

APPENDIX IV
FIELD DATA

8/9/10
Cycloniz form
8/9/10

Per A

Point

Q

7

1)

5

2)

7

3)

7

4)

7

5)

7

6)

7

7)

7

8)

8

9)

7

10)

6

11)

1

12)

-2

8/9/10
temp

134

AP 13

Per B

Point

Q

1)

5

2)

7

3)

8

4)

9

5)

7

6)

9

7)

7

8)

6

9)

5

10)

5

11)

5

12) - 3

CEM Calibration Summaries

Arrow Environmental Consulting, LLC

PO Box 3658

Easton PA 18043

Andy McNeel: (610) 597-1770

Fax: (610) 258-2470

Date: 9/14/16

Day: Tuesday

Fuel:

Nominal Firing Rate:

Observers: D. Stachek

Gas Type	Rack Pos.	Starting Cylinder Pressure (psi)	Standard Concentration (units)	Rack Calibration Response	Post Cal. Bias Response	Run-1 Cal. Drift Response	Run-2 Cal. Drift Response	Run-3 Cal. Drift Response	Run-4 Cal. Drift Response	Run-5 Cal. Drift Response	Ending Cylinder Pressure (psi)
O ₂			Zero	0.1	0.1	0.1	0.1	0.1	0.1	0.1	
			L								
			M 24.9	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
			H 3.0	5.1							
CO ₂			Zero	0.2	0.2	0.2	0.2	0.2	0.2	0.2	
			L								
			M 9.0	9.0							
			H 22.1	22.1	21.9	21.8	21.8	21.8	21.8	21.8	
CO			Zero	0.2	-0.2	-0.2	-0.2	-0.2	-0.2	-0.2	
			L								
			M 25.4	26.4	25.8	25.5	25.5	25.5	25.5	25.5	
			H 53.3	53.2							
NO _x			Zero	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
			L 54.8	54.1							
			M 11.3	11.0	11.0	11.0	11.0	11.0	11.0	11.0	
			H 22.8	22.8							
SO ₂			Zero	0.3	-0.4	1.0	0.9	0.7	0.7	0.7	
			L 42.0	41.6							
			M 1.1	84.5	87.5	90.5	90.0	90.2	90.2	90.2	
			H 19.9	19.7							
THC as			Zero		0.2	0.2	0.2	0.2	0.2	0.2	
			L 25.6		24.9						
			M 44.5		44.9	43.9	43.9	43.9	43.9	43.9	
			H 55.2		55.0						
CH ₄			Zero								
			L								
			M								
			H								
Run Times (start-stop)					0928	1050	1254	1414	1514	1614	
					1025	1150	1354	1454	1554	1654	

CE REF
0848
53.2
54.3 std

Post
DOx Conv.
check
time 1454
std 54.3 ppm
NO₂
response 53.2
ppm

01-04
2-60
3-106
4-002
5-710
6-502
7-024
8-000

Arrow Environmental Consulting, LLC

Date: 9-14-10
Day: _____
Fuel: _____
Rate: _____

Nominal Firing Rate:

[illegible]

Arrow Environmental Consulting, LLC

Fuel: _____
Nominal Firing Rate: _____

Arrow Environmental Consulting, LLC

Date: 9/16/10
Day: ~~Wednesday~~ Thurs

Fuel: _____

Nominal Firing Rate: _____

Observers:

243 243

Gas Type	Rack Pos.	Starting Cylinder Pressure (psi)	Standard Concentration (units)	ppmv Response	ppmv Response	ppmv Response	ppmv Response	ppmv Response	ppmv Response	Ending Cylinder Pressure (psi)
		Date:								
		Time:								
			Zero							
			L							
			M							
			H							
		Date:								
		Time:	8:12	8:23						
O ₂			Zero	0.4	0.1	0.0	0.1	0.0	0.0	
			L							
			M 2.49	2.5	2.5	2.4	2.5	2.4	2.4	
			H 5.0	5.0						
		Date:								
		Time:	8:12	8:23						
CO ₂			Zero	0.0	0.0	0.1	0.3	0.4		
			L							
			M 9.0	9.0						
			H 22.1	22.1	22.0	21.8	21.8	21.8		
					11.18	13.25	14.36	15.00		
					c/c					

