INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
Indianapolis

OFFICE MEMORANDUM

To: Rick Massoels Date: July 27, 2021

From: Michael T. Singer MTS Thru: Dave Cline DSC

Subject: Cokenergy, LLC
Source ID: 089-00383 Permit Number: T089-41033-00383
City: East Chicago County: Lake
Protocol Reviewer: JCF Field Observer: None
Test Company: TRC Environmental Corporation

The Compliance Data Section has reviewed this report and found the sampling procedures used and results obtained to be acceptable to this office. A copy of the test report is filed in the Virtual File Cabinet. The following is a summary of the test results.

Unit Tested: HRCC with waste heat boilers #256968
Date of test: June 9,2021
Test Purpose: Consent Decree (18-cv-35)
Type of Fuel: N/A
Pollution Control Equipment: Lime spray dryer desulfurization unit and baghouse system.
Permitted APCD Parameters: Pressure drop range of 4.0 to 13.0 inches of water.
APCD Parameters During Testing: Baghouse 1 pressure drop of 8.15 to 8.20 inches of water.
Baghouse 2 pressure drop of 7.89 to 7.97 inches of water.

Pollutants:	Pb
Test methods:	1,2,3A,4,12
Maximum Operating Rate:	960 kpph* (main steam flow)
Average Operating Rate During Test:	755 kpph* (main steam flow)
Pb Limit:	0.19 lbs/hr** (326 IAC 2-2)
Pb Emission Rate:	0.002 lbs/hr

Status: **In Compliance** (at 79% maximum permitted capacity)

*NOTE: The source's air permit does not describe the maximum capacity of the HRCC waste gas stream. However, the source provided the steam flow data for each test run in terms of kilo pounds per hour (kpph). This method of operating rate measurement, as well as the 79% operating rate during the test, is consistent with the prior Pb compliance test conducted on this unit.

**NOTE: The Pb emission limit for Stack ID 201 is an average over a six (6) hour period and is contained under Indiana Harbor Coke Company L.P permit number 089-41059-00382, Condition D.1.4(a).

SOURCE:	Cokenergy, LLC
UNIT TESTED:	HRCC with Waste Heat Boilers
TESTING COMPANY:	TRC Environmental Corporation
DATE OF TEST:	June 9, 2021
RUN NO.:	1

Area of Stack (enter diameter in inches), As

L =	0
W =	0
diameter (in) =	216
No. of Stacks =	1
Area Stack (ft^2) =	254.469

Molecular Weight of Stack Gas, Dry Basis, Md

%CO2 =	6.176153631	Method 3A?
%O2 =	11.98109235	Yes
Md (g/gmol) =	29.47	Equation 3-1

Volume of Dry Gas Collected @ STD. COND., Vm

Start Meter Volume (cf) =	762.5	
End Meter Volume (cf) =	822.825	
Vol. Int. Leak Checks (cf) =	0	
Vm (cf) =	60.325	
Vm (dscf) =	56.284	Equation 5-1

Volume of Water Vapor Collected @ STD. COND., Vw

Vlc (mL) =	221.2	
Vw (scf) =	10.41	Equation 5-2

Moisture Content of Stack Gas, Bws

		Equation 5-3	Sat. Moist.
Bws =	15.61%	15.61%	100.00%
1-Bws =	84.39%	84.39%	0.00%

Molecular Weight of Stack Gas, Ms

Ms (g/gmol) =	27.68	Equation 2-6

Absolute Pressure, Ps

Static (in H2O) =	-1.2
Ps (in Hg) =	29.02

Stack Gas Velocity, Vs

Cp =	0.84	
Vs (fps) =	72.09	Equation 2-7

Stack Gas Flowrate, Qs

Qs (acfm) =	1100628.74

Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd

Qstd (dscfh) =	3907360.75	Equation 2-8
Qstd (dscfm) =	651222.68	

Velocity at the Nozzle, Vn

Dia. of Nozzle (in) =	0.205	Area of Nozzle, An An (ft^2) =	0.000229211
Time of Run (min) =	96		
Vn (fps) =	72.06		

% Isokinetic, %I

%I =	99.96	PASS	
Intermediate (%I) =	100.03	PASS	Equation 5-8

Method 2

Point No.	Δp	√Δp	Stack Temp.
1	1.2	1.09544512	270
2	1.2	1.09544512	270
3	1.2	1.09544512	271
4	1.2	1.09544512	271
5	0.92	0.9591663	270
6	0.92	0.9591663	270
7	1.2	1.09544512	271
8	1.2	1.09544512	271
9	1.1	1.04880885	270
10	1.1	1.04880885	270
11	1	1	270
12	1	1	270
13	1.2	1.09544512	271
14	1.2	1.09544512	271
15	1.2	1.09544512	271
16	1.2	1.09544512	271
17	1	1	271
18	1	1	271
19	1.1	1.04880885	271
20	1.1	1.04880885	271
21	1.1	1.04880885	270
22	1.1	1.04880885	270
23	1.1	1.04880885	270
24	1.1	1.04880885	270
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
41			
42			
43			
44			
45			
46			
47			
48			
49			
50			
AVG	1.110	1.053	270.500

Method 4

ΔH	Meter In	Meter Out
1.3	84	84
1.3	85	84
1.3	85	84
1.3	86	85
1	86	85
1	86	85
1.3	86	86
1.3	87	86
1.2	88	86
1.2	88	86
1.1	88	87
1.1	89	87
1.3	88	87
1.3	88	88
1.3	89	88
1.3	89	88
1.1	89	88
1.1	90	88
1.2	87	87
1.2	87	87
1.2	88	87
1.2	88	87
1.2	89	88
1.2	89	88

Delta H@=	1.801
Pb (in Hg) =	29.11
gamma =	0.991
Post Test Cal	1.000 Pass

Particulate Emissions Test Results
Pollutant Mass Emission Rate, PMR

	Filterable	Condensible	Total
Mn (mg)			
Mn (a)			
Mn (g) =	0	0	0
PMR (lbs/hr) =	0.000	0.000	0.00000
Concentration, gr/dscf			
gr/dscf =	0.00000	0.00000	0.00000
Concentration, mg/dcsm			
mg/dscm =	0.00000	0.00000	0.00000

Pollutant Mass Emission Rate, Throughput Based

Production (lb/hr) =			
Production (ton/hr) =			
Production (ton/hr) =	0		
	Filterable	Condensible	Total
PMR (lbs/ton)	#DIV/0!	#DIV/0!	#DIV/0!

Antimony (Sb) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (a)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf	
gr/dscf =	0.00E+00
Concentration, mg/dcsm	
mg/dscm =	0.00

Antimony (Sb) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Arsenic (As) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (a)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf	
gr/dscf =	0.00E+00
Concentration, mg/dcsm	
mg/dscm =	0.00

Arsenic (As) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Barium (Ba) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (a)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf	
gr/dscf =	0.00E+00
Concentration, mg/dcsm	
mg/dscm =	0.00

Barium (Ba) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Beryllium (Be) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (a)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf	
gr/dscf =	0.00E+00
Concentration, mg/dcsm	
mg/dscm =	0.00

Beryllium (Be) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Cadmium (Cd) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (a)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf	
gr/dscf =	0.00E+00
Concentration, mg/dcsm	
mg/dscm =	0.00

Cadmium (Cd) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Chromium (Cr) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (a)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf	
gr/dscf =	0.00E+00
Concentration, mg/dcsm	
mg/dscm =	0.00

Chromium (Cr) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Cobalt (Co) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (a)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf	
gr/dscf =	0.00E+00
Concentration, mg/dcsm	
mg/dscm =	0.00

Cobalt (Co) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Copper (Cu) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (a)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf	
gr/dscf =	0.00E+00
Concentration, mg/dcsm	
mg/dscm =	0.00

Copper (Cu) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Lead (Pb) Emissions Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	1.7
Mn (mg)	
Mn (a)	
Mn (g) =	0.0000017
PMR (lbs/hr) =	0.003
Concentration, gr/dscf	
gr/dscf =	4.66E-07
Concentration, mg/dcsm	
mg/dscm =	0.00

Lead (Pb) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Manganese (Mn) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (a)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf	
gr/dscf =	0.00E+00
Concentration, mg/dcsm	
mg/dscm =	0.00

Manganese (Mn) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Mercury (Hg) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (a)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf	
gr/dscf =	0.00E+00
Concentration, mg/dcsm	
mg/dscm =	0.00

Mercury (Hg) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

SOURCE:	Cokenergy, LLC
UNIT TESTED:	HRCC with Waste Heat Boilers
TESTING COMPANY:	TRC Environmental Corporation
DATE OF TEST:	June 9, 2021
RUN NO.:	2

Area of Stack (enter diameter in inches), As

L =	0
W =	0
diameter (in) =	216
No. of Stacks =	1
Area Stack (ft^2) =	254.469

Molecular Weight of Stack Gas, Dry Basis, Md

%CO2 =	5.793650255	
%O2 =	12.36562066	
Md (g/gmol) =	29.42	Equation 3-1

Volume of Dry Gas Collected @ STD. COND., Vm

Start Meter Volume (cf) =	825.3	
End Meter Volume (cf) =	888.015	
Vol. Int. Leak Checks (cf) =	0	
Vm (cf) =	62.715	
Vm (dscf) =	58.417	Equation 5-1

Volume of Water Vapor Collected @ STD. COND., Vw

Vlc (mL) =	215.2	
Vw (scf) =	10.13	Equation 5-2

Moisture Content of Stack Gas, Bws

		Equation 5-3	Sat. Moist.
Bws =	14.77%	14.77%	100.00%
1-Bws =	85.23%	85.23%	0.00%

Molecular Weight of Stack Gas, Ms

Ms (g/gmol) =	27.73	Equation 2-6

Absolute Pressure, Ps

Static (in H2O) =	-1.2
Ps (in Hg) =	29.02

Stack Gas Velocity, Vs

Cp =	0.84	
Vs (fps) =	72.26	Equation 2-7

Stack Gas Flowrate, Qs

Qs (acfm) =	1103300.66

Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd

Qstd (dscfh) =	39576440.62	Equation 2-8
Qstd (dscfm) =	659607.34	

Velocity at the Nozzle, Vn / **Area of Nozzle, An**

Dia. of Nozzle (in) =	0.205	An (ft^2) =	0.000229211
Time of Run (min) =	96		
Vn (fps) =	74.01		

% Isokinetic, %I

%I =	102.41	PASS	
Intermediate (%I) =	102.48	PASS	Equation 5-8

Method 2				Method 4		
Point No.	Δp	√Δp	Stack Temp.	ΔH	Meter In	Meter Out
1	1.2	1.095445115	271	1.3	87	88
2	1.2	1.095445115	271	1.3	87	88
3	1.1	1.048808848	271	1.2	87	87
4	1.1	1.048808848	271	1.2	88	87
5	0.99	0.994987437	270	1.1	88	87
6	0.99	0.994987437	270	1.1	89	87
7	1.2	1.095445115	270	1.3	88	87
8	1.2	1.095445115	270	1.3	88	87
9	1.2	1.095445115	270	1.3	88	87
10	1.2	1.095445115	270	1.3	89	88
11	1.1	1.048808848	270	1.2	89	88
12	1.1	1.048808848	270	1.2	90	88
13	1.2	1.095445115	271	1.3	88	88
14	1.2	1.095445115	271	1.3	88	88
15	1.1	1.048808848	271	1.2	88	88
16	1.1	1.048808848	271	1.2	89	88
17	0.96	0.979795897	270	1.2	89	88
18	0.96	0.979795897	270	1.2	89	88
19	1.2	1.095445115	269	1.3	88	87
20	1.2	1.095445115	269	1.3	88	87
21	1.2	1.095445115	269	1.3	89	88
22	1.2	1.095445115	269	1.3	89	88
23	0.97	0.98488578	269	1.1	89	88
24	0.97	0.98488578	269	1.1	90	88
25						
26						
27						
28						
29						
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35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						
49						
50						
AVG	1.118	1.057	270.083	1.23	88.02083333	

Delta H@ =	1.801	
Pb (in Hg) =	29.11	
gamma =	0.991	
Post Test Cal	0.9734	Pass

Particulate Emissions Test Results
Pollutant Mass Emission Rate, PMR

	Filterable	Condensible	Total
Mn (mg)			
Mn (g)			
Mn (g) =	0	0	0
PMR (lbs/hr) =	0.000	0.000	0.00000
Concentration, gr/dscf			
gr/dscf =	0.00000	0.00000	0.00000
Concentration, mg/dcsm			
mg/dscm =	0.00000	0.00000	0.00000

Pollutant Mass Emission Rate, Throughput Based

	Filterable	Condensible	Total
Production (lb/hr) =			
Production (ton/hr) =			
Production (ton/hr) =	0		
PMR (lbs/ton)	#DIV/0!	#DIV/0!	#DIV/0!

Antimony (Sb) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (g)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf — gr/dscf =	0.00E+00
Concentration, mg/dcsm — mg/dscm =	0.00

Antimony (Sb) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Arsenic (As) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (g)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf — gr/dscf =	0.00E+00
Concentration, mg/dcsm — mg/dscm =	0.00

Arsenic (As) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Barium (Ba) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (g)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf — gr/dscf =	0.00E+00
Concentration, mg/dcsm — mg/dscm =	0.00

Barium (Ba) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Beryllium (Be) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (g)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf — gr/dscf =	0.00E+00
Concentration, mg/dcsm — mg/dscm =	0.00

Beryllium (Be) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Cadmium (Cd) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (g)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf — gr/dscf =	0.00E+00
Concentration, mg/dcsm — mg/dscm =	0.00

Cadmium (Cd) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Chromium (Cr) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (g)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf — gr/dscf =	0.00E+00
Concentration, mg/dcsm — mg/dscm =	0.00

Chromium (Cr) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Cobalt (Co) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (g)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf — gr/dscf =	0.00E+00
Concentration, mg/dcsm — mg/dscm =	0.00

Cobalt (Co) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Copper (Cu) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (g)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf — gr/dscf =	0.00E+00
Concentration, mg/dcsm — mg/dscm =	0.00

Copper (Cu) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Lead (Pb) Emissions Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	1.2
Mn (mg)	
Mn (g)	
Mn (g) =	0.0000012
PMR (lbs/hr) =	0.002
Concentration, gr/dscf — gr/dscf =	3.17E-07
Concentration, mg/dcsm — mg/dscm =	0.00

Lead (Pb) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Manganese (Mn) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (g)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf — gr/dscf =	0.00E+00
Concentration, mg/dcsm — mg/dscm =	0.00

Manganese (Mn) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

Mercury (Hg) Test Results
Pollutant Mass Emission Rate, PMR

Mn (ug)	
Mn (mg)	
Mn (g)	
Mn (g) =	0
PMR (lbs/hr) =	0.000
Concentration, gr/dscf — gr/dscf =	0.00E+00
Concentration, mg/dcsm — mg/dscm =	0.00

Mercury (Hg) Emission Rate Throughput Based

Production (lb/hr) =	0
Production (ton/hr) =	0
Production (ton/hr) =	0
PMR (lbs/ton)	#DIV/0!

SOURCE:	Cokenergy, LLC
UNIT TESTED:	HRCC with Waste Heat Boilers
TESTING COMPANY:	TRC Environmental Corporation
DATE OF TEST:	June 9, 2021
RUN NO.:	3

Area of Stack (enter diameter in inches), As

L =	0
W =	0
diameter (in) =	216
No. of Stacks =	1
Area Stack (ft^2) =	254.469

Molecular Weight of Stack Gas, Dry Basis, Md

%CO2 =	5.670790977	
%O2 =	12.6489573	
Md (g/gmol) =	29.41	Equation 3-1

Volume of Dry Gas Collected @ STD, COND., Vm

Start Meter Volume (cf) =	888.5	
End Meter Volume (cf) =	950.383	
Vol. Int. Leak Checks (cf) =	0	
Vm (cf) =	61.883	
Vm (dscf) =	57.660	Equation 5-1

Volume of Water Vapor Collected @ STD, COND., Vw

Vlc (mL) =	206.6	
Vw (scf) =	9.72	Equation 5-2

Moisture Content of Stack Gas, Bws

		Equation 5-3	Sat. Moist.
Bws =	14.43%	14.43%	100.00%
1-Bws =	85.57%	85.57%	0.00%

Molecular Weight of Stack Gas, Ms

Ms (g/gmol) =	27.77	Equation 2-6

Absolute Pressure, Ps

Static (in H2O) =	-1.2
Ps (in Hg) =	29.02

Stack Gas Velocity, Vs

Cp =	0.84	
Vs (fps) =	71.92	Equation 2-7

Stack Gas Flowrate, Qs

Qs (acfm) =	1098069.80

Stack Gas Flowrate @ STD, COND., Dry Basis, Qstd

Qstd (dscfh) =	39648261.31	Equation 2-8
Qstd (dscfm) =	660804.36	

Velocity at the Nozzle, Vn

Dia. of Nozzle (in) =	0.205	Area of Nozzle, An	
Time of Run (min) =	96	An (ft^2) =	0.00022921
Vn (fps) =	72.57		

% Isokinetic, %I

%I =	100.90	PASS	
Intermediate (%I) =	100.97	PASS	Equation 5-8

Method 2

Point No.	ΔP	Vlc	Stack Temp.
1	1.2	1.095445	269
2	1.2	1.095445	269
3	1.2	1.095445	269
4	1.2	1.095445	269
5	1	1	268
6	1	1	268
7	1.1	1.048809	269
8	1.1	1.048809	269
9	1.1	1.048809	268
10	1.1	1.048809	268
11	0.93	0.964365	268
12	0.93	0.964365	268
13	1.2	1.095445	269
14	1.2	1.095445	269
15	1.3	1.140175	269
16	1.2	1.095445	269
17	1	1	268
18	1	1	268
19	1.2	1.095445	268
20	1.2	1.095445	268
21	1.2	1.095445	267
22	1.2	1.095445	267
23	0.97	0.984886	267
24	0.97	0.984886	267
25			
26			
27			
28			
29			
30			
31			
32			
33			
34			
35			
36			
37			
38			
39			
40			
41			
42			
43			
44			
45			
46			
47			
48			
49			
50			
AVG	1.113	1.053	268.250

Method 4

ΔH	Meter In	Meter Out
1.3	86	86
1.3	86	86
1.3	87	86
1.3	87	86
1.1	87	87
1.1	88	87
1.2	87	87
1.2	87	87
1.2	87	87
1.2	87	87
1	88	87
1	88	87
1.3	88	87
1.3	88	88
1.3	90	88
1.3	90	88
1.1	90	89
1.1	91	89
1.3	88	88
1.3	88	88
1.3	89	88
1.3	89	88
1.1	90	89
1.1	90	89
1.21	87.8125	

Delta H@=	1.601	
Pb (in Hg) =	29.11	
gamma =	0.991	
Post Test Cal	0.9764	Pass

Particulate Emissions Test Results

Pollutant Mass Emission Rate, PMR

	Filterable	Condensible	Total
Mn (mg)			
Mn (g)			
Mn (g) =	0	0	0
PMR (lbs/hr) =	0.000	0.000	0.00000
Concentration, gr/dscf			
gr/dscf =	0.00000	0.00000	0.00000
Concentration, mg/dcsm			
mg/dscm =	0.00000	0.00000	0.00000

Pollutant Mass Emission Rate, Throughput Based

Production (lb/hr) =
Production (ton/hr) =
Production (ton/hr) = 0

	Filterable	Condensible	Total
PMR (lbs/ton)	#DIV/0!	#DIV/0!	#DIV/0!

Antimony (Sb) Test Results

Pollutant Mass Emission Rate, PMR

Mn (ug)
Mn (mg)
Mn (g) = 0
PMR (lbs/hr) = 0.000

Concentration, gr/dscf
gr/dscf = 0.00E+00

Concentration, mg/dcsm
mg/dscm = 0.00

Antimony (Sb) Emission Rate Throughput Based

Production (lb/hr) = 0
Production (ton/hr) = 0
Production (ton/hr) = 0
PMR (lbs/ton) #DIV/0!

Arsenic (As) Test Results

Pollutant Mass Emission Rate, PMR

Mn (ug)
Mn (mg)
Mn (g) = 0
PMR (lbs/hr) = 0.000

Concentration, gr/dscf
gr/dscf = 0.00E+00

Concentration, mg/dcsm
mg/dscm = 0.00

Arsenic (As) Emission Rate Throughput Based

Production (lb/hr) = 0
Production (ton/hr) = 0
Production (ton/hr) = 0
PMR (lbs/ton) #DIV/0!

Barium (Ba) Test Results

Pollutant Mass Emission Rate, PMR

Mn (ug)
Mn (mg)
Mn (g) = 0
PMR (lbs/hr) = 0.000

Concentration, gr/dscf
gr/dscf = 0.00E+00

Concentration, mg/dcsm
mg/dscm = 0.00

Barium (Ba) Emission Rate Throughput Based

Production (lb/hr) = 0
Production (ton/hr) = 0
Production (ton/hr) = 0
PMR (lbs/ton) #DIV/0!

Beryllium (Be) Test Results

Pollutant Mass Emission Rate, PMR

Mn (ug)
Mn (mg)
Mn (g) = 0
PMR (lbs/hr) = 0.000

Concentration, gr/dscf
gr/dscf = 0.00E+00

Concentration, mg/dcsm
mg/dscm = 0.00

Beryllium (Be) Emission Rate Throughput Based

Production (lb/hr) = 0
Production (ton/hr) = 0
Production (ton/hr) = 0
PMR (lbs/ton) #DIV/0!

Cadmium (Cd) Test Results

Pollutant Mass Emission Rate, PMR

Mn (ug)
Mn (mg)
Mn (g) = 0
PMR (lbs/hr) = 0.000

Concentration, gr/dscf
gr/dscf = 0.00E+00

Concentration, mg/dcsm
mg/dscm = 0.00

Cadmium (Cd) Emission Rate Throughput Based

Production (lb/hr) = 0
Production (ton/hr) = 0
Production (ton/hr) = 0
PMR (lbs/ton) #DIV/0!

Chromium (Cr) Test Results

Pollutant Mass Emission Rate, PMR

Mn (ug)
Mn (mg)
Mn (g)
Mn (g) = 0
PMR (lbs/hr) = 0.000

Concentration, gr/dscf
gr/dscf = 0.00E+00

Concentration, mg/dcsm
mg/dscm = 0.00

Chromium (Cr) Emission Rate Throughput Based

Production (lb/hr) = 0
Production (ton/hr) = 0
Production (ton/hr) = 0
PMR (lbs/ton) #DIV/0!

Cobalt (Co) Test Results

Pollutant Mass Emission Rate, PMR

Mn (ug)
Mn (mg)
Mn (g)
Mn (g) = 0
PMR (lbs/hr) = 0.000

Concentration, gr/dscf
gr/dscf = 0.00E+00

Concentration, mg/dcsm
mg/dscm = 0.00

Cobalt (Co) Emission Rate Throughput Based

Production (lb/hr) = 0
Production (ton/hr) = 0
Production (ton/hr) = 0
PMR (lbs/ton) #DIV/0!

Copper (Cu) Test Results

Pollutant Mass Emission Rate, PMR

Mn (ug)
Mn (mg)
Mn (g)
Mn (g) = 0
PMR (lbs/hr) = 0.000

Concentration, gr/dscf
gr/dscf = 0.00E+00

Concentration, mg/dcsm
mg/dscm = 0.00

Copper (Cu) Emission Rate Throughput Based

Production (lb/hr) = 0
Production (ton/hr) = 0
Production (ton/hr) = 0
PMR (lbs/ton) #DIV/0!

