4.08	28.61
9/15/2016	11:26:32	12.188	4.051	28.19
9/15/2016	11:27:32	12.043	4.09	28.2
9/15/2016	11:28:32	11.984	4.113	28.39
9/15/2016	11:29:32	11.912	4.167	28.49
9/15/2016	11:30:32	11.858	4.218	39.03
9/15/2016	11:31:32	11.817	4.214	103.84
9/15/2016	11:32:32	11.71	4.243	182.47
9/15/2016	11:33:31	11.689	4.254	277.45
9/15/2016	11:34:32	11.676	4.267	237.92
9/15/2016	11:35:32	14.657	2.905	151.59
9/15/2016	11:36:32	13.072	3.782	203.6
9/15/2016	11:37:32	12.551	3.966	137.55
9/15/2016	11:38:32	12.523	4.016	114.49
9/15/2016	11:39:32	12.411	4.011	103.9
9/15/2016	11:40:32	12.367	4.032	97.59
9/15/2016	11:41:32	12.318	4.048	105.07
9/15/2016	11:42:32	12.42	3.996	110.71
9/15/2016	11:43:32	12.686	3.872	104.07
9/15/2016	11:44:32	12.929	3.727	95.34
9/15/2016	11:45:32	12.988	3.696	95.28
9/15/2016	11:46:32	13.078	3.669	88.24
9/15/2016	11:47:32	13.049	3.684	81.21
9/15/2016	11:48:32	12.811	3.8	88.15
9/15/2016	11:49:32	12.683	3.874	90.3
9/15/2016	11:50:32	12.542	3.927	87.54
9/15/2016	11:51:32	12.528	3.92	86.74
9/15/2016	11:52:32	12.643	3.874	82.21
9/15/2016	11:53:32	12.826	3.779	75.69
9/15/2016	11:54:32	13.013	3.692	70.6
9/15/2016	11:55:32	13.113	3.657	67.76
9/15/2016	11:56:32	13.109	3.65	66.97
9/15/2016	11:57:32	13.248	3.577	63.67
9/15/2016	11:58:32	13.342	3.517	58.79
9/15/2016	11:59:32	13.361	3.512	58.38
9/15/2016	12:00:32	13.366	3.519	59.25
9/15/2016	12:01:32	13.38	3.504	59.25
9/15/2016	12:02:32	13.394	3.498	58.29
9/15/2016	12:03:32	14.031	3.175	55.97

9/15/2016	12:04:32	15.226	2.741	57.99
9/15/2016	12:05:32	12.807	3.951	68.97
9/15/2016	12:06:32	12.65	3.971	57.27
9/15/2016	12:07:32	12.396	4.075	47.91
9/15/2016	12:08:32	12.02	4.24	42.54
9/15/2016	12:09:32	11.875	4.28	39.08
9/15/2016	12:10:32	11.682	4.357	36.93
9/15/2016	12:11:32	11.611	4.361	35.27
9/15/2016	12:12:32	11.5	4.407	34.15
9/15/2016	12:13:32	11.492	4.405	33.6
9/15/2016	12:14:32	11.452	4.41	33.14
9/15/2016	12:15:32	11.444	4.408	32.34
9/15/2016	12:16:32	11.47	4.391	31.91
9/15/2016	12:17:32	11.502	4.389	31.69
9/15/2016	12:18:32	11.473	4.386	31.59
9/15/2016	12:19:32	11.482	4.381	31.3
9/15/2016	12:20:32	11.493	4.386	30.99
9/15/2016	12:21:32	11.386	4.427	30.91
9/15/2016	12:22:32	11.464	4.389	30.92
9/15/2016	12:23:32	11.422	4.406	30.93
9/15/2016	12:24:32	11.415	4.395	30.71
9/15/2016	12:25:32	11.407	4.4	30.52
9/15/2016	12:26:32	11.423	4.386	30.59
9/15/2016	12:27:32	11.423	4.397	30.66
9/15/2016	12:28:32	11.48	4.359	30.45
9/15/2016	12:29:32	11.553	4.335	30.17
9/15/2016	12:30:32	11.589	4.324	30.05
9/15/2016	12:31:32	11.61	4.315	30.05
9/15/2016	12:32:32	11.554	4.355	30.22
9/15/2016	12:33:32	11.522	4.354	30.12
9/15/2016	12:34:32	11.519	4.368	29.91
9/15/2016	12:35:32	14.625	2.897	37.53
9/15/2016	12:36:31	12.768	3.889	154.64
9/15/2016	12:37:32	12.067	4.187	264.27
9/15/2016	12:38:32	12.079	4.158	408.82
9/15/2016	12:39:32	12.192	4.083	506.02
9/15/2016	12:40:32	12.383	3.988	474.8
9/15/2016	12:41:32	12.607	3.901	234.4
9/15/2016	12:42:32	12.652	3.889	219.08
9/15/2016	12:43:32	12.578	3.925	221.18
9/15/2016	12:44:32	12.536	3.937	200.2
Average		12.46215	3.932578	73.28028