Lead (Pb) Emissions Test Results

Pollutant Mass Emission Rate, PMR

Mn (ug) 1.1
Mn (mg)
Mn (g)
Mn (g) = 0.0000011
PMR (lbs/hr) = 0.002

Concentration, gr/dscf
gr/dscf = 2.94E-07

Concentration, mg/dcsm
mg/dscm = 0.00

Lead (Pb) Emission Rate Throughput Based

Production (lb/hr) = 0
Production (ton/hr) = 0
Production (ton/hr) = 0
PMR (lbs/ton) #DIV/0!

Manganese (Mn) Test Results

Pollutant Mass Emission Rate, PMR

Mn (ug)
Mn (mg)
Mn (g)
Mn (g) = 0
PMR (lbs/hr) = 0.000

Concentration, gr/dscf
gr/dscf = 0.00E+00

Concentration, mg/dcsm
mg/dscm = 0.00

Manganese (Mn) Emission Rate Throughput Based

Production (lb/hr) = 0
Production (ton/hr) = 0
Production (ton/hr) = 0
PMR (lbs/ton) #DIV/0!

Mercury (Hg) Test Results

Pollutant Mass Emission Rate, PMR

Mn (ug)
Mn (mg)
Mn (g)
Mn (g) = 0
PMR (lbs/hr) = 0.000

Concentration, gr/dscf
gr/dscf = 0.00E+00

Concentration, mg/dcsm
mg/dscm = 0.00

Mercury (Hg) Emission Rate Throughput Based

Production (lb/hr) = 0
Production (ton/hr) = 0
Production (ton/hr) = 0
PMR (lbs/ton) #DIV/0!

SOURCE:	Cokenergy, LLC
UNIT TESTED:	HRCC with Waste Heat Boilers
TESTING COMPANY:	TRC Environmental Corporation
DATE OF TEST:	June 9, 2021
METHODS:	1-4, 29

Average Stack Temperature, Ts (F)		269.611
Average Stack Gas Velocity, Vs, fps		72.089
Average Stack Gas Flowrate, Qs, acfm		1100666.398
Average Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd (dscfm)		657211.459
Average Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd (dscfh)		39432687.564
Average % Isokinetic, %I	Pass	101.093
Average % Isokinetic measured from intermediate values, %I	Pass	101.159
Average Post Test Cal (2-run)	Pass	0.987
Average Post Test Cal (3-run)	Pass	0.983

PM Only	
Average Pollutant Mass Emission Rate, PMR, lbs/hr	0.000
Average Concentration, gr/dscf	0.000
Average Concentration, mg/dscm	0.000
Average Pollutant Mass Emission Rate, PMR, lbs/ton	#DIV/0!

PM10 (Filterable + Condensible)	
Average Pollutant Mass Emission Rate, PMR, lbs/hr	0.000
Average Concentration, gr/dscf	0.000
Average Concentration, mg/dscm	0.000
Average Pollutant Mass Emission Rate, PMR, lbs/ton	#DIV/0!

Average Production Rate, lb/hr	
Average Production Rate, ton/hr	
Opacity (highest 6-min average)	
Average Opacity	

Antimony (Sb), lb/hr				0.000
Antimony (Sb) lb/ton				#DIV/0!
Antimony (Sb) gr/dscf				0.00E+00
Arsenic (As), lb/hr				0.000
Arsenic (As) lb/ton				#DIV/0!
Arsenic (As) gr/dscf				0.00E+00
Barium (Ba), lb/hr				0.000
Barium (Ba) lb/ton				#DIV/0!
Barium (Ba) gr/dscf				0.00E+00
Beryllium (Be), lb/hr				0.000
Beryllium (Be) lb/ton				#DIV/0!
Beryllium (Be) gr/dscf				0.00E+00
Cadmium (Cd), lb/hr				0.000
Cadmium (Cd) lb/ton				#DIV/0!
Cadmium (Cd) gr/dscf				0.00E+00
Chromium (Cr), lb/hr				0.000
Chromium (Cr) lb/ton				#DIV/0!
Chromium (Cr) gr/dscf				0.00E+00
Cobalt (Co), lb/hr				0.000
Cobalt (Co) lb/ton				#DIV/0!
Cobalt (Co) gr/dscf				0.00E+00
Copper (Cu), lb/hr				0.000
Copper (Cu) lb/ton				#DIV/0!
Copper (Cu) gr/dscf				0.00E+00
Lead (Pb), lb/hr				0.002
Lead (Pb) lb/ton				#DIV/0!
Lead (Pb) gr/dscf				3.59E-07
Manganese (Mn), lb/hr				0.000
Manganese (Mn) lb/ton				#DIV/0!
Manganese (Mn) gr/dscf				0.00E+00
Mercury (Hg), lb/hr				0.000
Mercury (Hg) lb/ton				#DIV/0!
Mercury (Hg) gr/dscf				0.00E+00
Nickel (Ni), lb/hr				0.000
Nickel (Ni) lb/ton				#DIV/0!
Nickel (Ni) gr/dscf				0.00E+00
Phosphorus (P), lb/hr				0.000
Phosphorus (P) lb/ton				#DIV/0!
Phosphorus (P) gr/dscf				0.00E+00
Selenium (Se), lb/hr				0.000
Selenium (Se) lb/ton				#DIV/0!
Selenium (Se) gr/dscf				0.00E+00
Silver (Ag), lb/hr				0.000
Silver (Ag) lb/ton				#DIV/0!
Silver (Ag) gr/dscf				0.00E+00
Thallium (Tl), lb/hr				0.000
Thallium (Tl) lb/ton				#DIV/0!
Thallium (Tl) gr/dscf				0.00E+00
Zinc (Zn), lb/hr				0.000
Zinc (Zn) lb/ton				#DIV/0!
Zinc (Zn) gr/dscf				0.00E+00

SOURCE:	Cokenergy, LLC
UNIT TESTED:	HRCC with Waste Heat Boilers
TESTING COMPANY:	TRC Environmental Corporation
METHOD:	3A
DATE OF TEST:	June 9, 2021

O2 Reference Method Analyzer
Sampling System Bias Check and Measured Value Correction

O2 RM Monitor Span = 22.17 %

Run No.	(Cavg) Ave. Measured Raw (%)	(Co)i Initial Low Gas	(Co)f Final Low Gas	**Drift Assessment** Must be within **3.0%** Low Gas Drift (Eq 7E-4)	Low-Drift Pass/Fail
1	12.02	0.17	0.19	0.09%	Pass
2	12.41	0.19	0.19	0.00%	Pass
3	12.68	0.19	0.17	0.09%	Pass

Run No.	(Cm)i Initial Upscale	(Cm)f Final Upscale	**Drift Assessment** Must be within **3.0%** Upscale Gas Drift (Eq 7E-4)	Up-Drift Pass/Fail
1	10.24	10.26	0.09%	Pass
2	10.26	10.26	0.00%	Pass
3	10.26	10.24	0.09%	Pass

Run No.	(Cma) Upscale Calibration Gas %	Percent Moisture (%)	(Cgas) Corrected Dry Basis (%)	Corrected Wet Basis (%)
1	10.19	15.61%	11.98	10.11
2	10.19	14.77%	12.37	10.54
3	10.19	14.43%	12.65	10.82

40 CFR 60
Appendix A-4
Method 7E

Cgas = (Cavg - Co) * Cma / (Cm - Co) Eq. 7E-5

where: Cgas = Average effluent gas concentration adjusted for bias, %
Cavg = Average unadjusted gas concentration indicated data recorder for the test run, %
Co = Average of initial and final system cal. bias check responses from the low-level calibraiton gas, %
Cm = Average of initial and final system cal. bias check responses for the upscale calibration gas, %
Cma = Actual concentration of the upscale calibration gas, %

	< 20% of Span	40-60% of Span
	0	8.868
	4.434	13.302

Analyzer Calibration Error Check (ACE)
Linearity Check (Must be within **2.0%**)

	'Low' Low-Level Gas	**'Upscale'** Mid-Level Gas	High-Level Gas
Serial #	CC126284	CC432856	CC346448
Tag (Cv)	0.00	10.19	22.17
Monitor (Cdir)	0.09	10.29	22.28
Diff. (Cdir-Cv)	0.09	0.10	0.11
ACE (Eq 7E-1)	0.41%	0.45%	0.50%
	Pass	Pass	Pass

System Bias (SB) Low-Level Gas (Must be within **5.0%**)

Run No.	Low Linearity Gas (Cdir)	Final Low Gas Bias (Cs)	Low Gas SB (Eq 7E-2)	Low-Bias Pass/Fail
Initial	0.09	0.17	0.36%	Pass
1	0.09	0.19	0.45%	Pass
2	0.09	0.19	0.45%	Pass
3	0.09	0.17	0.36%	Pass

System Bias (SB) Upscale Gas (Must be within **5.0%**)

	Upscale Linearity Gas (Cdir)	Final Upscale Gas Bias (Cs)	Upscale Gas SB (Eq 7E-2)	Upscale-Bias Pass/Fail
Initial	10.29	10.24	-0.23%	Pass
1	10.29	10.26	-0.14%	Pass
2	10.29	10.26	-0.14%	Pass
3	10.29	10.24	-0.23%	Pass

SOURCE:	Cokenergy, LLC
UNIT TESTED:	HRCC with Waste Heat Boilers
TESTING COMPANY:	TRC Environmental Corporation
METHOD:	3A
DATE OF TEST:	June 9, 2021

CO2 Reference Method Analyzer
Sampling System Bias Check and Measured Value Correction

CO2 RM Monitor Span = 17.84 %

Run No.	(Cavg) Ave. Measured Raw (%)	(Co)i Initial Low Gas	(Co)f Final Low Gas	Drift Assessment Must be within **3.0%** Low Gas Drift (Eq 7E-4)	Low-Drift Pass/Fail
1	6.33	0.04	0.05	0.06%	Pass
2	5.87	0.05	0.05	0.00%	Pass
3	5.69	0.05	0.04	0.06%	Pass

Run No.	(Cm)i Initial Upscale	(Cm)f Final Upscale	Drift Assessment Must be within **3.0%** Upscale Gas Drift (Eq 7E-4)	Up-Drift Pass/Fail
1	9.04	8.95	0.50%	Pass
2	8.95	8.82	0.73%	Pass
3	8.82	8.78	0.22%	Pass

Run No.	(Cma) Upscale Calibration Gas %	Percent Moisture (%)	(Cgas) Corrected Dry Basis (%)	Corrected Wet Basis (%)
1	8.80	15.61%	6.18	5.21
2	8.80	14.77%	5.79	4.94
3	8.80	14.43%	5.67	4.85

40 CFR 60
Appendix A-4
Method 7E

Cgas = (Cavg - Co) * Cma / (Cm - Co) Eq. 7E-5

where: Cgas = Average effluent gas concentration adjusted for bias, %
Cavg = Average unadjusted gas concentration indicated data recorder for the test run, %
Co = Average of initial and final system cal. bias check responses from the low-level calibraiton gas, %
Cm = Average of initial and final system cal. bias check responses for the upscale calibration gas, %
Cma = Actual concentration of the upscale calibration gas, %

	< 20% of Span	40-60% of Span
	0	7.136
	3.568	10.704

Analyzer Calibration Error Check (ACE)
Linearity Check (Must be within **2.0%**)

	'Low' Low-Level Gas	**'Upscale'** Mid-Level Gas	High-Level Gas
Serial #	CC126284	CC432856	CC346448
Tag (Cv)	0.00	8.795	17.84
Monitor (Cdir)	0.04	9.04	17.93
Diff. (Cdir-Cv)	0.04	0.24	0.09
ACE (Eq 7E-1)	0.22%	1.37%	0.50%
	Pass	Pass	Pass

System Bias (SB) Low-Level Gas (Must be within **5.0%**)

Run No.	Low Linearity Gas (Cdir)	Final Low Gas Bias (Cs)	Low Gas SB (Eq 7E-2)	Low-Bias Pass/Fail
Initial	0.04	0.04	0.00%	Pass
1	0.04	0.05	0.06%	Pass
2	0.04	0.05	0.06%	Pass
3	0.04	0.04	0.00%	Pass

System Bias (SB) Upscale Gas (Must be within **5.0%**)

	Upscale Linearity Gas (Cdir)	Final Upscale Gas Bias (Cs)	Upscale Gas SB (Eq 7E-2)	Upscale-Bias Pass/Fail
Initial	9.04	9.04	0.00%	Pass
1	9.04	8.95	-0.50%	Pass
2	9.04	8.82	-1.23%	Pass
3	9.04	8.78	-1.46%	Pass

Singer, Michael T

From: Ford, Luke <lford@primaryenergy.com>
Sent: Tuesday, July 27, 2021 8:58 AM
To: Singer, Michael T
Subject: RE: Cokenergy, LLC - Compliance Test Report
Attachments: cokenergy stack test process data.pdf

Michael

See attached process data from the Pb test on 6/9/21. Let me know if there are additional questions.

Luke E. Ford
Director EH&S
Primary Energy
3210 Watling St.
MC 2-991
East Chicago, IN 46312

Email lford@primaryenergy.com
Office (219) 397-4626
Mobile (773) 447-8257

Efficiency is the Best Alternative Energy

From: Singer, Michael T <MTSinger@idem.IN.gov>
Sent: Monday, July 26, 2021 8:55 AM
To: Ford, Luke <lford@primaryenergy.com>
Subject: Cokenergy, LLC - Compliance Test Report

Hello Luke –

I am reviewing the stack test report for the Pb testing that was completed on Stack ID 201 on 6/9/2021. Could you please send me pressure drop data during the test for the baghouse system? If this has already been included in the report, please let me know as I may have overlooked it.

Thanks for your help.

Michael T. Singer
Environmental Manager II
Office of Air Quality, Compliance Data Section
Indiana Department of Environmental Management

Office: (317) 232-8429 • mtsinger@idem.in.gov
Cell: (463) 206-1458

IDEM values your feedback.
Please take two minutes and complete this brief survey.

Cokenergy Stack 201 Lead Emissions Testing Process Data June 9, 2021				
	Run 1	Run 2	Run 3	Average
Start Date	6/9/2021	6/9/2021	6/9/2021	
End Data	6/9/2021	6/9/2021	6/9/2021	
Start Time	7:38	9:51	12:00	
End Time	9:23	11:36	13:45	
Boiler FW Flow (KPPH)				
A1	33.51	32.90	31.58	32.67
A2	37.34	35.42	34.16	35.64
A3	36.86	35.38	34.23	35.49
A4	35.76	34.28	34.32	34.79
B1	33.66	33.58	32.74	33.32
B2	34.96	32.52	31.48	32.99
B3	35.07	35.23	34.00	34.77
B4	39.36	36.42	35.46	37.08
C1	63.18	61.15	58.29	60.87
C2	69.78	67.64	64.00	67.14
C3	62.63	60.91	58.86	60.80
C4	66.23	65.12	62.70	64.68
D1	53.97	50.61	49.06	51.21
D2	76.04	72.24	69.53	72.61
D3	68.19	66.01	64.29	66.16
D4	48.98	49.34	48.38	48.90
Steam From Boilers (KPPH)	782.99	755.79	727.49	755.43
Baghouse 1 DP in. WC	8.15	8.20	8.17	8.17
Baghouse 2 DP in. WC	7.89	7.90	7.97	7.92
Stack O2, %	11.64	12.05	12.33	12.01
Stack SO2, ppm	207.88	185.66	177.74	190.43
Stack Opacity, %	1.72	2.00	1.65	1.79

Duplicate copy of report recycled on 7/23/2021.

Received
State of Indiana
JUL 22 2021
DeptofEnvironmentalManagement
State of Indiana

~~PAE~~ ~~VCH~~ MTS

#2569168

Cokenergy, LLC
3210 Watling Street
Mail Code 2-991
East Chicago, Indiana 46312

July 19, 2021

Chief, Environmental Enforcement Section
Environment and Natural Resources Division
U.S. Department of Justice
Box 7611, Ben Franklin Station
Washington, DC 20044-7611
Re: DOJ No. 90-5-2-1-08555/1

Compliance Tracker
Air Enforcement and Compliance Assurance Branch
U.S. Environmental Protection Agency – Region 5
77 West Jackson Blvd. AE-18J
Chicago, IL 60604-3590

Including an electronic copy to:
R5airenforcement@epa.gov

Phil Perry
Indiana Department of Environmental Management
Chief, Air Compliance and Enforcement Branch
100 North Senate Avenue
MC-61-53, IGCN 1003
Indianapolis, IN 46204-2251

Air Enforcement Division Director
U.S. Environmental Protection Agency
Office of Civil Enforcement
Air Enforcement Division
U.S. Environmental Protection Agency
1200 Pennsylvania Ave, NW Mail Code: 2242A
Washington, DC 20460

Susan Tennenbaum
U.S. Environmental Protection Agency
Region 5
C-14J
77 West Jackson Blvd
Chicago, IL 60640

Including an electronic copy to:
tennenbaum.susan@epa.gov

Elizabeth A. Zlatos
Indiana Department of Environmental Management
Office of Legal Counsel
100 North Senate Avenue
MC-60-01, IGCN 1307
Indianapolis, IN 46204-2251

Including an electronic copy to:
bzlatos@idem.in.gov

Subject: Consent Decree, United States, et al. v. Indiana Harbor Coke Company, et al.
Cokenergy, LLC (Part 70 Permit No. T089-41033-00383)
Lead Stack Test Results Report – Cokenergy Stack 201

To Whom It May Concern:

In accordance with the Enhanced Monitoring Requirements, Paragraph 22a. and 22b. of the consent decree (18-cv-35), Cokenergy, LLC has completed the second stack test for lead on the Main Stack (Stack 201). The testing was completed on June 9, 2021, by TRC Environmental Corporation. The initial stack testing for lead and VOC was completed over the period of December 4 – December 6, 2019. The initial test and the second test were completed at least 18 months apart in accordance with paragraph 22a.

The lead testing results from the June 9, 2021, testing averaged 0.00202 pound per hour.

If you have any questions regarding this report, please contact me at (219) 397-4626 or email at lford@primaryenergy.com.

I certify under penalty of law that this information was prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my directions and my inquiry of the person(s) who manage the system, or the person(s) directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

Luke E. Ford
Director EH&S
Primary Energy

cc: East Chicago Public Library
2401 E. Columbus Drive
East Chicago, Indiana 46312

East Chicago Public Library
1008 W. Chicago Avenue
East Chicago, Indiana 46312

Attachments

File: X://675

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT
OFFICE OF AIR MANAGEMENT
COMPLIANCE AND ENFORCEMENT SECTION
PART 70 OPERATING PERMIT
CERTIFICATION

Source Name: Cokenergy LLC

Source Address: 3210 Watling Street, MC 2-991, East Chicago, Indiana 46312-1610

Part 70 Permit No.: T089-41033-00383

This certification shall be included when submitting monitoring, testing reports/results or other documents as required by this permit.

Please check what document is being certified:

☐ Annual Compliance Certification Letter

☐ Test Result (specify) _____

☒ Report (specify) Lead Stack Test Report pursuant to CD 18-cv-35

☐ Notification (specify) _____

☐ Affidavit (specify) _____

☐ Other (specify) _____

I certify that, based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

Signature: Seth Acheson

Printed Name: Seth Acheson

Title/Position: General Manager, Cokenergy, LLC

Phone: (219) 397-4521

Date: July 19, 2021

LEAD EMISSIONS COMPLIANCE TEST

Performed At
Primary Energy
Cokenergy Facility
HRCC Stack 201
East Chicago, Indiana

Test Date
June 9, 2021

Report No.
TRC Environmental Corporation Report 437378 B

Report Submittal Date
July 15, 2021

TRC Environmental Corporation
7521 Brush Hill Road
Burr Ridge, Illinois 60527
USA

T 312-533-2042
F 312-533-2070

Report Certification

I certify that to the best of my knowledge:

- Testing data and all corresponding information have been checked for accuracy and completeness.
- Sampling and analysis have been conducted in accordance with the approved protocol and applicable reference methods (as applicable).
- All deviations, method modifications, or sampling and analytical anomalies are summarized in the appropriate report narrative(s).

Gavin Lewis
Project Manager

July 15, 2021
Date

TRC was operating in conformance with the requirements of ASTM D7036-04 during this test program.

Bruce Randall
TRC Emission Testing Technical Director

TABLE OF CONTENTS

LEAD EMISSIONS COMPLIANCE TEST

1.0 INTRODUCTION

TRC Environmental Corporation (TRC) performed a lead (Pb) emissions compliance test program on the HRCC Stack 201 at the Cokenergy Facility of Primary Energy in East Chicago, Indiana on June 9, 2021. The tests were authorized by and performed for Primary Energy.

Cokenergy LLC, SunCoke Energy, Inc. and Indiana Harbor Coke Company entered into a Consent Decree (18-cv-35) (CD) with the United States and the State of Indiana to resolve alleged Clean Air Act violations. The CD became effective on October 25, 2018. Paragraph 22 of the CD requires stack testing of the Main Stack for lead and VOCs. The CD requires two (2) stack tests for lead and one (1) stack test for volatile organic compound (VOC) within 5 years of the effective date. The test satisfies the second of two lead stack tests. The test program was conducted according to the Indiana Department of Environmental Management (IDEM) Compliance Test Protocol dated April 27, 2021.

1.1 Project Contact Information

Participants		
Test Facility	Primary Energy Cokenergy Facility East Chicago, Indiana	Mr. Luke Ford Director EH&S 219-397-4626 (phone) lford@primaryenergy.com
Test Coordinator	Primary Energy 3210 Watling Street East Chicago, Indiana 46312 Permit No. T089-41033-00383	
Air Emissions Testing Body (AETB)	TRC Environmental Corporation 7521 Brush Hill Road Burr Ridge, Illinois 60527	Mr. Benigno Cacao Associate Project Manager 630-280-9068 (phone) 312-533-2070 (fax) bcacao@trccompanies.com

Rome Rothgeb, Ryan Novosel and Benigno Cacao of TRC conducted the testing. Documentation of the on-site ASTM D7036-04 Qualified Individual(s) (QI) can be located in the appendix to this report. No personnel from the IDEM observed the testing.

2.0 SUMMARY OF RESULTS

The results of this test program are summarized in the table below. Detailed individual run results are presented in Section 6.0. The Cokenergy Title V operating permit does not have a lead emission limit. However, the IHCC permit has a lead emission limit of 0.19 lb/hr. The measured lead emission rate was well within the IHCC limit.

Unit ID	Pollutant Tested		Measured Emissions
HRCC Stack 201	Pb	lb/hr	2.02E-03

The table below summarizes the test methods used, as well as the number and duration at the test location:

Unit ID/ Sample Location	Parameter Measured	Test Method(s)	No. of Runs	Run Duration (min)
HRCC Stack 201	Volumetric Flowrate	USEPA 1-4	3	96
	Pb	USEPA 12	3	96
	Carbon dioxide (CO_2), Oxygen (O_2)	USEPA 3A	3	96

3.0 DISCUSSION OF RESULTS

No problems were encountered with the testing equipment during the test program. Source operation appeared normal during the entire test program. No changes or problems were encountered that required modification of any procedures presented in the test plan. No adverse test or environmental conditions were encountered during the conduct of this test program. Unit operating data was performed by plant personnel and appended to the report.

4.0 SAMPLING AND ANALYSIS PROCEDURES

All testing, sampling, analytical, and calibration procedures used for this test program were performed in accordance with the methods presented in the following sections. Where applicable, the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods, USEPA 600/R-94/038c, September 1994 was used to supplement procedures.

4.1 Determination of Sample Point Locations by USEPA Method 1

This method is applicable to gas streams flowing in ducts, stacks, and flues and is designed to provide guidance for the selection of sampling ports and traverse points at which sampling for air pollutants will be performed. Sample ports must be located at least two duct diameters downstream and a half a duct diameter upstream from any flow disturbance.

The cross-section of the measurement site was divided into a number of equal areas, and the traverse points were located in the center of each area. The minimum number of points were determined from Figure 1-2 (non-particulate) of the Method.

4.2 Volumetric Flow Rate Determination by USEPA Method 2

This method is applicable for the determination of the average velocity and the volumetric flow rate of a gas stream.

The gas velocity head (ΔP) and temperature were measured at traverse points defined by USEPA Method 1. The velocity head was measured with a Type S (Stausscheibe or reverse type) pitot tube and oil-filled manometer; and the gas temperature was measured with a Type K thermocouple. The average gas velocity in the flue was calculated based on: the gas density (as determined by USEPA Methods 3A and 4); the flue gas pressure; the average of the square roots of the velocity heads at each traverse point, and the average flue gas temperature.

4.3 Determination of the Concentration of Gaseous Pollutants Using a Multi-Pollutant Sampling System

Concentrations of the pollutants in the following sub-sections were determined using one sampling system.

A straight-extractive sampling system was used. A data logger continuously recorded pollutant concentrations and generated one-minute averages of those concentrations.

All calibrations and system checks were conducted using USEPA Protocol gases. Three-point linearity checks were performed prior to sampling, and in the event of a failing system bias or drift test (and subsequent corrective action). System bias and drift checks were performed using the low-level gas and either the high- or mid-level gas (as specified in the appendices) prior to and following each test run.

The Low Concentration Analyzers (those that routinely operate with a calibration span of less than 20 ppm) used by TRC are ambient-level analyzers. Per Section 3.12 of Method 7E, a Manufacturer's Stability Test is not required for ambient-level analyzers. Analyzer interference tests were conducted in accordance with the regulations in effect at the time that TRC placed an analyzer model in service.

4.3.1 CO_2 Determination by USEPA Method 3A

This method is applicable for the determination of CO_2 concentrations in controlled and uncontrolled emissions from stationary sources only when specified within the regulations. The CO_2 analyzer was equipped with a non-dispersive infrared (IR) detector.

4.3.2 O_2 Determination by USEPA Method 3A

This method is applicable for the determination of O_2 concentrations in controlled and uncontrolled emissions from stationary sources only when specified within the regulations. The O_2 analyzer was equipped with a paramagnetic-based detector.

4.4 Lead Determination by USEPA Method 12

This method is applicable for the determination of inorganic lead (Pb) emissions from stationary sources, only as specified in an applicable subpart of the regulations. USEPA Methods 2-4 were performed concurrently with, and as an integral part of these determinations.

Flue gas was withdrawn isokinetically from the source at traverse points determined per USEPA Method 1. Particle-bound and gaseous Pb were collected in the nozzle, probe liner, filter, and impingers containing a solution of dilute nitric acid. The probe liner and filter were maintained at a temperature of 120±14°C (248 + 25°F). The collected samples were digested and analyzed via atomic absorption spectrophotometry using an air/acetylene flame.

5.0 QUALITY ASSURANCE PROCEDURES

TRC integrates our Quality Management System (QMS) into every aspect of our testing service. We follow the procedures specified in current published versions of the test Method(s) referenced in this report. Any modifications or deviations are specifically identified in the body of the report. We routinely participate in independent, third party audits of our activities, and maintain:

- Accreditation from the Louisiana Environmental Laboratory Accreditation Program (LELAP);
- Accreditation from the Stack Testing Accreditation Council (STAC) and the American Association for Laboratory Accreditation (A2LA) that our operations conform with the requirements of ASTM D 7036 as an Air Emission Testing Body (AETB).

These accreditations demonstrate that our systems for training, equipment maintenance and calibration, document control and project management will fully ensure that project objectives are achieved in a timely and efficient manner with a strict commitment to quality.

All calibrations are performed in accordance with the test Method(s) identified in this report. If a Method allows for more than one calibration approach, or if approved alternatives are available, the calibration documentation in the appendices specifies which approach was used. All measurement devices are calibrated or verified at set intervals against standards traceable to the National Institute of Standards and Technology (NIST). NIST traceability information is available upon request.

ASTM D7036-04 specifies that: *"AETBs shall have and shall apply procedures for estimating the uncertainty of measurement. Conformance with this section may be demonstrated by the use of approved test protocols for all tests. When such protocols are used, reference shall be made to published literature, when available, where estimates of uncertainty for test methods may be found."* TRC conforms with this section by using approved test protocols for all tests.

6.0 TEST RESULTS SUMMARY

Method 12 Metals Test Results Summary

Company:	Primary Energy
Plant:	Cokenergy Facility
Unit:	HRCC
Location:	Stack 201

Run No:	1	2	3	Average
Date:	6/9/2021	6/9/2021	6/9/2021	
Start Time:	7:38	9:51	12:00	
End Time:	9:23	11:36	13:45	
Run Duration (min):	96.0	96.0	96.0	
Fixed Gas Content:				
CO_2 (% vol)	6.2	5.8	5.7	5.9
O_2 (% vol)	12.0	12.4	12.6	12.3
Fractional Moisture Content:	0.156	0.148	0.145	0.150
Sample Volume, $V_{m(std)}$				
(dry std ft^3):	56.316	58.536	57.718	57.523
(dry std m^3):	1.595	1.658	1.634	1.629
Measured Volumetric Flow Rate				
Q_{std} (std ft^3/min):	771,285	774,313	770,833	772,144
$Q_{std(dry)}$ (dry std ft^3/min):	650,743	659,839	659,444	656,676
Net Mass Collected (µg)				
Lead:	1.70	1.20	1.10	1.33 ADL
Metals Concentration (lb/dscf)				
Lead:	6.65E-11	4.52E-11	4.20E-11	5.13E-11 ADL
Metals Emission Rate (lb/hr)				
Lead:	2.60E-03	1.79E-03	1.66E-03	2.02E-03 ADL
Isokinetic Variation (%):	100.1	102.6	101.2	101.3

ADL - all analytical values used to calculate and report an in-stack emissions value are greater than the laboratory's reported detection level(s)

English Units: Standard conditions of 29.92 inHg and 68° F
Metric Units: Standard conditions of 760 mmHg and 20° C

APPENDIX

AETB and QI Information Summary

Facility Name:	Primary Energy – Cokenergy Facility
Location:	HRCC Stack 201
Test Date:	June 9, 2021

Test Parameters:	1, 2, 3A, 4, 12
QI Last Name:	Cacao
QI First Name:	Benigno
QI Middle Initial:	----
AETB Name:	TRC Environmental Corporation
AETB Phone No:	312-533-2042
AETB Email:	bcacao@trccompanies.com
Group 1 Exam Date:	03/06/2020
Provider Name:	Source Evaluation Society
Provider Email:	qstiprogram@gmail.com
Group 3 Exam Date:	07/24/2020
Provider Name:	Source Evaluation Society
Provider Email:	qstiprogram@gmail.com
Group 4 Exam Date:	07/30/2020
Provider Name:	Source Evaluation Society
Provider Email:	qstiprogram@gmail.com

This is to Certify that:

Benigno Cacao

Is a Qualified Individual as defined in Section 8.3 of ASTM D7036-04 for the following test methods:

EPA Methods 1, 1A, 2, 2A, 2C, 2D, 2F, 2G, 2H, 3, 3B, 4, 5, 5A, 5B, 5D, 5E, 5F, 5i, 17, 19, 201A, and 202.

The individual has met the minimum experience requirements defined in Section 8.3.4.2 of ASTM D7036-04 and has successfully passed a comprehensive examination for the test methods designated above.

This certification is effective until: 03-06-2025

Edward J MacKinnon
Air Measurements Practice Quality Manager

Date of Issue: 03-10-2020

Certificate Number: 01547

TRC

This is to Certify that:

Benigno Cacao

Is a Qualified Individual as defined in Section 8.3 of ASTM D7036-04 for the following test methods:

EPA Methods 3A, 6C, 7E, 10, 10B, 19, 20, 25A.

CEM Performance Specifications PS2, PS3, PS4, PS4A, PS5, PS6, PS7, PS8, and PS15

The individual has met the minimum experience requirements defined in Section 8.3.4.2 of ASTM D7036-04 and has successfully passed a comprehensive examination for the test methods designated above.

This certification is effective until: 07-24-2025

Date of Issue: 07-27-2020

Certificate Number: 01571

Edward J MacKinnon
Air Measurements Practice Quality Manager

TRC

This is to Certify that:

Benigno Cacao

Is a Qualified Individual as defined in Section 8.3 of ASTM D7036-04 for the following test methods:

EPA Methods 1, 2, 3, 4, 12, 19, 29, 30B, 101, 101A, 102, and ASTM D6784-02.

The individual has met the minimum experience requirements defined in Section 8.3.4.2 of ASTM D7036-04 and has successfully passed a comprehensive examination for the test methods designated above.

This certification is effective until: 07-30-2025

Edward J MacKinnon
Air Measurements Practice Quality Manager

Date of Issue: 08-03-2020

Certificate Number: 01573

TRC

This certificate is the exclusive property of TRC and is non-transferable.

2021 Cokenergy CEMS RATA

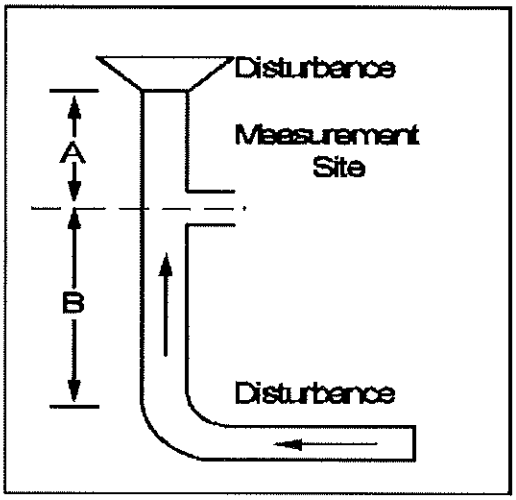
Run	Test Date	Start Time	End Time	Main Steam Flow [kpph]	Max Main Steam Flow [kpph]	Tested % Load [%]
1	6/9/2021	7:38	9:23	783	960	82%
2	6/9/2021	9:51	11:36	756	960	79%
3	6/9/2021	12:00	13:45	727	960	76%

Sample Location Information for Isokinetic Sampling - Round Ducts

Project #: 437378
Company: Primary Energy
Plant: Cokenergy Facility
Unit ID: HRCC
Sample Location: Stack 201

Distance A: 73.80 Feet, 4.10 Duct diameters
Distance B: 201.00 Feet, 11.17 Duct diameters
Meets Method 1 criteria

Duct Diameter: 216 inches 18.00 feet
# of Ports Used: 4
# of Points/Diameter: 6
Sample Plane: Horizontal
Port Type: Flange
Port Length: 7.0 inches
Port Inside Diameter: 6.0 inches



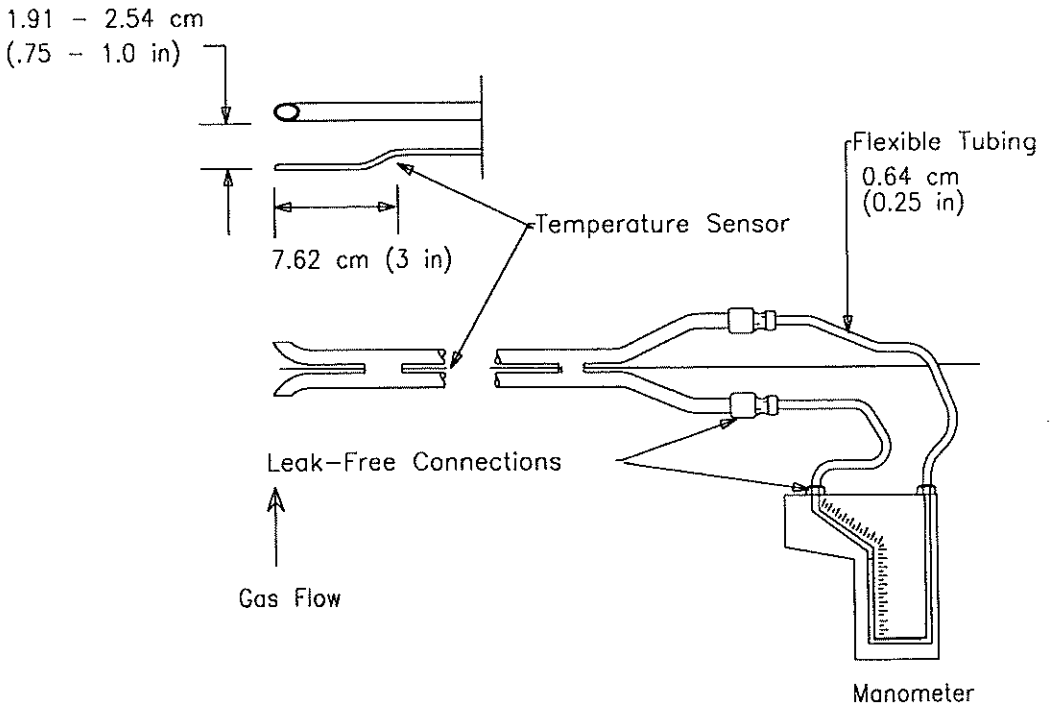
Traverse Point Locations

Point	% of diameter	Inches from wall	Inches from port edge
1	4.4	9.5	16.5
2	14.6	31.5	38.5
3	29.6	63.9	70.9

Pre-cyclonic flow check conducted? No Reason: Conducted Previously

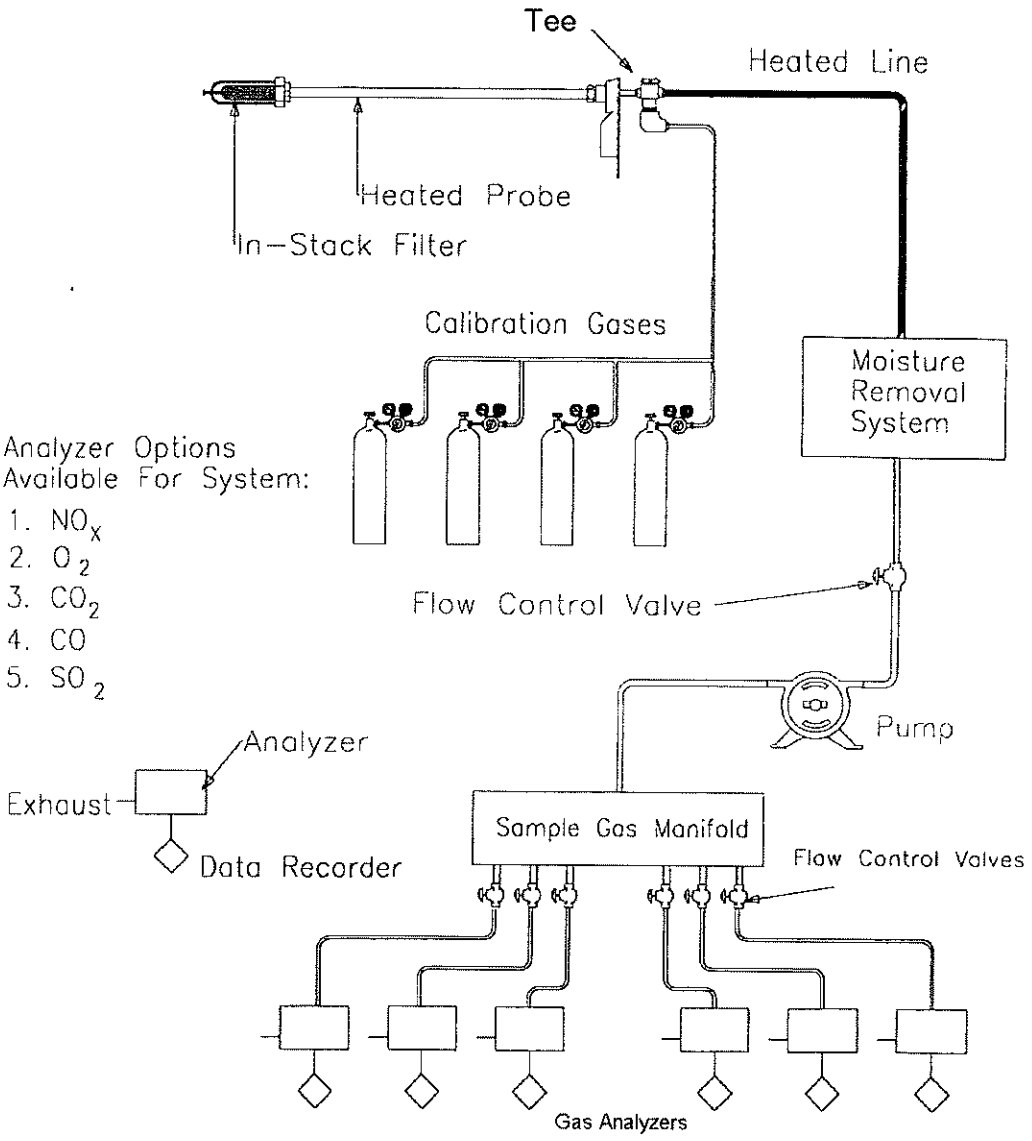
Determination of Stack Gas Velocity and Volumetric Flow Rate

USEPA Promulgated Test Method 2



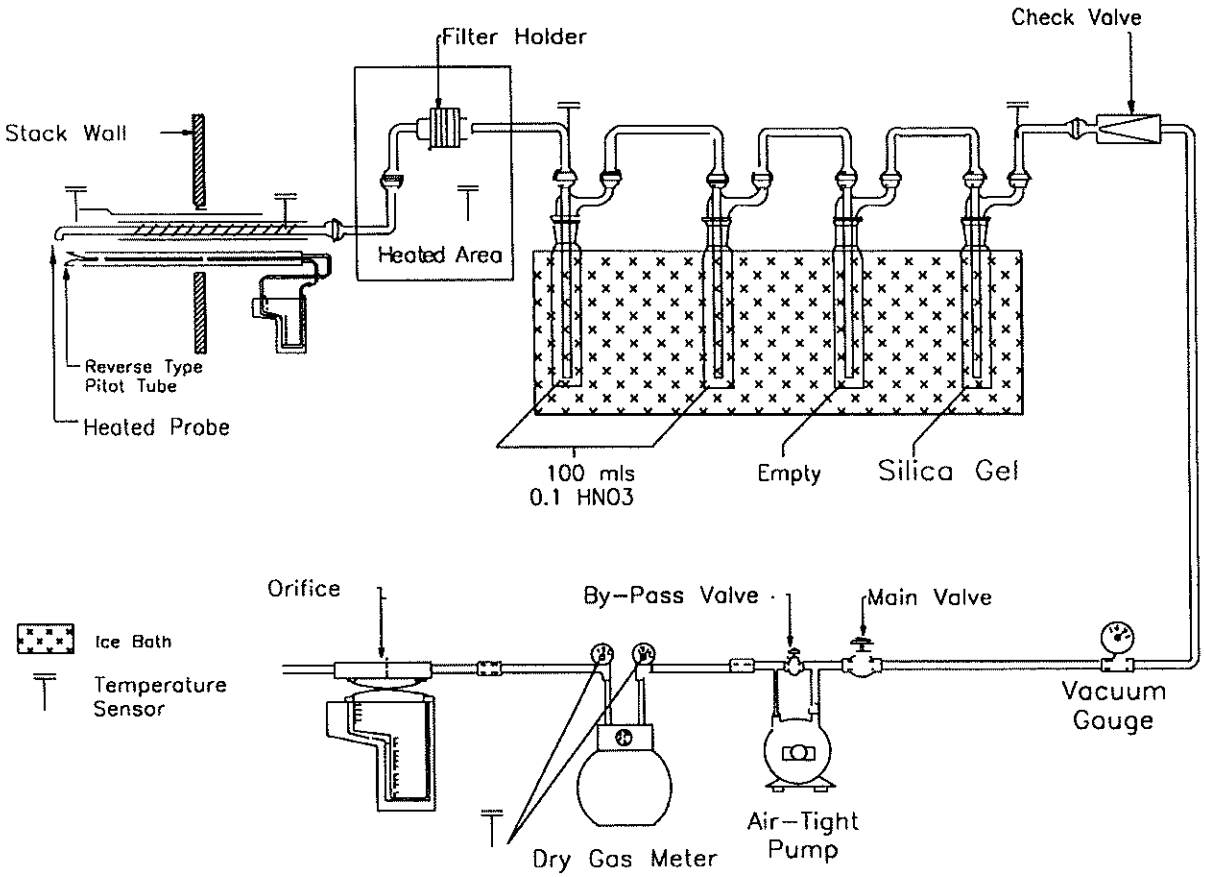
Determination of Multiple Gaseous Pollutants Using an Extractive Sampling Train

USEPA Promulgated Methods 3A and 6C



Determination of Inorganic Lead Emissions From Stationary Sources

USEPA Promulgated Method 12



TRC

Method 12 Sample Analysis Summary

Project#:	**437378**	Unit ID:	**HRCC**
Company:	**Primary Energy**	Location:	**Stack 201**
Plant:	**Cokenergy Facility**	Test Date(s):	**June 9, 2021**

Filter Diameter (mm): 82 (NuTech)

Gross front-half metals

	Run 1	Run 2	Run 3	Run 4	Reagent Blank
Pb (µg)	1.70	1.20	1.10	-	< 0.10

"<" indicates that the mass of a metal in the sample was below the laboratory analytical detection limit

Blank-corrected front-half metals

	Run 1	Run 2	Run 3	Run 4	
Pb (µg)	1.70	1.20	1.10	-	
-	-	-	-	-	

* If a "Gross" Run value was below the detection limit, subsequent calculations used a value of 0.0
If a Reagent Blank value was below the detection limit, subsequent calculations used a value of 0.0

TRC Environmental Corporation

7521 Brush Hill Road
Burr Ridge, IL 60527

Primary Energy – Lea Testing – Cokenergy Facility
Client Project #: 437378

Analytical Report
EA Project # 0621-108

EPA Method 12
Pb

NELAP Cert. No. 04010

Enthalpy Analytical, LLC
Phone: (919) 850-4392 / www.enthalpy.com
800-1 Capitola Drive – Durham, NC 27713

Reviewed and Approved by:

AMCross

Alexa Cross
QA Associate II

June 23, 2021

I certify that to the best of my knowledge all analytical data presented in this report:

- Have been checked for completeness
- Are accurate, error-free, and legible.
- Have been conducted in accordance with approved protocol, and that all deviations and analytical problems are summarized in the appropriate narrative(s).

This analytical report was prepared in Portable Document Format (.PDF) and contains 9 pages.

Report Issued: 6/23/2021

ENTHALPY

Enthalpy Analytical Narrative Summary

Company TRC Environmental Corporation

Job No. 0621-108 EPA Method 12

Client ID. 437378 – Primary Energy – Lea Testing – Cokenergy Facility

Custody Alyssa Miller received the samples on 6-14-21 at a temperature of 8.9 C after being relinquished by TRC Environmental Corporation. The samples were received in good condition.

Prior to, during, and after analysis, the samples were kept under lock with access only to authorized personnel by Enthalpy Analytical, LLC.

Preparation and Analysis The samples were prepared and analyzed for lead using the procedures found in EPA Method 12, *Determination of Inorganic Lead Emissions from Stationary Sources.*

The Agilent Model 7700x, Inductively Coupled Plasma Mass Spectrometer "U" (Serial No.: JP13512898) was used for this analysis.

Calibration The calibration curves met all method-specified precision criteria.

QC Notes The analyte of interest was not identified at concentrations greater than the reporting limit in the analyses of the laboratory blanks. The analyte of interest for the Laboratory Control Spikes was within the acceptance limits of 80% to 120%. All of the Matrix Spike recoveries were within the acceptance range of 75% to 125%. All of the required duplicate samples had a relative percent difference of 20% or less or were less than five times the limit of quantitation. All of the samples were analyzed at least in duplicate.

Reporting Notes The results are presented as total micrograms of lead in each run.

ENTHALPY

Enthalpy Analytical Narrative Summary

Company	TRC Environmental Corporation
Job No.	0621-108 EPA Method 12
Client ID.	437378 – Primary Energy – Lea Testing – Cokenergy Facility

Reporting Notes These analyses met the requirements of the TNI Standard. Any deviations from the requirements of the reference method or TNI Standard have been stated above.

Continued

The results presented in this report are representative of the samples as provided to the laboratory.

ENTHALPY ANALYTICAL

ANALYSIS REPORT

EA Project #: 0621-108
Client: TRC Environmental Corporation
Client Project ID: 437378 - Primary Energy - Lea Testing - Cokenergy Facility

METHOD 12
Total Micrograms in Run

Sample ID	Pb µg
HRCC_S201_M12_R1	1.7
HRCC_S201_M12_R2	1.2
HRCC_S201_M12_R3	1.1
Reagent Blank - Impinger	< 0.10
Reagent Blank - Filter	< 0.10

QC SUMMARY

Lab Blank (ppb)	< 1.0
LCS, % Recovery	102%
Spike, % Recovery	107%
Duplicate, RPD	1.4%

METHOD 12: LEAD

ICP-MS ANALYSIS RUN SUMMARY AND CALCULATION WORKSHEET

Client: TRC
EA Proj. #: 0621-108
Analysis Date: 06-21-21

ICPMS RL = 1.0 µg/L
LCS Conc. = 100 µg/L
Analyst: MAL

Sample ID		Test Sol'n	Dig'te Conc	FV	Dilution			Total
Client	EA ID	µg/L	µg/L	ml	Factor			µg
Run 1	**0621-108.1**	**16.8**	16.8	100	1			1.7
Run 2	**0621-108.2**	**11.8**	11.8	100	1			1.2
Run 3	**0621-108.3**	**11.3**	11.3	100	1			1.1
Blank - Filter	**0621-108.4F**	**0.8**	0.8	100	1		<	0.10
Blank - Impinger	**0621-108.4I**	**0.9**	0.9	100	1		<	0.10
			0.0	100	1		<	0.1
			0.0	100	1		<	0.1
			0.0	100	1		<	0.1
			0.0	100	1		<	0.1
			0.0	100	1		<	0.1
Lab Blank	0621-108.LB	**0.34**	0.3	100	1		<	0.1
LCS	0621-108.LCS	**50.9**	101.8	100	2	101.8%	% Rec.	
Spike (50ppb)	0621-108.1S	**70.4**	70.4	100	1	107.2%	% Rec.	
Duplicate	0621-108.2D	**11.6**	11.6	100	1	1.4%	%RPD	

TRC Report 437378 B

28 of 88

2+A1 W34

Chain of Custody Record

Project Name Primary Energy - Lea Testing	TRC Contact Gavin Lewis	T. (312)533-2025	Analyses Required
	Email: glewis@trccompanies.com		
Site Name Cokenergy Facility	Sampling System Prepared by Ben Cacao		
Project No · 437378	Samples Recovered by Ben Cacao		

Sub Lab ID	Sample ID Number	Sample Description* (Unit-Location-Method-Run-Container Number)	Date Sampled	Run Time (Optional)	**No of Containers	M12 (Lead Analysis)					Comments.
	378001	HRCC_S201_M12_R1_C1	6/9/2021			x					Filter
	378002	HRCC_S201_M12_R1_C2	6/9/2021			x					0 1N HNO3 Probe Rinse
	378003	HRCC_S201_M12_R1_C3	6/9/2021			x					Impinger 0 1N HNO3
	378004	HRCC_S201_M12_R1_C3	6/9/2021			x					Impinger 0 1N HNO3
	378005	HRCC_S201_M12_R2_C1	6/9/2021			x					Filter
	378006	HRCC_S201_M12_R2_C2	6/9/2021			x					0 1N HNO3 Probe Rinse
	378007	HRCC_S201_M12_R2_C3	6/9/2021			x					Impinger 0 1N HNO3
	378008	HRCC_S201_M12_R2_C3	6/9/2021			x					Impinger 0.1N HNO3
	378009	HRCC_S201_M12_R3_C1	6/9/2021			x					Filter
	378010	HRCC_S201_M12_R3_C2	6/9/2021			x					0.1N HNO3 Probe Rinse
	378011	HRCC_S201_M12_R3_C3	6/9/2021			x					Impinger 0.1N HNO3
	378012	HRCC_S201_M12_R3_C3	6/9/2021			x					Impinger 0 1N HNO3
	378013	HRCC_S201_M12_RB_C4	6/9/2021			x					Filter Blank (2 pcs)

General Instructions: This form documents all changes in custody. The name and dated signature for each person associated with the release or receipt of the listed samples must be recorded

TAT Standard Need By Date	Project Remarks	Relinquished by: (Sign & Print)	Date/Time	Received by (Sign & Print)	Date/Time
Shipped by Shipped On	M12 (Lead Analysis)	DEN FEDEX	6-10-21 0900	Gayle Swanson	6/10/21 9:10
Ship To Attn		Gayle Swanson	8:45 6/11/21	D Zac Ward	08:45 6-11-21
Lab Enthalpy Analytical		Given Courier to WIC 2	5:55pm 6-12-21	Alyssa Miller	06.14.21 0900
Address 800 Capitola Drive Ste 1 Durham, NC 27713		D Zac Ward			
Phone 919-850-4392					

Amb temp

Special Instructions. Sample ID #s **378003** and **378004** are the same sample **Run 1** (Need to be combined as one sample)

Sample ID #s **378007** and **378008** are the same sample **Run 2** (Need to be combined as one sample)

Sample ID #s **378011** and **378012** are the same sample **Run 3** (Need to be combined as one sample)

SUBCONTRACTOR LABORATORY MUST CONTACT THE CITED TRC CONTACT TO ENSURE A PO IS IN PLACE.

TRC Environmental Corporation
7521 Brush Hill Road
Burr Ridge, Illinois 60527 USA
T: (312) 533-2042 F: (312)533-2070

8.9°C Receipt 2, good condition Amm3 06.14.21

2+A1 W34

Chain of Custody Record

Project Name	Primary Energy - Lea Testing	TRC Contact	Gavin Lewis
		Email	glewis@trccompanies.com
Site Name	Cokenergy Facility	Sampling System Prepared by	Ben Cacao
Project No	437378	Samples Recovered by	Ben Cacao

T (312)533-2025

Sub Lab ID	Sample ID Number	Sample Description* (Unit-Location-Method-Run-Container Number)	Date Sampled	Run Time (Optional)	**No of Containers	Analyses Required: M12 (Lead Analysis)	Comments
	378014	HRCC_S201_M12_RB_C5	6/9/2021			x	0.1N HNO3 Blank

General Instructions: This form documents all changes in custody. The name and dated signature for each person associated with the release or receipt of the listed samples must be recorded.

TAT	Standard	Need By Date	
Shipped by		Shipped On	
Ship To Attn'			
Lab	Enthalpy Analytical		
Address	800 Capitola Drive Ste 1 Durham, NC 27713		
Phone	919-850-4392		

Project Remarks: M12 (Lead Analysis)

Relinquished by: (Sign & Print)	Date/Time	Received by (Sign & Print)	Date/Time
BEN CACAO	6-10-21 0900	Gayle Swanson	6/10/21 9:10
Gayle Swanson	6/11/21 8:45	Dan Ward	08:45 6-11-21
Dan Ward to CNC2	5:55 am 6-12-21	Alyssa M Miller	06-14-21 0940
Dan Ward		Alyssa M Miller	

Special Instructions

SUBCONTRACTOR LABORATORY MUST CONTACT THE CITED TRC CONTACT TO ENSURE A PO IS IN PLACE.

TRC Environmental Corporation
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8.9°C Rayfek 2, good condition Amm 3 06.14.21

This Is The Last Page Of This Report.

Company:	Primary Energy	**Run:**	1
Plant:	Cokenergy Facility	**Test Date:**	6/9/2021
Unit:	HRCC		
Test Location:	Stack 201		
Method:	Method 12		

X-Factor Isokinetic Sampling Coefficient (based on pre-test data)

$$\textbf{X-Factor} = 846.72 \times (D_n)^4 \times \Delta H_{@l} \times C_p^2 \times (1-B_{ws})^2 \times \frac{(M_d \times T_m \times P_s)}{(M_s \times T_s \times (P_{bar} + (\Delta H_{@l}/13.6)))} \times Ts/Tm$$

Where:

T_s = Temperature of effluent gas (^oR)
T_m = Average dry test meter temperature (^oR)
D_n = Nozzle Diameter (in.)
$\Delta H_{@l}$ = Orifice pressure drop corresponding to 0.75 cfm meter flow rate (in. H_20)
C_p = Pitot Tube Coefficient (dimensionless)
B_{ws} = Effluent gas fractional moisture content (dimensionless)
M_d = Dry molecular weight of exhaust (lb/lb-mole)
M_s = Molecular weight of exhaust, wet basis (lb/lb-mole)
P_s = Absolute flue gas pressure ("Hg)
P_{bar} = Ambient barometric pressure at sample elevation ("Hg)

D_n =	0.205	in.	P_s =	29.02	in. Hg abs.
$\Delta H_{@l}$ =	1.80	in. H_2O	M_s =	27.82	lb/lb-mole
C_p =	0.84	(dimensionless)	T_s =	730	^oR
M_d =	29.39	lb/lb-mole	P_{bar} =	29.11	in. Hg
T_m =	545	^oR	B_{ws} =	0.138	(dimensionless)

X-Factor = 1.480

Dry Molecular Weight

$$M_d = 0.44 \times (\%CO_2) + 0.32 \times (\%O_2) + 0.28 \times \%N_2$$

Where:

M_d = Dry molecular weight of exhaust (lb/lb-mole)
$\%CO_2$ = Effluent gas Carbon Dioxide Content (% volume, dry basis)
$\%O_2$ = Effluent gas Oxygen Content (% volume, dry basis)
$\%N_2$ = Effluent gas Nitrogen Dioxide Content (% volume, dry basis)

$\%CO_2$ =	6.2	%vol dry	$\%N_2$ =	81.8	%vol dry
$\%O_2$ =	12.0	%vol dry			

M_d = 29.47 lb/lb-mole

Company:	Primary Energy	**Run:**	1
Plant:	Cokenergy Facility	**Test Date:**	6/9/2021
Unit:	HRCC		
Test Location:	Stack 201		
Method:	Method 12		

Wet Molecular Weight

$$M_s = Md \times (1-Bws) + (18.015 \times Bws)$$

Where:

M_s = Effluent gas molecular weight (lb/lb-mole, wet basis)

Bws = Effluent gas fractional moisture content (dimensionless)

M_d = 29.47 lb/lb-mole B_{ws} = 0.156

M_s = 27.68 lb/lb-mole

Effluent Gas Pressure

$$P_s = P_{bar} + (P_g/13.6)$$

Where:

P_s = flue gas pressure ("Hg)

P_{bar} = Ambient barometric pressure at sample elevation ("Hg)

P_g = Flue gas gauge pressure ("H_2O)

P_{bar} = 29.11 "Hg P_g = -1.20 "H_2O

P_s = 29.02 "Hg

Average Meter Temperature

$$T_m = \frac{\sum_{i=1}^{n} (T_{mini} + T_{mouti})/2}{n}$$

Where:

T_m = Average dry test meter temperature (°R)

T_{min} = Temperature of gas entering dry test meter (°R)

T_{mout} = Temperature of gas leaving dry test meter (°R)

Avg T_{min} = 547.1 °R Avg T_{mout} = 546.2 °R

T_m = 546.6 °R

Company:	Primary Energy	**Run:**	1
Plant:	Cokenergy Facility	**Test Date:**	6/9/2021
Unit:	HRCC		
Test Location:	Stack 201		
Method:	Method 12		

ΔH at Sample Point - Example Point 1-1

$$\Delta H_i = \text{X-Factor} \times \Delta Pi \times Tmi/Tsi$$

Where:

ΔH_i = Pressure differential across calibrated orifice at point *i* ("H_2O)

ΔP_i = Velocity head across pitot at point *i* ("H_2O)

Ts = Temperature of effluent gas (°R)

X-Factor = 1.48 ΔPi = 1.20 "H_2O

Tmi = 544.2 °R Tsi = 729.7 °R

ΔH_i = 1.32 "H_2O

Sample Volume at Standard Conditions

$$V_{m(std)} = (T_{std}/29.92) \times Y \times V_m \times (P_{bar} + \Delta H/13.6)/T_m$$

Where:

$V_{m(std)}$ = Sample volume collected, corrected to 29.92 inHg and 527.67°R (ft^3, dry basis)

Y = Dry test meter calibration coefficient (dimensionless)

V_m = Sample volume collected at actual conditions (ft^3, dry basis)

T_{std} = Standard Temperature 527.67 (°R)

ΔH = Average pressure differential across calibrated orifice ("H_2O)

Y = 0.991 V_m = 60.325 cf

P_{bar} = 29.110 "Hg ΔH = 1.21 "H_2O

T_m = 546.6 °R T_{std} = 527.67 °R

$V_{m(std)}$ = 56.316 dscf

Volume of Water Vapor Condensed

$$V_{wc(std)} = 0.04716 \times (Tstd / 527.67) \times M_{H2O}$$

Where:

$V_{wc(std)}$ = Volume of water vapor condensed, corrected to 29.92 inHg and 527.67°R (ft^3, wet basis)

M_{H2O} = Net weight gain of impingers (grams)

M_{H2O} = 221.2 grams

$V_{wc(std)}$ = 10.432 wscf

Company:	Primary Energy	**Run:**	1
Plant:	Cokenergy Facility	**Test Date:**	6/9/2021
Unit:	HRCC		
Test Location:	Stack 201		
Method:	Method 12		

Moisture Content

$$B_{ws} = \frac{V_{wc(std)}}{V_{wc(std)} + V_{m(std)}}$$

$V_{wc(std)}$ = 10.432 wscf $V_{m(std)}$ = 56.316 dscf

B_{ws} = 0.156

Average Duct Velocity

$$V_s = 85.49 \times C_p \times \text{Sqrt } \Delta P \text{ (avg)} \times (T_s/(P_s \times M_s))^{1/2}$$

Where:

V_s = Average velocity of effluent gas (ft/sec)

C_p = Pitot calibration coefficient (dimensionless)

Sqrt ΔP (avg) = Average of the square roots of ΔP's at all traverse points

C_p = 0.840 Sqrt ΔP (avg) = 1.053

T_s = 730.2 °R P_s = 29.02 "Hg

M_s = 27.68 lb/lb-mole

V_s = 72.07 ft/sec

Method 2 Volumetric Flow Rate (Actual Basis)

$$Q = V_s \times A \times 60$$

Where:

Q = Effluent gas volumetric flow rate at actual conditions (ft^3/min)

A = Cross-sectional area of duct at sample location (ft^2)

V_s = 72.07 ft/sec A = 254.469 ft^2

Q = 1,100,308 cfm

Company:	Primary Energy	**Run:**	1
Plant:	Cokenergy Facility	**Test Date:**	6/9/2021
Unit:	HRCC		
Test Location:	Stack 201		
Method:	Method 12		

Method 2 Volumetric Flow Rate (Standard Basis)

$$Q_{std} = \frac{T_{std} \times Q \times P_s}{T_s \times 29.92}$$

Where:

Q_{std} = Effluent gas volumetric flow rate corrected to 29.92 in. Hg and 527.67°R (ft³/min)

Q = 1100308 cfm P_s = 29.02 "Hg

T_s = 730.2 °R

Q_{std} = 771,285 scfm

Method 2 Volumetric Flow Rate (Standard Dry Basis)

$$Q_{std(dry)} = Q_{std} \times (1\text{-}Bws)$$

Where:

$Q_{std(dry)}$ = Effluent gas volumetric flow rate corrected to 29.92 inHg and 527.67°R (ft³/min, dry basis)

Q_{std} = 771285 scfm B_{ws} = 0.156

$Q_{std(dry)}$ = 650,743 dscfm

Isokinetic Variation:

$$I = \frac{0.0945 \times Ts \times Vm(std) \times 527.67}{V_s \times \theta \times A_n \times P_s \times (1\text{-}Bws) \times T_{std}}$$

Where:

I = Percent of isokinetic sampling (dimensionless)

θ = Total sample collection time (min)

A_n = Cross-sectional area of nozzle (ft^2)

T_s = 730.2 °R $V_{m(std)}$ = 56.316 dscf

V_s = 72.066 ft/sec θ = 96.0 min

P_s = 29.02 "Hg A_n = 0.000229 ft^2 B_{ws} = 0.156

I = 100.1 %

Example Calculations - Selected Metal Emission Rate

Project Number:	437378	Test Date:	June 9, 2021
Customer:	Primary Energy	Facility:	Cokenergy Facility
Unit Identification:	HRCC	Run #:	1
Sample Location:	Stack 201	Selected Metal:	Lead:

Lead: Concentration (µg/dscm)

$$C_s = \frac{M}{V_{m(std)}}$$

Where:

C_s = Concentration of selected metal, µg/dscm
M = Mass collected, microgram, µg
$V_{m(std)}$ = Volume of sample gas in dry standard cubic meters

M = 1.7000 µg $V_{m(std)}$ = 1.595 dry std. m^3

C_s = 1.066 µg/dscm

Lead: Concentration (lb/dscf):

$$C_d = \frac{\left(\frac{M}{(10^6 \times 453.6)}\right)}{V_{m(std)}}$$

Where:

C_d = Concentration of selected metal, lb/dscf
M = Mass collected, microgram, µg
453.6 = conversion, 453.6 grams to lbs
$V_{m(std)}$ = Volume of sample gas in dry standard cubic feet

$V_{m(std)}$ = 5.632E+01 dscf

C_d = 6.655E-11 lb/dscf

Lead: Emission Rate (lb/hr):

$$ER = C_d \times 60 \times Q_{STD(dry)}$$

Where:

ER = Emission Rate of Selected Metal, lb/hr
C_d = Concentration of selected metal, lb/dscf
60 = conversion, 60 minutes/hr
$Q_{std(dry)}$ = Stack gas volumetric flow rate, dry standard cubic feet per minute

C_d = 6.655E-11 lb/dscf $Q_{std(dry)}$ = 650743 ft^3/min

ER = 2.598E-03 lb/hr

Example Calculations - Effluent Gas Concentration Determination

Project Number:	437378	Test Date:	June 9, 2021
Customer:	Primary Energy	Facility:	Cokenergy Facility
Unit Identification:	HRCC	Run #:	1
Sample Location:	Stack 201		

$$C_{gas} = (C - C_0) \times \frac{C_{ma}}{C_m - C_0}$$

Where:

C_{gas} = Effluent gas concentration (ppm or %vol)

C = Average gas concentration indicated by analyzer (ppm or %vol)

C_0 = Average of pre- and post-test system bias checks using low range gas (ppm or % vol)

C_m = Average of pre- and post-test system bias checks using upscale gas (ppm or % vol)

C_{ma} = Actual concentration of upscale gas (ppm or % vol)

CO_2	C =	6.33 %vol	C_0 =	0.05 %vol
	C_m =	9.00 %vol	C_{ma} =	8.795 %vol
	C_{CO2} =	**6.2 %vol**		
O_2	C =	12.02 %vol	C_0 =	0.18 %vol
	C_m =	10.25 %vol	C_{ma} =	10.19 %vol
	C_{O2} =	**12.0 %vol**		

Note: Interim results are not rounded.

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Isokinetic Test Support Data

Company:	Primary Energy	Project#:	437378
Plant:	Cokenergy Facility	Test Method(s):	Method 12
Unit ID:	HRCC	Test Run #:	1
Location:	Stack 201	Test Date(s):	6/9/2021

Console Operator:	Ryan Novosel	Unit Operating Mode:	Normal
Console ID:	E33	Duct Shape/Area:	Round / 254.47 ft^2
Meter Y:	0.991	F_d Factor:	dscf/MMBtu
Orifice $\Delta H_{@i}$:	1.801	F_c Factor:	scf/MMBtu
Pitot Tube ID:	727	F_w Factor:	wscf/MMBtu
Cal. coefficient (C_p):	0.84	Fuel heat content:	Btu /
Probe Liner Material:	Glass	Process/fuel flow rate:	
Nozzle Material:	Stainless steel	Soot blown?	Fuel Type:
Nozzle Diameter (D_n):	0.205 in	Duration:	min

Sample collection time				Tare wt.	Final wt:
Total # of points:	12	Imp #	Contents	(grams)	(grams)
Target Sample time/point:	8.0 min	1	0.1N HNO3	727.4	882.0
Target run duration:	96.0 min	2	0.1N HNO3	642.5	685.6
		3	Empty	643.8	649.4
Barometric Pressure (P_{bar}):	29.11 in Hg	4	Silica	730.3	748.2
Stack Static Pressure (P_g):	-1.20 in H2O				
Stack Pressure (P_s):	29.02 in Hg				
Leak Checks					
Pre-Test Train Leak Check:	0.004 CFM @ 16 "Hg			Net grams (M_{H2O}):	221.2
Pre-Test Pitot Leak Check:	Pass (Pass or Fail)				
Post-Test Train Leak Rate:	0.009 CFM @ 16 "Hg	Gas Molecular Weight Method:			
Post-Test Pitot Leak Check:	Pass (Pass or Fail)	Method 3A, Instrumental	% CO_2 :	6.2	%vol dry
Pump/Orifice Leak Check:	Pass (Pass or Fail)		% O_2 :	12.0	%vol dry
Filter/Thimble ID:	-		% Nitrogen + % CO :	81.8	%vol dry
Tare Weight:	- grams		M_d - dry basis :	29.472	lb/lb-mole

Description of Filter and Front Half Rinses:

Description of Impinger liquid:

General Comments:

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Isokinetic Test - Processed Traverse Data

Company:	Primary Energy	**Project #:**	437378	**Test Date:**	6/9/2021
Plant:	Cokenergy Facility	**Method(s):**	Method 12	**X-Factor:**	1.480
Unit:	HRCC	**Run #:**	1	**Minutes/pt:**	4
Location:	Stack 201				

Port & Point ID	Clock Time	Meter Volume (V_m) ft^3	ΔP ("H_2O)	Stack (Ts) °F	Dry Gas Meter Inlet (T_{min}) °F	Dry Gas Meter Outlet (T_{mout}) °F	Orifice ΔH ("H_2O)	Sample Vacuum ("Hg)
1-1	7:38:00	762.500	1.20	270	84	84	1.30	4.0
1-1	7:42:00	765.160	1.20	270	85	84	1.30	4.0
1-2	7:46:00	767.730	1.20	271	85	84	1.30	4.0
1-2	7:50:00	770.280	1.20	271	86	85	1.30	4.0
1-3	7:54:00	772.650	0.92	270	86	85	1.00	4.0
1-3	7:58:00	775.270	0.92	270	86	85	1.00	4.0
	8:02:00	777.700						
2-1	8:05:00	777.700	1.20	271	86	86	1.30	4.0
2-1	8:09:00	780.220	1.20	271	87	86	1.30	4.0
2-2	8:13:00	782.750	1.10	270	88	86	1.20	4.0
2-2	8:17:00	785.310	1.10	270	88	86	1.20	4.0
2-3	8:21:00	787.850	1.00	270	88	87	1.10	4.0
2-3	8:25:00	790.320	1.00	270	89	87	1.10	4.0
	8:29:00	792.781						
3-1	8:32:00	792.781	1.20	271	88	87	1.30	4.0
3-1	8:36:00	795.310	1.20	271	88	88	1.30	4.0
3-2	8:40:00	797.750	1.20	271	89	88	1.30	4.0
3-2	8:44:00	800.430	1.20	271	89	88	1.30	4.0
3-3	8:48:00	803.000	1.00	271	89	88	1.10	4.0
3-3	8:52:00	805.500	1.00	271	90	88	1.10	4.0
	8:56:00	808.000						
4-1	8:59:00	808.000	1.10	271	87	87	1.20	4.0
4-1	9:03:00	810.520	1.10	271	87	87	1.20	4.0
4-2	9:07:00	813.980	1.10	270	88	87	1.20	4.0
4-2	9:11:00	815.430	1.10	270	88	87	1.20	4.0
4-3	9:15:00	817.860	1.10	270	89	88	1.20	4.0
4-3	9:19:00	820.350	1.10	270	89	88	1.20	4.0
	9:23:00	822.825						
Run Times:		V_m, ft^3	Ave. ΔP	T_s, °F	T_m, °F		ΔH	Max. Vac.
Start	7:38	60.325	1.11	270.5	87.5	86.5	1.208	4
End	9:23		Ave. √ΔP	T_s, °R	Ave. T_m, °R			
			1.05	730.2	546.6			
Comments/Notes:								

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Isokinetic Test Support Data

Company:	Primary Energy	Project#:	437378
Plant:	Cokenergy Facility	Test Method(s):	Method 12
Unit ID:	HRCC	Test Run #:	2
Location:	Stack 201	Test Date(s):	6/9/2021

Console Operator:	Ryan Novosel	Unit Operating Mode:	Normal
Console ID:	E33	Duct Shape/Area:	Round / 254.47 ft^2
Meter Y:	0.991	F_d Factor:	dscf/MMBtu
Orifice $\Delta H_{@i}$:	1.801	F_c Factor:	scf/MMBtu
Pitot Tube ID:	727	F_w Factor:	wscf/MMBtu
Cal. coefficient (C_p):	0.84	Fuel heat content:	Btu /
Probe Liner Material:	Glass	Process/fuel flow rate:	
Nozzle Material:	Stainless steel	Soot blown?	Fuel Type:
Nozzle Diameter (D_n):	0.205 in	Duration:	min

Sample collection time

Total # of points:	12	
Target Sample time/point:	8.0	min
Target run duration:	96.0	min
Barometric Pressure (P_{bar}):	29.14	in Hg
Stack Static Pressure (P_g):	-1.20	in H2O
Stack Pressure (P_s):	29.05	in Hg

Imp #	Contents	Tare wt. (grams)	Final wt: (grams)
1	0.1N HNO3	655.8	832.1
2	0.1N HNO3	745.4	767.8
3	Empty	562.4	564.6
4	Silica	801.5	815.8
		Net grams (M_{H2O}):	215.2

Leak Checks

Pre-Test Train Leak Check:	0.003	CFM @ 15	"Hg
Pre-Test Pitot Leak Check:	Pass	(Pass or Fail)	
Post-Test Train Leak Rate:	0.003	CFM @ 15	"Hg
Post-Test Pitot Leak Check:	Pass	(Pass or Fail)	
Pump/Orifice Leak Check:	Pass	(Pass or Fail)	
Filter/Thimble ID:	-		
Tare Weight:	-	grams	

Gas Molecular Weight Method: Method 3A, Instrumental

% CO_2 :	5.8	%vol dry
% O_2 :	12.4	%vol dry
% Nitrogen + % CO :	81.8	%vol dry
M_d - dry basis :	29.424	lb/lb-mole

Description of Filter and Front Half Rinses:

Description of Impinger liquid:

General Comments:

TRC

Isokinetic Test - Processed Traverse Data

Company:	Primary Energy	**Project #:**	437378	**Test Date:**	6/9/2021
Plant:	Cokenergy Facility	**Method(s):**	Method 12	**X-Factor:**	1.480
Unit:	HRCC	**Run #:**	2	**Minutes/pt:**	4
Location:	Stack 201				

Port & Point ID	Clock Time	Meter Volume (V_m) ft^3	ΔP ("H_2O)	Stack (Ts) °F	Dry Gas Meter Inlet (T_{min}) °F	Dry Gas Meter Outlet (T_{mout}) °F	Orifice ΔH ("H_2O)	Sample Vacuum ("Hg)
1-1	9:51:00	825.300	1.20	271	87	88	1.30	4.0
1-1	9:55:00	828.010	1.20	271	87	88	1.30	4.0
1-2	9:59:00	830.720	1.10	271	87	87	1.20	4.0
1-2	10:03:00	833.370	1.10	271	88	87	1.20	4.0
1-3	10:07:00	836.040	0.99	270	88	87	1.10	4.0
1-3	10:11:00	838.700	0.99	270	89	87	1.10	4.0
	10:15:00	841.341						
2-1	10:18:00	841.341	1.20	270	88	87	1.30	4.0
2-1	10:22:00	844.000	1.20	270	88	87	1.30	4.0
2-2	10:26:00	846.870	1.20	270	88	87	1.30	4.0
2-2	10:30:00	849.230	1.20	270	89	88	1.30	4.0
2-3	10:34:00	851.850	1.10	270	89	88	1.20	4.0
2-3	10:38:00	854.470	1.10	270	90	88	1.20	4.0
	10:42:00	857.078						
3-1	10:45:00	857.078	1.20	271	88	88	1.30	4.0
3-1	10:49:00	859.700	1.20	271	88	88	1.30	4.0
3-2	10:53:00	862.290	1.10	271	88	88	1.20	4.0
3-2	10:57:00	864.880	1.10	271	89	88	1.20	4.0
3-3	11:01:00	867.470	0.96	270	89	88	1.20	4.0
3-3	11:05:00	870.040	0.96	270	89	88	1.20	4.0
	11:09:00	872.611						
4-1	11:12:00	872.611	1.20	269	88	87	1.30	4.0
4-1	11:16:00	875.210	1.20	269	88	87	1.30	4.0
4-2	11:20:00	877.770	1.20	269	89	88	1.30	4.0
4-2	11:24:00	880.340	1.20	269	89	88	1.30	4.0
4-3	11:28:00	882.970	0.97	269	89	88	1.10	4.0
4-3	11:32:00	885.450	0.97	269	90	88	1.10	4.0
	11:36:00	888.015						

Run Times:		V_m, ft^3	Ave. ΔP	T_s, °F	T_m, °F		ΔH	Max. Vac.
Start	9:51	62.715	1.12	270.1	88.4	87.6	1.233	4
End	11:36		Ave. √ΔP	T_s, °R	Ave. T_m, °R			
			1.06	729.8	547.7			
Comments/Notes:								

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Isokinetic Test Support Data

Company:	Primary Energy	Project#:	437378
Plant:	Cokenergy Facility	Test Method(s):	Method 12
Unit ID:	HRCC	Test Run #:	3
Location:	Stack 201	Test Date(s):	6/9/2021

Console Operator:	Ryan Novosel	Unit Operating Mode:	Normal
Console ID:	E33	Duct Shape/Area:	Round / 254.47 ft^2
Meter Y:	0.991	F_d Factor:	dscf/MMBtu
Orifice $\Delta H_{@i}$:	1.801	F_c Factor:	scf/MMBtu
Pitot Tube ID:	727	F_w Factor:	wscf/MMBtu
Cal. coefficient (C_p):	0.84	Fuel heat content:	Btu /
Probe Liner Material:	Glass	Process/fuel flow rate:	
Nozzle Material:	Stainless steel	Soot blown?	Fuel Type:
Nozzle Diameter (D_n):	0.205 in	Duration:	min

Sample collection time	
Total # of points:	12
Target Sample time/point:	8.0 min
Target run duration:	96.0 min
Barometric Pressure (P_{bar}):	29.11 in Hg
Stack Static Pressure (P_g):	-1.20 in H2O
Stack Pressure (P_s):	29.02 in Hg

Imp #	Contents	Tare wt. (grams)	Final wt: (grams)
1	0.1N HNO3	761.3	927.0
2	0.1N HNO3	640.1	663.6
3	Empty	591.9	594.2
4	Silica	842.7	857.8
		Net grams (M_{H2O}):	206.6

Leak Checks			
Pre-Test Train Leak Check:	0.005 CFM @ 15 "Hg		
Pre-Test Pitot Leak Check:	Pass (Pass or Fail)		
Post-Test Train Leak Rate:	0.004 CFM @ 15 "Hg	Gas Molecular Weight Method:	
Post-Test Pitot Leak Check:	Pass (Pass or Fail)	Method 3A, Instrumental	% CO_2 : 5.7 %vol dry
Pump/Orifice Leak Check:	Pass (Pass or Fail)		% O_2 : 12.6 %vol dry
Filter/Thimble ID:	-		% Nitrogen + % CO : 81.7 %vol dry
Tare Weight:	- grams		M_d - dry basis : 29.416 lb/lb-mole

Description of Filter and Front Half Rinses:

Description of Impinger liquid:

General Comments:

TRC

Isokinetic Test - Processed Traverse Data

Company:	Primary Energy	**Project #:**	437378	**Test Date:**	6/9/2021
Plant:	Cokenergy Facility	**Method(s):**	Method 12	**X-Factor:**	1.480
Unit:	HRCC	**Run #:**	3	**Minutes/pt:**	4
Location:	Stack 201				

Port & Point ID	Clock Time	Meter Volume (V_m) ft^3	ΔP ("H_2O)	Stack (Ts) °F	Dry Gas Meter Inlet (T_{min}) °F	Dry Gas Meter Outlet (T_{mout}) °F	Orifice ΔH ("H_2O)	Sample Vacuum ("Hg)
1-1	12:00:00	888.500	1.20	269	86	86	1.30	4.0
1-1	12:04:00	891.010	1.20	269	86	86	1.30	4.0
1-2	12:08:00	893.650	1.20	269	87	86	1.30	4.0
1-2	12:12:00	896.270	1.20	269	87	86	1.30	4.0
1-3	12:16:00	898.880	1.00	268	87	87	1.10	4.0
1-3	12:20:00	901.480	1.00	268	88	87	1.10	4.0
	12:24:00	904.073						
2-1	12:27:00	904.073	1.10	269	87	87	1.20	4.0
2-1	12:31:00	906.630	1.10	269	87	87	1.20	4.0
2-2	12:35:00	909.000	1.10	268	87	87	1.20	4.0
2-2	12:39:00	911.680	1.10	268	87	87	1.20	4.0
2-3	12:43:00	914.180	0.93	268	88	87	1.00	4.0
2-3	12:47:00	916.690	0.93	268	88	87	1.00	4.0
	12:51:00	919.190						
3-1	12:54:00	919.190	1.20	269	88	87	1.30	4.0
3-1	12:58:00	921.810	1.20	269	88	88	1.30	4.0
3-2	13:02:00	924.410	1.20	269	90	88	1.30	4.0
3-2	13:06:00	927.020	1.20	269	90	88	1.30	4.0
3-3	13:10:00	929.620	1.00	268	90	89	1.10	4.0
3-3	13:14:00	932.220	1.00	268	91	89	1.10	4.0
	13:18:00	934.828						
4-1	13:21:00	934.828	1.20	268	88	88	1.30	4.0
4-1	13:25:00	937.440	1.20	268	88	88	1.30	4.0
4-2	13:29:00	940.040	1.20	267	89	88	1.30	4.0
4-2	13:33:00	942.630	1.20	267	89	88	1.30	4.0
4-3	13:37:00	945.220	0.97	267	90	89	1.10	4.0
4-3	13:41:00	947.810	0.97	267	90	89	1.10	4.0
	13:45:00	950.383						
Run Times:		V_m, ft^3	Ave. ΔP	T_s, °F	T_m, °F		ΔH	Max. Vac.
Start	12:00	61.883	1.11	268.3	88.2	87.5	1.208	4
End	13:45		Ave. √ΔP	T_s, °R	Ave. T_m, °R			
			1.05	727.9	547.5			
Comments/Notes:								

TRC

Instrumental Reference Method Field Data

Project Number:	437378	Date:	6/9/2021
Customer:	Primary Energy	Facility:	Cokenergy Facility
Unit Identification:	HRCC	Recorded by:	Ben Cacao
Sample Location:	Stack 201	Fc Factor:	-
Load Level/Condition:	> 50% Load	Fd Factor:	-

RM Analyzer Information			
Reference Method Probe Type (Moisture Basis):			Extractive (Dry)
Pollutant	Manufacturer	Model #	Serial Number
NO_X	-	-	-
SO_2	-	-	-
CO	-	-	-
CO_2	Servomex	1440	1440DI/3759
O_2	Servomex	1440	1440DI/3759

Reference Method Initial Calibration Error Test								
Pollutant	Cal Gas Level	Cal Gas Cylinder Information			Analyzer Response	Absolute Difference	% Cal Error	Error Status
		Concentration	Exp Date	ID #				
NO_X	Low	-	-	-	-	-	-	-
	Mid	-	-	-	-	-	-	-
	High	-	-	-	-	-	-	-
SO_2	Low	-	-	-	-	-	-	-
	Mid	-	-	-	-	-	-	-
	High	-	-	-	-	-	-	-
CO	Low	-	-	-	-	-	-	-
	Mid	-	-	-	-	-	-	-
	High	-	-	-	-	-	-	-
CO_2	Low	0	03/04/29	SG9182147BAL	0.04	0.04	0.22	Pass
	Mid	8.795	09/25/28	CC432856	9.04	0.24	1.37	Pass
	High	17.84	04/30/27	CC346448	17.93	0.09	0.50	Pass
O_2	Low	0	03/04/29	SG9182147BAL	0.09	0.09	0.41	Pass
	Mid	10.19	09/25/28	CC432856	10.29	0.10	0.45	Pass
	High	22.17	04/30/27	CC346448	22.28	0.11	0.50	Pass

TRC

Instrumental Reference Method Field Data

Project Number:	437378	Start Date:	6/9/2021
Customer:	Primary Energy	End Date:	6/9/2021
Unit Identification:	HRCC	Facility:	Cokenergy Facility
Sample Location:	Stack 201	Recorded by:	Ben Cacao
Load Level/Condition:	> 50% Load	Fc Factor:	-
		Fd Factor:	-

Test Parameter				NO_X	SO_2	CO	CO_2	O_2	Volumetric Flow Rate	Moisture Fraction
Calibration Span, CS (Day 1)				-	-	-	17.84	22.17		
Calibration Span, CS (Day 2)				-	-	-	-	-		
Run No.	Start Date	First Minute	Last Minute	Run Average Raw Analyzer Responses					DSCFM	Bws
1	6/9/21	7:38	9:23	-	-	-	6.33	12.02	-	-
2	6/9/21	9:51	11:36	-	-	-	5.87	12.41	-	-
3	6/9/21	12:00	13:45	-	-	-	5.69	12.68	-	-

Actual Concentration of the Upscale Calibration Gas, C_{MA}					
	NO_X	SO_2	CO	CO_2	O_2
C_{MA} (Day 1)	-	-	-	8.795	10.19
C_{MA} (Day 2)	-	-	-	-	-

System Responses to Zero Calibration Gas										
Run No.	NO_X		SO_2		CO		CO_2		O_2	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	-	-	-	-	-	-	0.04	0.05	0.17	0.19
2	-	-	-	-	-	-	0.05	0.05	0.19	0.19
3	-	-	-	-	-	-	0.05	0.04	0.19	0.17

System Responses to Upscale Calibration Gas										
Run No.	NO_X		SO_2		CO		CO_2		O_2	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
1	-	-	-	-	-	-	9.04	8.95	10.24	10.26
2	-	-	-	-	-	-	8.95	8.82	10.26	10.26
3	-	-	-	-	-	-	8.82	8.78	10.26	10.24

TRC

Instrumental Reference Method Calibration Data

Project Number:	437378	Start Date:	6/9/2021
Customer:	Primary Energy	End Date:	6/9/2021
Unit Identification:	HRCC	Facility:	Cokenergy Facility
Sample Location:	Stack 201	Recorded by:	Ben Cacao

CO_2 System Bias/Calibration Error and Drift Summary

Run #	Calibration Gas Level	Span	Cdir	Initial Values		Final Values		Drift
		Span Gas Concentration (%vol)	Direct Cal Response (%vol)	System Response (%vol)	System Bias (% of span)	System Response (%vol)	System Bias (% of span)	(% of span)
1	Low Level Gas	17.84	0.04	0.04	0.0	0.05	0.1	0.1
	Upscale Gas	17.84	9.04	9.04	0.0	8.95	-0.5	0.5
2	Low Level Gas	17.84	0.04	0.05	0.1	0.05	0.1	0.0
	Upscale Gas	17.84	9.04	8.95	-0.5	8.82	-1.2	0.7
3	Low Level Gas	17.84	0.04	0.05	0.1	0.04	0.0	0.1
	Upscale Gas	17.84	9.04	8.82	-1.2	8.78	-1.5	0.2

O_2 System Bias/Calibration Error and Drift Summary

Run #	Calibration Gas Level	Span	Cdir	Initial Values		Final Values		Drift
		Span Gas Concentration (%vol)	Direct Cal Response (ppm)	System Response (%vol)	System Bias (% of span)	System Response (%vol)	System Bias (% of span)	(% of span)
1	Low Level Gas	22.17	0.09	0.17	0.4	0.19	0.5	0.1
	Upscale Gas	22.17	10.29	10.24	-0.2	10.26	-0.1	0.1
2	Low Level Gas	22.17	0.09	0.19	0.5	0.19	0.5	0.0
	Upscale Gas	22.17	10.29	10.26	-0.1	10.26	-0.1	0.0
3	Low Level Gas	22.17	0.09	0.19	0.5	0.17	0.4	0.1
	Upscale Gas	22.17	10.29	10.26	-0.1	10.24	-0.2	0.1

Instrumental Reference Method
Calibration Corrected Test Data

Project Number:	437378	Start Date:	6/9/2021
Customer:	Primary Energy	End Date:	6/9/2021
Unit Identification:	HRCC	Facility:	Cokenergy Facility
Sample Location:	Stack 201	Recorded by:	Ben Cacao
RM Probe Type:	Extractive (Dry)	Fc Factor:	-
Load Level/Condition:	> 50% Load	Fd Factor:	-

Reference Method Results, As Measured Moisture Basis

Run #	Date	Start Time	End Time	NOX ppmvd	SO2 ppmvd	CO ppmvd	CO2 % v/v dry	O2 % v/v dry
1	6/9/21	7:38	9:23	-	-	-	6.2	12.0
2	6/9/21	9:51	11:36	-	-	-	5.8	12.4
3	6/9/21	12:00	13:45	-	-	-	5.7	12.6

Primary Energy
Cokenergy Facility
HRCC Stack 201

Linearity

Date/Time	CO2 %dry	O2 %dry
6/9/2021 6:59	0.05	0.09
6/9/2021 7:00	0.04	0.09
6/9/2021 7:01	2.77	3.31
6/9/2021 7:02	17.82	22.20
6/9/2021 7:03	17.91	22.28
6/9/2021 7:04	17.93	22.28
6/9/2021 7:05	12.84	15.63
6/9/2021 7:06	9.03	10.29
6/9/2021 7:07	9.04	10.29
6/9/2021 7:08	9.12	10.44

Primary Energy
Cokenergy Facility
HRCC Stack 201

Pre Run 1 / Response Time

Date/Time	CO2 %dry	O2 %dry	
6/9/2021 7:22	0.05	0.17	
6/9/2021 7:23	0.04	0.17	
6/9/2021 7:24	2.09	2.41	UpScale
6/9/2021 7:25	9.12	10.23	
6/9/2021 7:26	9.04	10.24	
6/9/2021 7:27	9.04	10.24	
6/9/2021 7:28	7.22	8.13	DownScale
6/9/2021 7:29	0.10	0.20	
6/9/2021 7:30	0.06	0.17	

Primary Energy
Cokenergy Facility
HRCC Stack 201

Post Run 1

Date/Time	CO2 %dry	O2 %dry
6/9/2021 9:30	0.06	0.19
6/9/2021 9:31	0.05	0.19
6/9/2021 9:32	6.29	7.33
6/9/2021 9:33	8.94	10.26
6/9/2021 9:34	8.95	10.26
6/9/2021 9:35	8.94	10.26

Primary Energy
Cokenergy Facility
HRCC Stack 201

Post Run 2

Date/Time	CO2 %dry	O2 %dry
6/9/2021 11:42	0.06	0.19
6/9/2021 11:43	0.05	0.19
6/9/2021 11:44	5.54	6.59
6/9/2021 11:45	8.80	10.25
6/9/2021 11:46	8.82	10.26
6/9/2021 11:47	8.82	10.26

Primary Energy
Cokenergy Facility
HRCC Stack 201

Post Run 3

Date/Time	CO2 %dry	O2 %dry
6/9/2021 13:51	0.05	0.18
6/9/2021 13:52	0.04	0.17
6/9/2021 13:53	5.37	6.49
6/9/2021 13:54	8.76	10.24
6/9/2021 13:55	8.78	10.24
6/9/2021 13:56	8.78	10.25

Primary Energy
Cokenergy Facility
HRCC Stack 201

Run 1

Date/Time	CO2 %dry	O2 %dry
6/9/2021 7:38	6.09	11.94
6/9/2021 7:39	6.12	11.92
6/9/2021 7:40	6.10	11.94
6/9/2021 7:41	6.12	11.92
6/9/2021 7:42	6.14	11.92
6/9/2021 7:43	6.16	11.91
6/9/2021 7:44	6.14	11.92
6/9/2021 7:45	6.15	11.92
6/9/2021 7:46	6.16	11.90
6/9/2021 7:47	6.17	11.94
6/9/2021 7:48	6.20	11.91
6/9/2021 7:49	6.23	11.92
6/9/2021 7:50	6.25	11.93
6/9/2021 7:51	6.27	11.90
6/9/2021 7:52	6.26	11.92
6/9/2021 7:53	6.27	11.93
6/9/2021 7:54	6.33	11.90
6/9/2021 7:55	6.30	11.89
6/9/2021 7:56	6.33	11.91
6/9/2021 7:57	6.63	11.93
6/9/2021 7:58	6.80	11.92
6/9/2021 7:59	6.66	11.92
6/9/2021 8:00	6.58	11.91
6/9/2021 8:01	6.52	11.95
6/9/2021 8:02	6.52	11.94
6/9/2021 8:03	6.50	11.96
6/9/2021 8:04	6.51	11.94
6/9/2021 8:05	6.50	11.97
6/9/2021 8:06	6.51	11.96
6/9/2021 8:07	6.49	11.96
6/9/2021 8:08	6.48	11.95
6/9/2021 8:09	6.47	11.96
6/9/2021 8:10	6.46	11.96
6/9/2021 8:11	6.46	11.97
6/9/2021 8:12	6.46	11.97
6/9/2021 8:13	6.45	11.98
6/9/2021 8:14	6.45	11.98
6/9/2021 8:15	6.44	11.99
6/9/2021 8:16	6.44	11.99
6/9/2021 8:17	6.43	12.00
6/9/2021 8:18	6.42	12.01
6/9/2021 8:19	6.42	12.01
6/9/2021 8:20	6.42	12.01
6/9/2021 8:21	6.41	12.02
6/9/2021 8:22	6.41	12.01
6/9/2021 8:23	6.40	12.02
6/9/2021 8:24	6.38	12.06
6/9/2021 8:25	6.37	12.08
6/9/2021 8:26	6.36	12.08

Primary Energy
Cokenergy Facility
HRCC Stack 201

Run 1

Date/Time	CO2 %dry	O2 %dry
6/9/2021 8:27	6.36	12.09
6/9/2021 8:28	6.36	12.09
6/9/2021 8:29	6.36	12.07
6/9/2021 8:30	6.36	12.08
6/9/2021 8:31	6.36	12.09
6/9/2021 8:32	6.34	12.10
6/9/2021 8:33	6.35	12.09
6/9/2021 8:34	6.35	12.09
6/9/2021 8:35	6.35	12.09
6/9/2021 8:36	6.37	12.08
6/9/2021 8:37	6.36	12.08
6/9/2021 8:38	6.36	12.08
6/9/2021 8:39	6.36	12.08
6/9/2021 8:40	6.36	12.08
6/9/2021 8:41	6.34	12.10
6/9/2021 8:42	6.34	12.10
6/9/2021 8:43	6.32	12.13
6/9/2021 8:44	6.33	12.12
6/9/2021 8:45	6.32	12.12
6/9/2021 8:46	6.34	12.10
6/9/2021 8:47	6.33	12.10
6/9/2021 8:48	6.34	12.09
6/9/2021 8:49	6.34	12.09
6/9/2021 8:50	6.34	12.10
6/9/2021 8:51	6.35	12.08
6/9/2021 8:52	6.37	12.06
6/9/2021 8:53	6.37	12.05
6/9/2021 8:54	6.36	12.05
6/9/2021 8:55	6.36	12.06
6/9/2021 8:56	6.36	12.06
6/9/2021 8:57	6.35	12.07
6/9/2021 8:58	6.36	12.06
6/9/2021 8:59	6.38	12.03
6/9/2021 9:00	6.37	12.05
6/9/2021 9:01	6.36	12.06
6/9/2021 9:02	6.36	12.06
6/9/2021 9:03	6.36	12.06
6/9/2021 9:04	6.36	12.06
6/9/2021 9:05	6.36	12.06
6/9/2021 9:06	6.39	12.06
6/9/2021 9:07	6.28	12.03
6/9/2021 9:08	6.41	12.05
6/9/2021 9:09	6.16	12.05
6/9/2021 9:10	6.17	12.05
6/9/2021 9:11	6.16	12.05
6/9/2021 9:12	6.15	12.06
6/9/2021 9:13	6.15	12.06
6/9/2021 9:14	6.16	12.05
6/9/2021 9:15	6.18	12.02

Primary Energy
Cokenergy Facility
HRCC Stack 201

Run 1

Date/Time	CO2 %dry	O2 %dry
6/9/2021 9:16	6.17	12.04
6/9/2021 9:17	6.17	12.04
6/9/2021 9:18	6.16	12.04
6/9/2021 9:19	6.16	12.05
6/9/2021 9:20	6.18	12.03
6/9/2021 9:21	6.17	12.04
6/9/2021 9:22	6.15	12.06
6/9/2021 9:23	6.16	12.06
Average	**6.33**	**12.02**

Primary Energy
Cokenergy Facility
HRCC Stack 201

Run 2

Date/Time	CO2 %dry	O2 %dry
6/9/2021 9:51	6.05	12.16
6/9/2021 9:52	6.03	12.18
6/9/2021 9:53	6.05	12.15
6/9/2021 9:54	6.05	12.15
6/9/2021 9:55	6.05	12.15
6/9/2021 9:56	6.04	12.17
6/9/2021 9:57	6.04	12.16
6/9/2021 9:58	6.03	12.17
6/9/2021 9:59	6.02	12.19
6/9/2021 10:00	6.01	12.20
6/9/2021 10:01	6.01	12.19
6/9/2021 10:02	6.00	12.22
6/9/2021 10:03	6.00	12.22
6/9/2021 10:04	6.00	12.21
6/9/2021 10:05	6.01	12.21
6/9/2021 10:06	6.01	12.21
6/9/2021 10:07	5.98	12.24
6/9/2021 10:08	6.00	12.23
6/9/2021 10:09	5.99	12.24
6/9/2021 10:10	5.98	12.25
6/9/2021 10:11	5.97	12.26
6/9/2021 10:12	5.99	12.22
6/9/2021 10:13	5.99	12.23
6/9/2021 10:14	5.98	12.24
6/9/2021 10:15	5.98	12.24
6/9/2021 10:16	5.96	12.27
6/9/2021 10:17	5.97	12.27
6/9/2021 10:18	5.95	12.28
6/9/2021 10:19	5.95	12.29
6/9/2021 10:20	5.91	12.34
6/9/2021 10:21	5.92	12.33
6/9/2021 10:22	5.91	12.35
6/9/2021 10:23	5.93	12.32
6/9/2021 10:24	5.93	12.31
6/9/2021 10:25	5.91	12.34
6/9/2021 10:26	5.92	12.34
6/9/2021 10:27	5.92	12.32
6/9/2021 10:28	5.92	12.32
6/9/2021 10:29	5.92	12.33
6/9/2021 10:30	5.92	12.35
6/9/2021 10:31	5.92	12.33
6/9/2021 10:32	5.91	12.34
6/9/2021 10:33	5.90	12.36
6/9/2021 10:34	5.90	12.36
6/9/2021 10:35	5.90	12.37
6/9/2021 10:36	5.89	12.37
6/9/2021 10:37	5.89	12.37
6/9/2021 10:38	5.89	12.38
6/9/2021 10:39	5.91	12.34

Primary Energy
Cokenergy Facility
HRCC Stack 201

Run 2

Date/Time	CO2 %dry	O2 %dry
6/9/2021 10:40	5.90	12.36
6/9/2021 10:41	5.88	12.39
6/9/2021 10:42	5.90	12.37
6/9/2021 10:43	5.88	12.39
6/9/2021 10:44	5.89	12.39
6/9/2021 10:45	5.88	12.39
6/9/2021 10:46	5.88	12.39
6/9/2021 10:47	5.88	12.39
6/9/2021 10:48	5.88	12.38
6/9/2021 10:49	5.87	12.40
6/9/2021 10:50	5.87	12.40
6/9/2021 10:51	5.87	12.41
6/9/2021 10:52	5.86	12.43
6/9/2021 10:53	5.87	12.41
6/9/2021 10:54	5.85	12.44
6/9/2021 10:55	5.86	12.42
6/9/2021 10:56	5.86	12.44
6/9/2021 10:57	5.86	12.42
6/9/2021 10:58	5.86	12.42
6/9/2021 10:59	5.86	12.43
6/9/2021 11:00	5.87	12.42
6/9/2021 11:01	5.84	12.44
6/9/2021 11:02	5.85	12.43
6/9/2021 11:03	5.84	12.44
6/9/2021 11:04	5.85	12.42
6/9/2021 11:05	5.86	12.42
6/9/2021 11:06	5.84	12.44
6/9/2021 11:07	5.85	12.44
6/9/2021 11:08	5.82	12.47
6/9/2021 11:09	5.82	12.46
6/9/2021 11:10	5.83	12.46
6/9/2021 11:11	5.83	12.46
6/9/2021 11:12	5.78	12.53
6/9/2021 11:13	5.72	12.62
6/9/2021 11:14	5.72	12.63
6/9/2021 11:15	5.70	12.67
6/9/2021 11:16	5.69	12.69
6/9/2021 11:17	5.69	12.68
6/9/2021 11:18	5.68	12.70
6/9/2021 11:19	5.69	12.70
6/9/2021 11:20	5.68	12.71
6/9/2021 11:21	5.69	12.70
6/9/2021 11:22	5.69	12.70
6/9/2021 11:23	5.67	12.71
6/9/2021 11:24	5.66	12.74
6/9/2021 11:25	5.67	12.74
6/9/2021 11:26	5.68	12.71
6/9/2021 11:27	5.67	12.73
6/9/2021 11:28	5.66	12.74

Primary Energy
Cokenergy Facility
HRCC Stack 201

Run 2

Date/Time	CO2 %dry	O2 %dry
6/9/2021 11:29	5.67	12.73
6/9/2021 11:30	5.69	12.71
6/9/2021 11:31	5.68	12.72
6/9/2021 11:32	5.67	12.73
6/9/2021 11:33	5.67	12.72
6/9/2021 11:34	5.67	12.72
6/9/2021 11:35	5.67	12.72
6/9/2021 11:36	5.67	12.73
Average	**5.87**	**12.41**

Primary Energy
Cokenergy Facility
HRCC Stack 201

Run 3

Date/Time	CO2 %dry	O2 %dry
6/9/2021 12:00	5.74	12.59
6/9/2021 12:01	5.75	12.59
6/9/2021 12:02	5.73	12.60
6/9/2021 12:03	5.74	12.59
6/9/2021 12:04	5.75	12.59
6/9/2021 12:05	5.74	12.59
6/9/2021 12:06	5.73	12.61
6/9/2021 12:07	5.73	12.61
6/9/2021 12:08	5.75	12.58
6/9/2021 12:09	5.74	12.60
6/9/2021 12:10	5.73	12.60
6/9/2021 12:11	5.73	12.61
6/9/2021 12:12	5.73	12.61
6/9/2021 12:13	5.72	12.62
6/9/2021 12:14	5.71	12.64
6/9/2021 12:15	5.71	12.64
6/9/2021 12:16	5.72	12.62
6/9/2021 12:17	5.72	12.63
6/9/2021 12:18	5.73	12.61
6/9/2021 12:19	5.71	12.64
6/9/2021 12:20	5.70	12.65
6/9/2021 12:21	5.72	12.63
6/9/2021 12:22	5.74	12.59
6/9/2021 12:23	5.72	12.62
6/9/2021 12:24	5.71	12.64
6/9/2021 12:25	5.73	12.61
6/9/2021 12:26	5.71	12.64
6/9/2021 12:27	5.72	12.62
6/9/2021 12:28	5.72	12.63
6/9/2021 12:29	5.72	12.63
6/9/2021 12:30	5.71	12.64
6/9/2021 12:31	5.69	12.66
6/9/2021 12:32	5.69	12.66
6/9/2021 12:33	5.69	12.67
6/9/2021 12:34	5.69	12.67
6/9/2021 12:35	5.69	12.66
6/9/2021 12:36	5.69	12.68
6/9/2021 12:37	5.70	12.67
6/9/2021 12:38	5.70	12.66
6/9/2021 12:39	5.72	12.62
6/9/2021 12:40	5.72	12.63
6/9/2021 12:41	5.70	12.66
6/9/2021 12:42	5.71	12.64
6/9/2021 12:43	5.72	12.64
6/9/2021 12:44	5.71	12.64
6/9/2021 12:45	5.72	12.64
6/9/2021 12:46	5.70	12.66
6/9/2021 12:47	5.70	12.66
6/9/2021 12:48	5.71	12.65

Primary Energy
Cokenergy Facility
HRCC Stack 201

Run 3

Date/Time	CO2 %dry	O2 %dry
6/9/2021 12:49	5.70	12.67
6/9/2021 12:50	5.70	12.68
6/9/2021 12:51	5.69	12.69
6/9/2021 12:52	5.69	12.68
6/9/2021 12:53	5.69	12.66
6/9/2021 12:54	5.69	12.67
6/9/2021 12:55	5.69	12.67
6/9/2021 12:56	5.70	12.65
6/9/2021 12:57	5.68	12.68
6/9/2021 12:58	5.68	12.68
6/9/2021 12:59	5.69	12.67
6/9/2021 13:00	5.69	12.67
6/9/2021 13:01	5.69	12.68
6/9/2021 13:02	5.69	12.68
6/9/2021 13:03	5.67	12.69
6/9/2021 13:04	5.67	12.69
6/9/2021 13:05	5.67	12.71
6/9/2021 13:06	5.67	12.69
6/9/2021 13:07	5.66	12.71
6/9/2021 13:08	5.67	12.71
6/9/2021 13:09	5.66	12.71
6/9/2021 13:10	5.67	12.71
6/9/2021 13:11	5.67	12.72
6/9/2021 13:12	5.67	12.71
6/9/2021 13:13	5.67	12.71
6/9/2021 13:14	5.65	12.73
6/9/2021 13:15	5.67	12.71
6/9/2021 13:16	5.64	12.73
6/9/2021 13:17	5.66	12.71
6/9/2021 13:18	5.64	12.74
6/9/2021 13:19	5.64	12.74
6/9/2021 13:20	5.65	12.73
6/9/2021 13:21	5.64	12.74
6/9/2021 13:22	5.64	12.76
6/9/2021 13:23	5.64	12.74
6/9/2021 13:24	5.64	12.76
6/9/2021 13:25	5.63	12.78
6/9/2021 13:26	5.64	12.75
6/9/2021 13:27	5.64	12.76
6/9/2021 13:28	5.65	12.76
6/9/2021 13:29	5.65	12.75
6/9/2021 13:30	5.65	12.75
6/9/2021 13:31	5.64	12.76
6/9/2021 13:32	5.65	12.75
6/9/2021 13:33	5.64	12.76
6/9/2021 13:34	5.64	12.76
6/9/2021 13:35	5.65	12.74
6/9/2021 13:36	5.64	12.76
6/9/2021 13:37	5.63	12.76

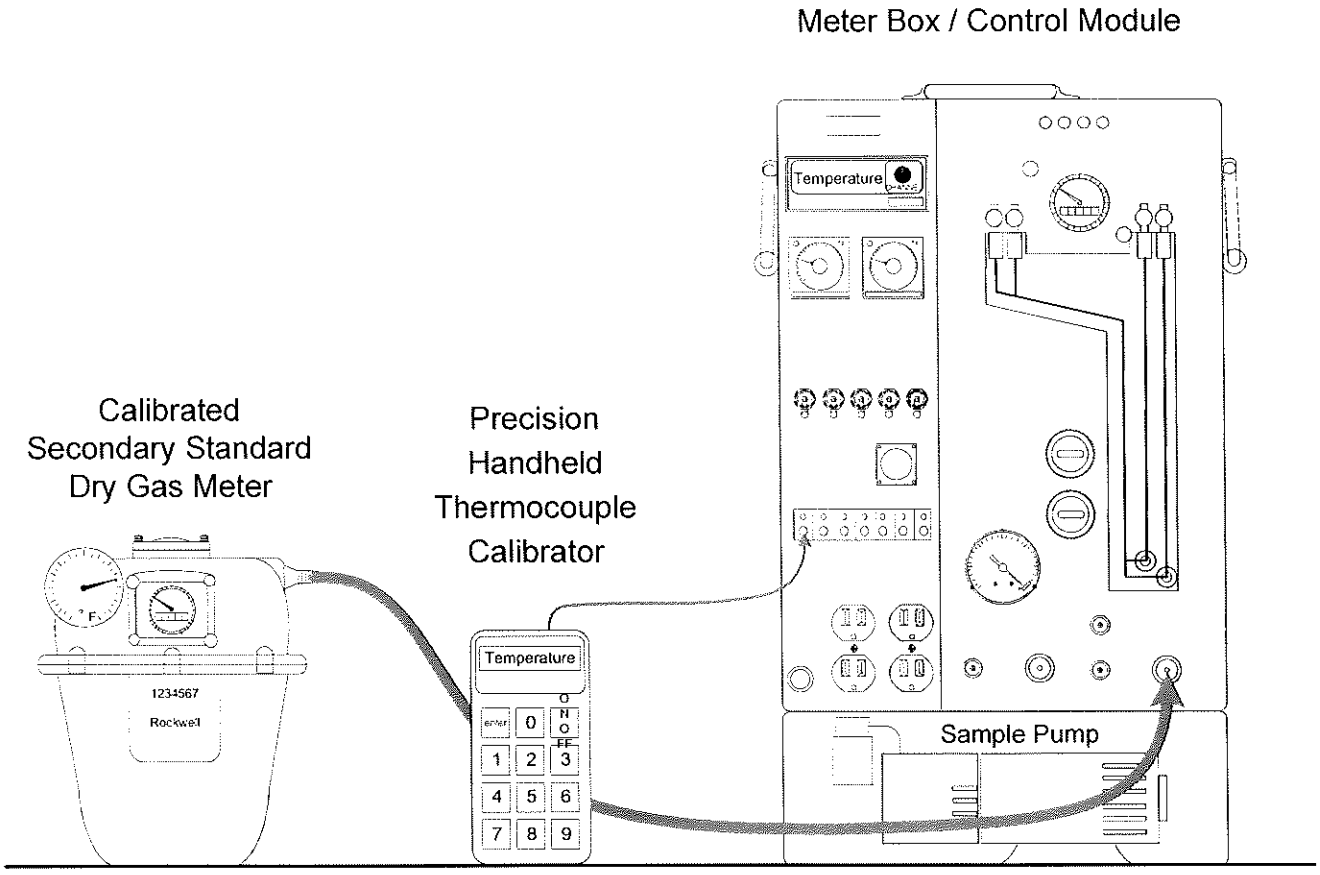
Primary Energy
Cokenergy Facility
HRCC Stack 201

Run 3

Date/Time	CO2 %dry	O2 %dry
6/9/2021 13:38	5.63	12.76
6/9/2021 13:39	5.62	12.78
6/9/2021 13:40	5.62	12.78
6/9/2021 13:41	5.63	12.78
6/9/2021 13:42	5.62	12.79
6/9/2021 13:43	5.63	12.79
6/9/2021 13:44	5.62	12.79
6/9/2021 13:45	5.63	12.78
Average	**5.69**	**12.68**

Equipment Configuration for Meter Box Calibration

USEPA Promulgated Method 5



Pre Test DGM Calibration

(before use, as left data)

Control Module I.D. No.	E33	System Leak Check:	Passed @ > 8" w.c. @ > 5 min.	Date:	04-30-2019
Standard Meter I.D. No.:	3623853	Standard Meter Calibration Date:	8-22-2018	Calibrated By:	L. campo
Standard Meter (Y_{dv}):	0.9972	Standard Meter Calibration Due Date:	8-22-2019	Barometric Pressure :	29.38

Run Number	Orifice Setting in.H_20	Meter Pressure in.H_20	Standard Meter Volume Vr	Control Module DGM Volume Vd	Standard Meter Temp. F Tr	Dry Gas Meter Inlet Temp. F Tdi	Dry Gas Meter Outlet Temp. F Tdo	Dry Gas Meter Avg. Temp. F Td	Time Min.	Time Sec.	Gamma Correction Coef. Y	Pressure equal to: 0.75 cfm @ STP (DH@)	Flow Rate (Q) scfm
Initial			829.438	545.853	72	73	73						
Final			838.046	554.530	72	73	73						
Difference 1	0.35	0.35	8.608	8.677	72	73	73	73	25	5	0.990	1.712	0.34
Initial			818.524	534.897	72	72	72						
Final			829.154	545.565	72	73	73						
Difference 2	0.85	0.85	10.630	10.668	72	73	73	73	20	12	0.992	1.770	0.52
Initial			838.286	554.765	72	73	73						
Final			849.935	566.460	72	73	73						
Difference 3	2.00	2.00	11.649	11.695	72	73	73	73	15	2	0.990	1.919	0.76
								Pre Test Calibration Factor (Y_{avg})			0.991	1.801	

Specifications: CFR 40, Part 60, Appendix A, Method 5, section 10.3.1. Calibration Before Use.

Pre Test Temperature Indicator Calibration

(For K-Type Thermocouples)

Date: 04-30-2019

Name: L. campo

Control Module Number: E33

Ambient Temperature: 72 °F

Reference std. thermocouple calibrator: Omega Engineering, Inc. Model No. CL23A *
Reference std. thermocouple calibrator serial number: T-236796
Date of reference std. calibration verification: 5/31/2018
Due date of reference std. calibration verification: 5/31/2019

Reference Thermometer (°F)	Thermometer Under Test (°F)	Temperature Difference (%)
0	0	0.0
600	600	0.0
1200	1200	0.0

$$\text{Temperature Difference, \%} = \frac{\text{Ref. std. temp. (°F + 460)} - \text{Therm. under test temp. (°F + 460)}}{\text{Reference std temp. (°F + 460)}} \times 100 \leq 1.5\ \%$$

** Reference std. is directly traceable to NIST (National Institute of Standards and Technology)*

Post Meter Calibration Verification

Project Number: 437378
Last Test Run: 6/9/2021
Operator(s): Ryan Novosel

	Run 1	Run 2	Run 3	Average
Console/Meter ID:	E33	E33	E33	N/A
Run Time (min):	96	96	96	
V_m (cf):	60.325	62.715	61.883	
T_m (°R):	546.65	547.36	547.15	
P_{bar} ("H_g):	29.11	29.14	29.11	
DH_{avg} ("H_2O):	1.21	1.23	1.21	
M_d:	29.47	29.42	29.42	
Orifice $\Delta H_{@i}$:	1.801	1.801	1.801	
Meter Y_i:	0.991	0.991	0.991	0.991
Y_{qa}:	0.999	0.972	0.975	0.982

Difference between average Y_{qa} and Y_i: 0.9%

Calibration Status: Pass

Specification: USEPA Method 5, Section 16.3, *Alternative Post-Test Metering System Calibration*
The average Y_{qa} must be within 5% of Y_i

Post Test Leak Checks				Specification:
Train Leak Check:	Pass	Pass	Pass	(≤ 0.020 CFM)
Pump/Orifice Leak Checl	Pass	Pass	Pass	(= 0" @ 5-7" H_20)

Field Calibration Tool Identification

Analyst:	Ryan Novosel
Date:	6/9/2021
Project Number:	437378
Client:	Primary Energy
Test Location:	HRCC Stack 201

Calibration Tools: Include all of the tools from the field calibration kit that you will be using on this project. (See SOP AM-CAL-025 for instructions on re-verification)

Item	ID#	S/N	Calibration Due Date
Digital Caliper	FK005-DC005	--	9/5/2021
Thermometer	TH005	91221541	9/5/2021
Barometer	BA005	160874750	8/12/2021
Calibration Weight	W100-005	8140	9/5/2021
Calibration Weight A	W500-005	4593	9/5/2021
Calibration Weight B	W500/2-005	4594	9/5/2021
Type A Angle Finder	AF005	--	9/5/2021
Plastic/Magnetic Torpedo Level	TL005	--	--

Pre-Test Thermocouple Calibration Checks

Analyst:	Ryan Novosel
Date:	6/9/2021
Project Number:	437378
Client:	Primary Energy
Test Location:	HRCC Stack 201

(See SOP AM-CAL-005 for instructions)

Console/Meter Box ID #	E33
Probe ID#	727
Test Location/Measurement Point Info:	Stack
NIST Thermometer ID #	TH005

Procedure 1: Calibrate thermocouple against a reference thermometer.

After each test run series, check the accuracy (and, hence, the calibration) of each thermocouple system at ambient temperature, or any other temperature, within the range specified by the manufacturer, using a reference thermometer.

Procedure 2: Check the response of the thermocouple to a change in temperature.

Check the "continuity" of the thermocouple by subjecting it to a change in temperature (e.g., removing it from the stack or touching an ice cube). This step will also check for loose connections and reversed connections.

Measurement	T/C Temp, °F	NIST Thermometer Temp, °F	Difference, °F (± 2)	Continuity Check	Overall Status
Stack	81	81.4	0.4	Pass	Pass
Filter	82	82.9	0.9	Pass	Pass
Impinger Exit	82	83	1.0	Pass	Pass
Meter in	81	81.7	0.7	Pass	Pass
Meter Out	81	81.4	0.4	Pass	Pass
Probe	81	81.9	0.9	Pass	Pass
Other					
Other					

Notes:

Post-Test Thermocouple Calibration Checks

Analyst:	Ryan Novosel
Date:	6/9/2021
Project Number:	437378
Client:	Primary Energy
Test Location:	HRCC Stack 201

(See SOP AM-CAL-005 for instructions)

Console/Meter Box ID #	E33
Probe ID#	727
Test Location/Measurement Point Info:	Stack
NIST Thermometer ID #	TH005

Procedure 1: Calibrate thermocouple against a reference thermometer.

After each test run series, check the accuracy (and, hence, the calibration) of each thermocouple system at ambient temperature, or any other temperature, within the range specified by the manufacturer, using a reference thermometer.

Procedure 2: Check the response of the thermocouple to a change in temperature.

Check the "continuity" of the thermocouple by subjecting it to a change in temperature (e.g., removing it from the stack or touching an ice cube). This step will also check for loose connections and reversed connections.

Measurement	T/C Temp, °F	NIST Thermometer Temp, °F	Difference, °F (± 2)	Continuity Check	Overall Status
Stack	88	89	1.0	Pass	Pass
Filter	88	89	1.0	Pass	Pass
Impinger Exit	89	89.5	0.5	Pass	Pass
Meter in	89	89.4	0.4	Pass	Pass
Meter Out	89	89.3	0.3	Pass	Pass
Probe	88	88.6	0.6	Pass	Pass
Other					
Other					

Notes:

PRE-TEST TYPE S PITOT TUBE INSPECTION

(See SOP AM-CAL-006 for Instructions)

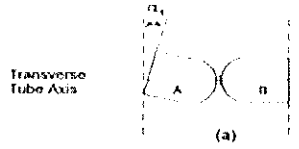
Pitot Tube No. : 727 Date: 6/9/2021 Analyst: Ryan Novosel

Project Number: 437378 Client: Primary Energy Test Location: HRCC Stack 201

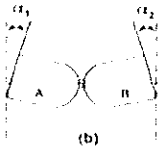
Type S Pitot tube face openings meet alignment specifications illustrated in Figures 2-2 and 2-3 of Method 2?

x yes _____ no

Comments: _____



Limit:
$\alpha_1 < 10°$



Limit:
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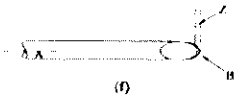
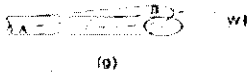
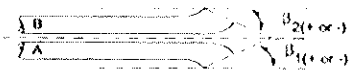


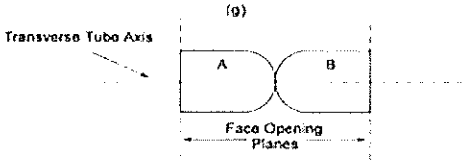
Limit:
$Z \leq 1/8$ (0.125) inch



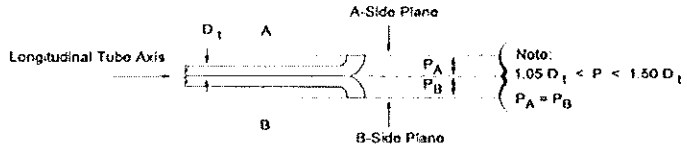
Limit:
$W \leq 1/32$ (0.0132) inch



Limit:
$\beta_1 < 5°$
$\beta_2 < 5°$



Requirement:
Face opening planes perpendicular to transverse axis



Requirement:
Face opening planes parallel to longitudinal axis

Requirement:
Both legs of equal length and centerlines coincident when viewed

POST-TEST TYPE S PITOT TUBE INSPECTION

(See SOP AM-CAL-006 for Instructions)

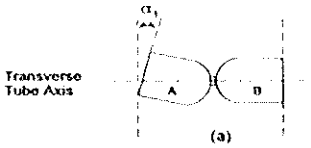
Pitot Tube No. : 727 Date: 6/9/2021 Analyst: Ryan Novosel

Project Number: 437378 Client: Primary Energy Test Location: HRCC Stack 201

Type S Pitot tube face openings meet alignment specifications illustrated in Figures 2-2 and 2-3 of Method 2?

x yes _____ no

Comments: _____



Limit:
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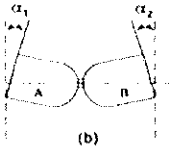

Limit:
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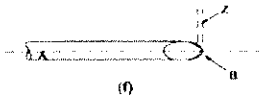
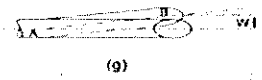
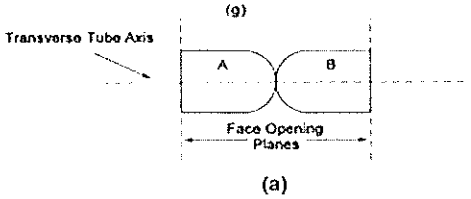


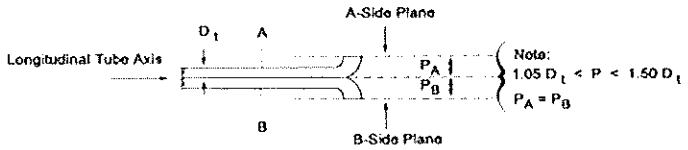
Limit:
$Z \leq 1/8$ (0.125) inch



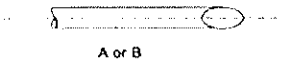
Limit:
$W \leq 1/32$ (0.0132) inch



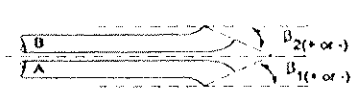
Requirement:
Face opening planes perpendicular to transverse axis



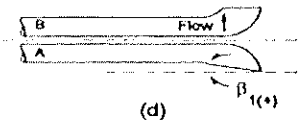
Requirement:
Face opening planes parallel to longitudinal axis



Requirement:
Both legs of equal length and centerlines coincident when viewed



Limit:
$\beta_1 < 5°$
$\beta_2 < 5°$

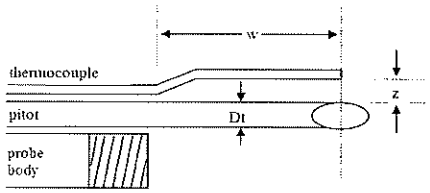


PRE-TEST PITOT TUBE ASSEMBLY INSPECTION

Analyst:	Ryan Novosel
Date:	6/9/2021
Project Number:	437378
Test Location:	HRCC Stack 201
EPA Probe Configuration:	Method 5

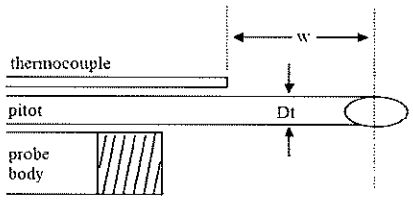
Pitot Assembly Intercomponent Spacings Meet Requirements x Yes _____ No
(See SOP AM-CAL-006 for Instructions)

Configuration A

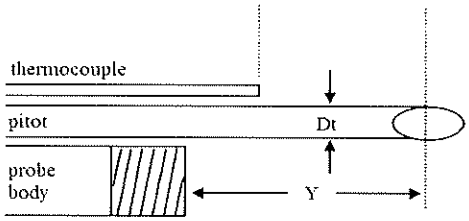


Requirements
D_t = ≥ 3/16" to ≤ 3/8"
W = ≥ 3 inches
Z = ≥ 0.75 inches

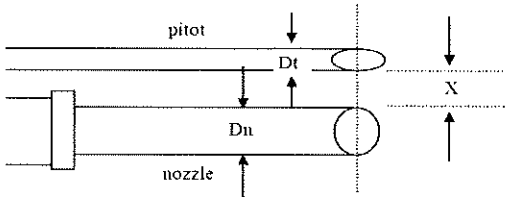
Configuration B



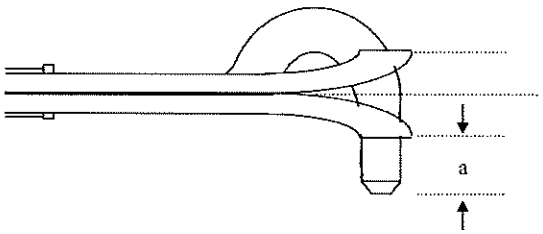
Requirements
D_t = ≥ 3/16" to ≤ 3/8"
W = ≥ 2 inches



Requirements
D_t = ≥ 3/16" to ≤ 3/8"



Requirements
D_t = ≥ 3/16" to ≤ 3/8"
X = ≥ 0.75 inches



Requirements

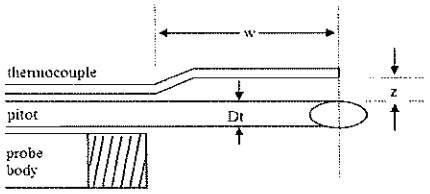
a = ≥ 0 inches

POST-TEST PITOT TUBE ASSEMBLY INSPECTION

Analyst:	Ryan Novosel
Date:	6/9/2021
Project Number:	437378
Test Location:	HRCC Stack 201
EPA Probe Configuration:	Method 5

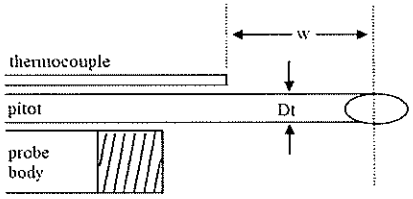
Pitot Assembly Intercomponent Spacings Meet Requirements x Yes ____ No
(See SOP AM-CAL-006 for Instructions)

Configuration A

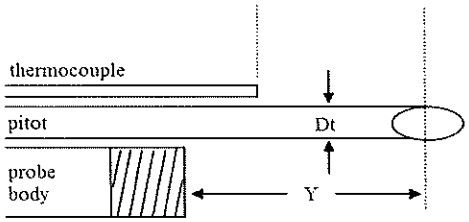


Requirements
D_t = ≥ 3/16" to ≤ 3/8"
W = ≥ 3 inches
Z = ≥ 0.75 inches

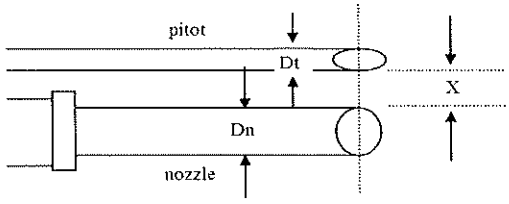
Configuration B



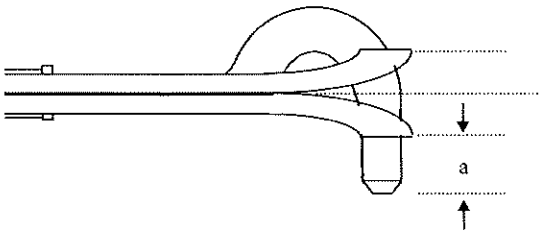
Requirements
D_t = ≥ 3/16" to ≤ 3/8"
W = ≥ 2 inches



Requirements
D_t = ≥ 3/16" to ≤ 3/8"



Requirements
D_t = ≥ 3/16" to ≤ 3/8"
X = ≥ 0.75 inches



Requirements

a = ≥ 0 inches

Top Loading Field Balance Check

Analyst:	Ryan Novosel
Project Number:	437378
Client:	Primary Energy
Test Location:	HRCC Stack 201

(See SOP AM-CAL-009 for instructions)

Type of Scale	Lab Top-loading Scale
Scale ID#	P1821017

Tolerance (g) = +/- **0.5**

Date	Reference Weight Serial Number	Nominal Weight Value* (g)	Weight Found (g)	Difference	Pass
6/9/21	4593	500.0	500.0	0.0	YES

*Weight (ASTM Class 6 or better) must be at least 500 g or within 50 g of loaded impinger.

Barometric Pressure Determination

Analyst:	Ryan Novosel
Date:	6/9/2021
Project Number:	437378
Client:	Primary Energy
Test Location:	HRCC Stack 201

Procedure: Use a NIST traceable field barometer for all field measurements. Bring the field barometer to the test location and allow 15 minutes for the instrument to stabilize prior to recording readings.

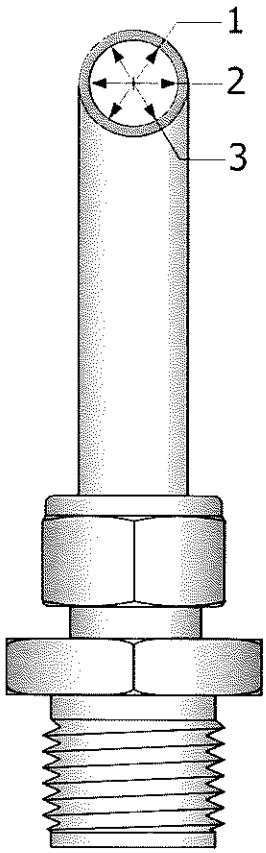
Date:	6/9/2021
Barometer Serial Number:	160874750
Barometer Pressure Prior to Testing:	29.11
Barometer Pressure After Testing:	29.11
Average Barometric Pressure:	29.11

Add reading? No

Nozzle Calibration

Analyst:	Ryan Novosel
Date:	6/9/2021
Project Number:	437378
Client:	Primary Energy
Test Location:	HRCC Stack 201

(See SOP AM-CAL-007 for Instructions)



Nozzle ID No.: 0.205

Maximum - Minimum ≤ 0.004 inches

Pre Test

0.205	**1**
0.205	**2**
0.206	**3**

PASS - measurements meet specifications.

Average
0.205

TRC

Response Time Verification

Project Number:	437378	Test Date:	6/9/2021
Customer:	Primary Energy	Facility:	Cokenergy Facility
Unit Identification:	HRCC	Recorded By:	Ben Cacao
Sample Location:	Stack 201		

Upscale Response Check							
Pollutant	Cal Gas Level	Cal Gas Conc.	Start Time	Stable Response	Upscale Target Response	Time at Target	Response Time
NO_X	-	-	-	-	-	-	-
SO_2	-	-	-	-	-	-	-
CO	-	-	-	-	-	-	-
CO_2	Mid	8.80	7:24:00	9.04	8.59	7:25:00	0:01:00
O_2	Mid	10.19	7:24:00	10.24	9.73	7:25:00	0:01:00

Target Response is 95% of the Pre 1 System Response from the Upscale Bias Test

Start time is the time at which gas is introduced upstream of the probe.

Time at target is the time at which the required target response is achieved.

Response time is the difference between the two.

Downscale Response Check						
Pollutant	Cal Gas Level	Cal Gas Conc.	Start Time	Downscale Target Response	Time at Target	Response Time
NO_X	-	-	-	-	-	-
SO_2	-	-	-	-	-	-
CO	-	-	-	-	-	-
CO_2	Mid	8.80	7:28:00	0.44	7:29:00	0:01:00
O_2	Mid	10.19	7:28:00	0.51	7:29:00	0:01:00

Target Response is 0.5 ppm or 5.0 percent of the upscale gas concentration (whichever is less restrictive)

System Response Times	
Pollutant	**Response Time**
NO_X	**0:00:00**
SO_2	**0:00:00**
CO	**0:00:00**
CO_2	**0:01:00**
O_2	**0:01:00**

System response is the longer of the responses to zero and upscale gas.

ANALYZER INTERFERENCE RESPONSE TEST

USEPA Reference Method: 3A Analyzer Type: CO_2

Analyzer Manufacturer: Servomex Model Number: 1440

Analyzer Span: 0-20%

Test Performed by: D. Grabowski Date: 1/23/1998

Interference Gas	Interference Gas Concentration	Affect of Interference Gas on Analyzer	
		Analyzer Response, ppm	Percent of Span
NO_x	498.0 ppm	-0.02	-0.10
SO_2	208.9 ppm	-0.02	-0.10
CO	450.7 ppm	-0.02	-0.10
CO_2	10.06%	--	--
O_2	22.5%	-0.02	-0.10
	Total Response (sum)	-0.04	-0.40

Total affect on analyzer reading must be < 2% of analyzer span.

Detailed interference response test data is maintained on file and is available upon request.

ANALYZER INTERFERENCE RESPONSE TEST

USEPA Reference Method: 3A Analyzer Type: O_2

Analyzer Manufacturer: Servomex Model Number: 1440

Analyzer Span: 0-25%

Test Performed by: D. Grabowski Date: 1/23/1998

Interference Gas	Interference Gas Concentration	Affect of Interference Gas on Analyzer	
		Analyzer Response, ppm	Percent of Span
NO_x	498.0 ppm	0.02	0.08
SO_2	208.9 ppm	0.02	0.08
CO	450.7 ppm	0.00	0.00
CO_2	10.06%	0.00	0.00
O_2	22.5%	--	--
	Total Response (sum)	0.04	0.16

Total affect on analyzer reading must be < 2% of analyzer span.

Detailed interference response test data is maintained on file and is available upon request.

Airgas
an Air Liquide company

Airgas Mid-West region
Airgas USA, LLC
1601 Nicholas Blvd
Elk Grove, IL 60007
Airgas.com

CERTIFICATE OF BATCH ANALYSIS

Grade of Product: CEM-CAL ZERO

Part Number:	NI CZ15A	Reference Number:	136-402054703-1
Cylinder Analyzed:	CC126284	Cylinder Volume:	142.0 CF
Laboratory:	192 - Elk Grove (SAP) - IL	Cylinder Pressure:	2000 PSIG
Analysis Date:	Mar 04, 2021	Valve Outlet:	580
Lot Number:	136-402054703-1		

Expiration Date: Mar 04, 2029

ANALYTICAL RESULTS

Component	Requested Purity	Certified Concentration
NITROGEN	99.9995 %	99.9995 %
CARBON DIOXIDE	< 1.0 PPM	0.14 PPM
NOx	< 0.1 PPM	< 0.1 PPM
SO2	< 0.1 PPM	< 0.1 PPM
THC	< 0.1 PPM	0.076 PPM
CARBON MONOXIDE	< 0.5 PPM	<LDL 0.04 PPM

Permanent Notes: Airgas certifies that the contents of this cylinder meet the requirements of 40 CFR 72.2

Cylinders in Batch:

CC126284, CC235351, CC276618, CC313926, CC478855, SG9182147BAL

Impurities verified against analytical standards traceable to NIST by weight and/or analysis.

Signature on file
Approved for Release

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
12722 S. Wentworth Ave.
Chicago, IL 60628
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E03NI81E15A37P2	Reference Number:	54-401917068-1
Cylinder Number:	CC432856	Cylinder Volume:	150.3 CF
Laboratory:	124 - Chicago (SAP) - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12020	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	Sep 25, 2020

Expiration Date: Sep 25, 2028

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	9.000 %	8.795 %	G1	+/- 0.5% NIST Traceable	09/25/2020
OXYGEN	10.00 %	10.19 %	G1	+/- 0.7% NIST Traceable	09/25/2020
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	08010526	K020991	4.954 % CARBON DIOXIDE/NITROGEN	+/- 0.5%	Dec 14, 2023
NTRM	98050916	SG9168259BAL	16.04 % OXYGEN/NITROGEN	+/- 0.6%	Oct 06, 2021

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO2-1 HORIBA VIA-510 V1E3H7P5	NDIR	Sep 24, 2020
O2-1 HORIBA MPA-510 3VUYL9NR	Paramagnetic	Sep 10, 2020

Triad Data Available Upon Request

Signature on file
Approved for Release

Airgas
an Air Liquide company

Airgas Specialty Gases
Airgas USA, LLC
12722 S. Wentworth Ave.
Chicago, IL 60628
Airgas.com

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Part Number:	E03NI60E15A1069	Reference Number:	54-401484876-1
Cylinder Number:	CC346448	Cylinder Volume:	158.2 CF
Laboratory:	124 - Chicago (SAP) - IL	Cylinder Pressure:	2015 PSIG
PGVP Number:	B12019	Valve Outlet:	590
Gas Code:	CO2,O2,BALN	Certification Date:	Apr 30, 2019

Expiration Date: Apr 30, 2027

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a mole/mole basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	18.00 %	17.84 %	G1	+/- 0.9% NIST Traceable	04/30/2019
OXYGEN	22.00 %	22.17 %	G1	+/- 0.7% NIST Traceable	04/30/2019
NITROGEN	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	13060817	CC416652	24.04 % CARBON DIOXIDE/NITROGEN	+/- 0.6%	May 16, 2019
NTRM	15010420	K027067	22.454 % OXYGEN/NITROGEN	+/- 0.2%	Aug 05, 2021

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
CO2-1 HORIBA VIA-510 V1E3H7P5	NDIR	Apr 27, 2019
O2-1 HORIBA MPA-510 3VUYL9NR	Paramagnetic	Apr 25, 2019

Triad Data Available Upon Request

Signature on file
Approved for Release

TRC

Isokinetic Test Support Data

Company: COKE ENERGY
Plant: EAST CHICAGO
Unit ID: HRCE
Location: STACK

Project#: 437378
Test Method(s): 12
Test Run #: 1
Test Date(s): 6-9-21

Console Operator: RN
Console ID: E33
Meter Y: .991
Orifice $\Delta H_{@}$: 1.891
Pitot Tube ID: 727
Cal. coefficient (C_p): .840
Probe Liner Material: GLASS
Nozzle Material: SS
Nozzle Diameter (D_n): .205 in

Unit Operating Mode: Normal
Duct Shape/Area: Round / 254.47 ft²
F_d Factor: dscf/MMBtu
F_c Factor: scf/MMBtu
F_w Factor: wscf/MMBtu
Fuel heat content: Btu /
Process/fuel flow rate:
Soot blown? N/A Fuel Type:
Duration: N/A min

Sample collection time
Total # of points: 12
Target Sample time/point: 8 min
Target run duration: 96 min

Barometric Pressure (P_{bar}): 28.11 in Hg
Stack Static Pressure (P_g): -1.2 in H2O
Stack Pressure (P_s): 29.02 in Hg

Imp #	Contents	Tare wt. (grams)	Final wt: (grams)
1	0.1N HNO3	727.9	880
2	0.1N HNO3	642.5	685.6
3	Empty	643.8	649.4
4	Silica	730.3	748.5
			748.2
			07/07/2021
			KEM

Net grams (M_{H2O}): 221.5
221.2
07/07/2021
KEM

Leak Checks
Pre-Test Train Leak Check: .004 CFM @ 16 "Hg
Pre-Test Pitot Leak Check: PASS (Pass or Fail)
Post-Test Train Leak Rate: .004 CFM @ 16 "Hg
Post-Test Pitot Leak Check: Pass (Pass or Fail)
Pump/Orifice Leak Check: Pass (Pass or Fail)
Filter/Thimble ID: --
Tare Weight: -- grams

Gas Molecular Weight Method: 3A INSTRUMENTAL
% CO_2: 6.2 %vol dry
% O_2: 12 %vol dry
% Nitrogen + % CO: 81.80 %vol dry
M_d - dry basis: 29.47 lb/lb-mole

Description of Filter and Front Half Rinses:

Description of Impinger liquid:

General Comments:

TRC

Company: COKE ENERGY
Plant: EAST CHICAGO
Unit: HRSG
Location: STACK

Job #: 437378
Methods: 12
Run #: 1
Traverse Sheet: ____ of ____

Test Date: 6-9-21
X-Factor: 1,480
Minutes/pt: 4

Port & Point ID	Clock Time	Meter Volume ft^3	ΔP in. H_2O	Stack °F	Dry Gas Meter Inlet °F	Dry Gas Meter Outlet °F	Orifice ΔH in. H_2O	This data not entered in Excel: Probe Liner °F	Filter Outlet °F	Impinger Train Outlet °F	Impinger Train CPM Filter °F	Pump Vacuum In. Hg
1-1	738	762.5	1.2	270	84	84	1.3	261	260	57	NA	4
1	742	765.16	1.2	270	85	84	1.3	261	260	57		4
2	746	767.73	1.2	271	85	84	1.3	262	260	57		4
2	750	770.28	1.2	271	86	85	1.3	262	260	58		4
3	754	772.65	.92	270	86	85	1.0	262	260	58		4
3	758	775.27	.92	270	86	85	1.0	262	260	58		4
	802	777.7										
2-1	805	777.7	1.2	271	86	86	1.3	262	260	58		4
1	809	780.22	1.2	271	87	86	1.3	262	259	59		4
2	813	782.75	1.1	270	88	86	1.2	261	259	59		4
2	817	785.31	1.1	270	88	86	1.2	261	259	59		4
3	821	787.85	1.0	270	88	87	1.1	261	259	60		4
3	825	790.32	1.0	270	89	87	1.1	261	260	60		4
	829	792.781										
3-1	832	792.751	1.2	271	88	87	1.3	261	260	61		4
1	836	795.31	1.2	271	88	88	1.3	261	260	61		4
2	840	797.75	1.3	271	89	88	1.3	261	259	61		4
2	844	800.43	1.3	271	89	88	1.3	261	260	62		4
3	848	803	1.0	271	89	88	1.1	261	260	62		4
3	852	805.5	1.0	271	90	88	1.1	261	260	62		4
	856	808										
4-1	859	808	1.1	271	87	87	1.2	261	260	63		4
1	903	810.52	1.1	271	87	87	1.2	262	259	63		4
2	907	813.98	1.1	270	88	87	1.2	262	260	63		4
2	911	815.42	1.1	270	88	87	1.2	262	260	64		4
3	915	817.86	1.1	270	89	88	1.2	261	260	64		4
3	919	820.35	1.1	271	89	88	1.2	261	260	64		4
	923	822.825										

Comments/notes:

TRC

Isokinetic Test Support Data

Company: COKE ENERGY
Plant: EAST CHICAGO
Unit ID: HRSG
Location: STACK

Project#: 437378
Test Method(s): 5 / 12
Test Run #: 2
Test Date(s): 6-9-21

Console Operator: RN
Console ID: E33
Meter Y: .991
Orifice $\Delta H_{@}$: 1.801
Pitot Tube ID: 737
Cal. coefficient (C_p): .84
Probe Liner Material: GLASS
Nozzle Material: SS
Nozzle Diameter (D_n): .205 in

Unit Operating Mode: Normal
Duct Shape/Area: Round / 254.47 ft²
F_d Factor: ____ dscf/MMBtu
F_c Factor: ____ scf/MMBtu
F_w Factor: ____ wscf/MMBtu
Fuel heat content: ____ Btu / ____
Process/fuel flow rate: ____ ____ ____
Soot blown? N/A Fuel Type: ____
Duration: N/A min

Sample collection time
Total # of points: 12
Target Sample time/point: 8 min
Target run duration: 96 min

Barometric Pressure (P_{bar}): 29.14 in Hg
Stack Static Pressure (P_g): -1.2 in H2O
Stack Pressure (P_s): 29.05 in Hg

Imp #	Contents	Tare wt. (grams)	Final wt: (grams)
1	0.1N HNO3	655.8	832.1
2	0.1N HNO3	745.4	767.5
3	Empty	562.4	564.6
4	Silica	701.5	715.5

Net grams (M_{H2O}): 215.2

Leak Checks
Pre-Test Train Leak Check: .003 CFM @ 15 "Hg
Pre-Test Pitot Leak Check: PASS (Pass or Fail)
Post-Test Train Leak Rate: .003 CFM @ 15 "Hg
Post-Test Pitot Leak Check: PASS (Pass or Fail)
Pump/Orifice Leak Check: PASS (Pass or Fail)
Filter/Thimble ID: --
Tare Weight: -- grams

Gas Molecular Weight Method:
3A INSTRUMENTAL
% CO_2: 5.8 %vol dry
% O_2: 12.4 %vol dry
% Nitrogen + % CO: 81.80 %vol dry
M_d - dry basis: 29.42 lb/lb-mole

Description of Filter and Front Half Rinses:

Description of Impinger liquid:

General Comments:

TRC

Company: COKE ENERGY
Plant: EAST CHICAGO
Unit: HRSG
Location: STACK

Job #: 437378
Methods: 12
Run #: 2
Traverse Sheet: ____ of ____

Test Date: 6-9-21
X-Factor: 1.480
Minutes/pt: 4

Port & Point ID	Clock Time	Meter Volume ft³	ΔP in. H_2O	Stack °F	Dry Gas Meter Inlet °F	Dry Gas Meter Outlet °F	Orifice ΔH in. H_2O	This data not entered in Excel: Probe Liner °F	Filter Outlet °F	Impinger Train Outlet °F	Impinger Train CPM Filter °F	Pump Vacuum in. Hg
1-1	951	825.3	1.2	271	87	88	1.3	260	259	56	NA	4
1	955	828.01	1.2	271	87	88	1.3	260	259	56		4
2	959	830.72	1.1	271	87	87	1.3	260	258	56		4
2	1003	833.37	1.1	271	88	87	1.3	260	258	56		4
3	1007	836.04	.98	270	88	87	1.1	261	258	57		4
3	1011	838.70	.99	270	89	87	1.1	261	258	57		4
	1015	841.341										
2-1	1018	841.341	1.2	270	88	87	1.3	261	258	57		4
1	1022	844	1.2	270	88	87	1.3	261	258	58		4
2	1026	846.87	1.2	270	88	87	1.3	261	259	58		4
2	1030	849.23	1.2	270	89	88	1.3	261	259	58		4
3	1034	851.88	1.1	270	89	87	1.2	261	259	59		4
3	1038	854.47	1.1	270	90	88	1.2	261	259	59		4
	1042	857.078										
3-1	1045	857.078	1.2	271	88	87	1.3	261	259	59		4
1	1049	859.70	1.2	271	88	88	1.3	261	258	60		4
2	1053	862.29	1.1	271	88	88	1.2	260	258	60		4
2	1057	864.88	1.1	271	89	88	1.2	260	258	60		4
3	1101	867.47	.96	270	89	88	1.2	260	259	61		4
3	1105	870.04	.96	270	89	88	1.2	260	259	61		4
	1109	872.611										
4-1	1112	872.611	1.3	269	88	87	1.3	260	258	61		4
1	1116	875.21	1.3	269	88	87	1.3	260	258	62		4
2	1120	877.77	1.3	269	89	88	1.3	260	258	62		4
2	1124	880.34	1.2	269	89	88	1.3	261	258	63		4
3	1128	882.92	.97	269	89	88	1.1	261	258	63		4
3	1132	885.45	.97	269	90	88	1.1	26	258	63		4
	1136	888.015										

Comments/notes:

TRC

Isokinetic Test Support Data

Company: COKE ENERGY
Plant: EAST CHICAGO
Unit ID: HRSG
Location: STACK

Project#: 437378
Test Method(s): 12
Test Run #: 3
Test Date(s): 6-9-21

Console Operator: RN
Console ID: E33
Meter Y: .991
Orifice $\Delta H_{@}$: 1.801
Pitot Tube ID: 727
Cal. coefficient (C_p): .84
Probe Liner Material: GLASS
Nozzle Material: SS
Nozzle Diameter (D_n): .205 in

Unit Operating Mode: Normal
Duct Shape/Area: Round / 254.47 ft²
F_d Factor: dscf/MMBtu
F_c Factor: scf/MMBtu
F_w Factor: wscf/MMBtu
Fuel heat content: Btu /
Process/fuel flow rate:
Soot blown? N/A Fuel Type:
Duration: N/A min

Sample collection time
Total # of points: 12
Target Sample time/point: 5 min
Target run duration: 96 min

Barometric Pressure (P_{bar}): 29.11 in Hg
Stack Static Pressure (P_g): -1.0 in H2O
Stack Pressure (P_s): 29.02 in Hg

Imp #	Contents	Tare wt. (grams)	Final wt: (grams)
1	0.1N HNO3	761.3	927
2	0.1N HNO3	640.1	663.6
3	Empty	591.9	594.2
4	Silica	842.7	857.8

Net grams (M_{H2O}): 206.6

Leak Checks
Pre-Test Train Leak Check: .005 CFM @ 15 "Hg
Pre-Test Pitot Leak Check: PASS (Pass or Fail)
Post-Test Train Leak Rate: .004 CFM @ 15 "Hg
Post-Test Pitot Leak Check: PASS (Pass or Fail)
Pump/Orifice Leak Check: PASS (Pass or Fail)
Filter/Thimble ID: --
Tare Weight: -- grams

Gas Molecular Weight Method: BY INSTRUMENTAL
% CO_2: 5.7 %vol dry
% O_2: 12.6 %vol dry
% Nitrogen + % CO: 81.70 %vol dry
M_d - dry basis: 29.42 lb/lb-mole

Description of Filter and Front Half Rinses:

Description of Impinger liquid:

General Comments:

TRC

Company: Calpine Energy
Plant: East Chicago
Unit: HRSG
Location: Stack

Job #: 437378
Methods: 12
Run #: 3
Traverse Sheet: ___ of ___

Test Date: 6-9-21
X-Factor: 1.480
Minutes/pt: 4

									This data not entered in Excel				
					Dry Gas Meter						Impinger Train		
Port & Point ID	Clock Time	Meter Volume ft³	ΔP in. H_2O	Stack °F	Inlet °F	Outlet °F	Orifice ΔH in. H_2O	Probe Liner °F	Filter Outlet °F	Outlet °F	CPM Filter °F	Pump Vacuum in. Hg
1-1	1200	888.50	1.2	268	86	85	1.3	259	262	55	NA	4
1	1204	891.01	1.2	265	86	86	1.3	259	262	55		4
2	1208	893.65	1.2	265	87	86	1.3	259	262	55		4
2	1212	896.27	1.2	269	87	86	1.3	260	262	56		4
3	1216	898.88	1.0	268	87	87	1.1	260	262	56		4
3	1220	901.48	1.0	268	88	87	1.1	260	262	56		4
	1224	904.073										
2-1	1227	904.073	1.1	269	87	87	1.2	260	261	56		4
1	1231	906.63	1.1	269	87	87	1.2	260	261	57		4
2	1235	909	1.1	268	87	87	1.2	260	262	57		4
2	1239	911.68	1.1	268	87	87	1.2	260	262	57		4
3	1243	914.18	.93	268	88	87	1.0	260	262	57		4
3	1247	916.69	.93	265	89	87	1.0	259	262	58		4
	1251	919.19										
3-1	1254	919.19	1.2	268	88	87	1.3	259	261	55		4
1	1258	921.81	1.2	268	88	88	1.3	259	261	58		4
2	1302	924.41	1.3	267	90	88	1.3	259	262	58		4
2	1306	927.02	1.2	265	90	89	1.3	259	262	59		4
3	1310	929.62	1.0	268	90	89	1.1	258	262	60		4
3	1314	932.22	1.0	268	91	89	1.1	259	262	60		4
	1318	934.828										
4-1	1321	934.828	1.2	269	88	88	1.3	258	262	60		4
1	1325	937.99	1.2	270	88	88	1.3	259	261	61		4
2	1329	940.04	1.2	267	89	88	1.3	260	261	61		4
2	1333	942.63	1.2	267	91	88	1.3	260	261	61		4
3	1337	945.22	.97	267	90	89	1.1	260	263	62		4
3	1341	947.81	.97	267	90	89	1.1	260	262	62		4
	1345	950.383										

Comments/notes:

M4 MOISTURE ANALYSIS DATA SHEET

Client Name	PINMAN ENERGY	Project Number	437378
Plant Name	COKENERGY FACILITY	Sample Method	M4
City / State	EAST CHICAGO, IN	Recovery Location	MOBILE LAB (T24)
Test Location	STACK 201	Analyst Signature	

Run Number	1	2	3	
Test Date	6-9-21	6-9-21	6-9-21	
Recovery Date	6-9-21	6-9-21	6-9-21	
Recovered By	B. CACAO	B. CACAO	B. CACAO	
Impinger 1 0.1N HNO_3				
Final Weight, g	882.0	832.1	927.0	
Initial Weight, g	727.4	655.8	761.3	
Net weight, g	154.6	176.3	165.7	
Impinger 2 0.1N HNO_3				
Final Weight, g	685.6	767.8	663.6	
Initial Weight, g	642.5	745.4	640.1	
Net weight, g	43.1	22.4	23.5	
Impinger 3 EMPTY				
Final Weight, g	649.4	564.6	594.2	
Initial Weight, g	643.8	562.4	591.9	
Net weight, g	5.6	2.2	2.3	
Impinger 4 SILICA				
Final Weight, g	748.2	815.8	857.8	
Initial Weight, g	730.3	801.5	842.7	
Net weight, g	17.9	14.3	15.1	
Impinger 5 _____				
Final Weight, g				
Initial Weight, g				
Net weight, g				
Impinger 6 _____	FRONT HALF RINSE = 100 ml	FRONT HALF RINSE = 100 ml	FRONT HALF RINSE = 100 ml	
Final Weight, g	BACK HALF RINSE = 220 ml	BACK HALF RINSE = 220 ml	BACK HALF RINSE = 220 ml	
Initial Weight, g				
Net weight, g				
Impinger 7 _____				
Final Weight, g	CO_2 = 6.2	CO_2 = 5.8	CO_2 = 5.7	
Initial Weight, g	O_2 = 12.0	O_2 = 12.4	O_2 = 12.6	
Net weight, g				
Total Catch, g	221.2 ✓	215.2 ✓	206.6 ✓	

Balance ID:	P1821017
Weight ID:	4588
Weight (g):	500

	Y or N	Date
weight reading within 0.5g?	Y	6-9-21
weight reading within 0.5g?		
weight reading within 0.5g?		
weight reading within 0.5g?		

Checked By: _____ Date:

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LUKE FORD
219-397-4626
COKENERGY
3210 WATLING STREET
EAST CHICAGO IN 46312

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IN. DEPT. OF ENVIRONMENTAL MANAGEME
CHIEF AIR COMPL AND ENFORCEMENT BRA
MC-61-53, IGCN 1003
100 NORTH SENATE AVENUE
INDIANAPOLIS IN 46204

IN 461 9-01

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BILLING: P/P

XOL 21.06.14 NV45 29.0A 07/?

CARR: UPS GROUND
TRK#: 1ZF349F80392854412
RCVD: 7/22/2021 8:02:45 AM

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ROUTE: IDEM
MSC:

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From: Ford, Luke
To: IDEM Test Protocol
Subject: RE: Cokenergy T089-41033-00383 RATA/Lead Test Notification
Date: Monday, May 24, 2021 9:36:06 AM
Attachments: image002.png
image001.png
CE_2021_14day_Test_Notification_052421.pdf

Attached please find the 14 day test notification for planned relative accuracy tests audit (RATA) and lead stack test scheduled to be completed at Cokenergy on June 8, 2021.

If there are any questions, please do not hesitate to contact me.

Luke E. Ford
Director EH&S
Primary Energy
3210 Watling St.
MC 2-991
East Chicago, IN 46312

Email lford@primaryenergy.com
Office (219) 397-4626
Mobile (773) 447-8257

Primary Energy®
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From: Ford, Luke
Sent: Tuesday, April 27, 2021 7:32 AM
To: IDEM Test Protocol <Test_Protocol@idem.IN.gov>
Subject: Cokenergy T089-41033-00383 RATA/Lead Test Notifications

Attached please find the test notifications for planned relative accuracy tests audit (RATA) and lead stack test scheduled to be completed at Cokenergy the week of June 7, 2021.

If there are any questions, please do not hesitate to contact me.

Regards,

Luke E. Ford

Director EH&S
Primary Energy
3210 Watling St.
MC 2-991
East Chicago, IN 46312

Email lford@primaryenergy.com
Office (219) 397-4626
Mobile (773) 447-8257

Cokenergy, LLC
3210 Watling Street MC 2-991
East Chicago, IN 46312

May 24, 2021

Via Electronic Mail

Indiana Department of Environmental Management
Compliance and Enforcement Branch
Office of Air Quality
100 N. Senate Avenue
Mail Code 61-53, IGCN 1003
Indianapolis, IN 46204 - 2251

Subject: Cokenergy, LLC 14-Day Test Notification
Part 70 Permit T089-41033-00383

To Whom It May Concern:

In accordance with 326 IAC 3-6-2 (h), Cokenergy, LLC hereby notifies you of an upcoming relative accuracy test audit (RATA) and stack test for lead. The testing is currently scheduled for the week of June 7, 2021 with a planned test date of June 8, 2021. The Test Protocol for RATA and lead testing was submitted on April 27, 2021.

If you have any questions, please contact me at (219) 397-4626.

Sincerely,

Luke E. Ford
Director EH&S
Primary Energy

File: X:\\ 613.2 and 674.4

From: Cline, Dave
To: FISHER, JARROD; Haun, Vivian
Subject: FW: Cokenergy T089-41033-00383 RATA/Lead Test Notifications - Compliance Protocol
Date: Tuesday, April 27, 2021 10:35:32 PM
Attachments: Cokenergy LLC Pb testing protocol.pdf
089-41033-00383.pdf
image002.png

JCF For review

From: IDEM Test Protocol <Test_Protocol@idem.IN.gov>
Sent: Tuesday, April 27, 2021 10:47 AM
To: Cline, Dave <DCLINE@idem.IN.gov>
Subject: Cokenergy T089-41033-00383 RATA/Lead Test Notifications - Compliance Protocol

Protocol to be assigned for review.

From: Ford, Luke <lford@primaryenergy.com>
Sent: Tuesday, April 27, 2021 8:32 AM
To: IDEM Test Protocol <Test_Protocol@idem.IN.gov>
Subject: Cokenergy T089-41033-00383 RATA/Lead Test Notifications

---

Attached please find the test notifications for planned relative accuracy tests audit (RATA) and lead stack test scheduled to be completed at Cokenergy the week of June 7, 2021.

If there are any questions, please do not hesitate to contact me.

Regards,

Luke E. Ford
Director EH&S
Primary Energy
3210 Watling St.
MC 2-991
East Chicago, IN 46312

Email lford@primaryenergy.com
Office (219) 397-4626
Mobile (773) 447-8257

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Efficiency is the Best Alternative Energy

Cokenergy LLC
3210 Watling Street MC 2-991
East Chicago, IN 46312

April 27, 2021 Electronic Submittal – Test_Potocol@idem.IN.gov

Indiana Department of Environmental Management
Compliance and Enforcement Branch
Office of Air Quality
100 North Senate Avenue
MC 61-53 IGCN 1003
Indianapolis, IN 46204-2251

Subject: Cokenergy, LLC Test Notifications
Part 70 Permit T089-41033-00383

To Whom It May Concern:

Please find enclosed the test notifications and sampling protocol for the upcoming relative accuracy test audit (RATA) and lead testing to be conducted at Cokenergy. We propose to complete the testing the week of June 7, 2021.

If you have any questions, please contact me at (219) 397-4626.

Sincerely,

Luke E. Ford
Director EH&S
Primary Energy

cc: N. Estrada, IHCC

File: X:\\ 613.2, 674.4

VOC AND TOXICS COMPLIANCE TEST PROTOCOL

State Form 55058 (7-12)
Indiana Department of Environmental Management
Office of Air Quality, Compliance Data Section

 # 256968

INSTRUCTIONS: Please complete this form and mail it back to: 100 N Senate Avenue, Mail Code 61-53, IGCN 1003, Indianapolis, IN 46204-2251; or fax it to: (317) 233-6865; or e-mail it to: Test_Protocol@idem.IN.gov.

Date Prepared: 04/27/2021 **Proposed Test Date:** 06/08/2021 **Plant Address:** 3210 Watling Street, MC 2-991 **Plant Location:** East Chicago

1. SOURCE INFO: ID/Permit No.: T089-41033-00383

Company: Cokenergy, LLC
Mail Address: 3210 Watling Street, MC 2-991
City, State, ZIP: East Chicago IN 46312
Company Contact: Luke Ford Telephone: (219) 397-4626

2. TEST COMPANY INFORMATION

Name: TRC Environmental
Address: 7521 Brush Hill Road
City, State, ZIP: Burr Ridge, IL A 60527
Contact: Gavin Lewis Telephone: (312) 533-2025

3. PROCESS INFORMATION *(Submit a separate form for each unit to test.)*

Unit to Test: Stack 201
Maximum Rated Capacity: 960 kpph
Proposed Operating Speed: Normal load of coke battery
Describe method used to determine operating level:
Steam Production Rate

Pollution Control Equipment: FGD and Baghouse
Process Description:
Electrical generator

List and describe organic raw materials used in process:
Waste heat from IHCC Coke Ovens

Person responsible for recording Process and Control Equipment data:
Luke Ford

Fuel Type: Waste Heat

4a. TEST INFORMATION	No. Runs	Time
Method 1-4	3	1.5 hr
Method 18		
Method 23		
Method 24		
Method 25		
Other: Method 12 (Lead)	3	1.5 hr

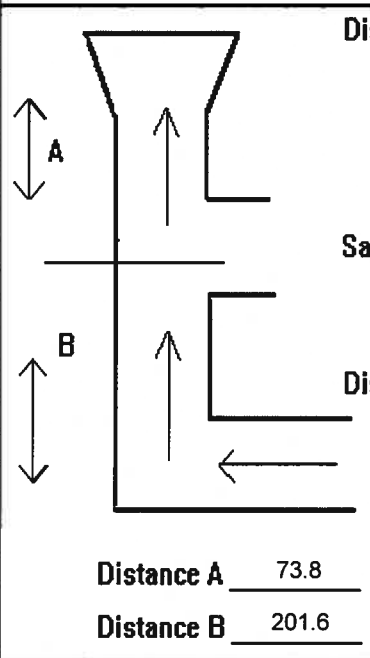
5. Check Applicable Program:

Title V: ☐ FESOP: ☐
SSOA: ☐ MSOP: ☐
Other: ☑ Specify: Consent decree

AGENCY USE ONLY:

Inspector: CYU
Reviewer: JCF
Date Received: 4-27-2021
Approval date:
Comments:

6. SAMPLE SITE LOCATION



Distance A 73.8
Distance B 201.6

Does sample port location meet 40 CFR 60, Appx. A, Method 1, Sec. 1.2 Requirements: ◉Yes / No○
If No, explain:

Approximate Stack gas flow (ACFM):	1,275,000.0
Approximate Stack gas temp (deg. F):	290.0
Approximate Stack gas moisture (%):	12.0

7. REASON FOR TEST:

Operating Permit:	○Yes / No○
Construction Permit:	○Yes / No○
If yes, Unit Start Up Date:	
State Agreed Order: Please include No.	
Title V:	○Yes / No○
Compliance with 326 IAC NSPS 40 CFR 60 Subpart ____:	○Yes / No○

Other (EPA, CD, State, 114):
Consent decree 18-cv-35, paragraph 22

4b. Capture Efficiency Testing

Test Information	No. Runs	Time
Permanent Enclosure Method:		
Temporary Enclosure Method:		
Data Quality Objective Method:		

326 IAC 3-6-2(a) requires this completed form to be submitted 35 days prior to the proposed test date to the above address. 326 IAC 2-1.1-7(6)(B) requires any applicable test fee to be submitted with the protocol. *(FEE NOT APPLICABLE IF PROGRAM IS FESOP, TITLE V OR VE TESTING ONLY.)*