NOx CE DATA	
DATE: _____	DATE: _____
Time: _____	Time: _____
NO2 concentration _____ ppm	NO2 concentration _____ ppm
Analyzer response: _____ ppm	Analyzer response: _____ ppm
Analyzer ID _____	Analyzer ID _____

10:05 start COS train
10:10 oxidize - sees Pump
11:25 Start Run 1
transition to NH3

Arrow Environmental Consulting, LLC
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Andy McNeel: (610) 597-1770
Fax: (610) 258-2470

Project : KESS

Observers:

Gas Type	Rack Pos.	Starting Cylinder Pressure (psi)	Standard Concentration (units)	Bias ppmv Response	POST ppmv Response	Ppmv Response	Bias ppmv Response	Ppmv Response	ppmv Response	Ending Cylinder Pressure (psi)
		Date:								
		Time:								
			Zero							
			L							
			M							
			H							
		Date:								
		Time:								
				9-17						
			Zero N ₂	0655	0.1	0.0	12.11	13.48	14.47	
O ₂			L					0.0	0.0	
			M 2.49	2.5	2.47	2.41	2.41	2.41	2.41	
			H 5.01	5.0						
		Date:								
		Time:		9-17						
				0655	0.15	12.11	13.48	14.47	16.47	
			Zero N ₂	0.0	0.2	0.4	1.4	0.5	NO.4	
CO ₂			L							
			M 9.0	9.0						
			H 22.1	22.1	21.8	22.1	22.1	22.10	22.1	
						12.11	13.48	14.45	15.44	
						CHECK			NORMAL	

DATE: _____
Time: _____
NO₂ concentration _____
Analyzer response: _____
Analyzer ID _____

DATE: _____
Time: _____
NO₂ concentration _____ ppm
Analyzer response: _____ ppm
Analyzer ID _____

CEM Calibration Summaries

Arrow Environmental Consulting, LLC
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Easton PA 18043
Andy McNeel: (610) 597-1770
Fax: (610) 258-2470

Project: Hess WGS
Cyanide R4
Observers: CFM 033
Date: 9/2/11
Day: Tues
Fuel: _____
Nominal Firing Rate: _____

Gas Type	Rack Pos	Starting Cylinder Pressure (psi)	Standard Concentration (units)	Rack Calibration Response	Post Cal. Bias Response	Run- Cal Drift Response	Run- Cal Drift Response	Run- Cal Drift Response	Run- Cal Drift Response	Run- Cal Drift Response	Run- Cal Drift Response	Ending Cylinder Pressure (psi)
O ₂			Zero	0.1	0.16	0.0						
			L									
			M 2.45	2.5	2.5	2.5						
			H 5.01	5.1								
CO ₂			Zero	0.0	0.0	0.3						
			L									
			M 9.0	8.8								
			H 22.1	22.1	21.9	21.9						
CO			Zero									
			L									
			M									
			H									
NO _x			Zero									
			L									
			M									
			H									
SO ₂			Zero									
			L									
			M									
			H									
THC as			Zero									
			L									
			M									
			H									
CH ₄			Zero									
			L									
			M									
			H									
Run Times (start-stop)						5.01						
						11.33						

Arrow Environmental Consulting, LLC

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Easton PA 18043
Andy McNeel: (610) 597-1770
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[illegible]

Facility: Hess
 Source: WGS/FCCU
CTM 033

Run # 1
 Date: 9-14-10
 Day: TUES

Stack Dimensions (inches): 91"
 Barometric Pressure (" Hg): 29.90
 Static Pressure (" H₂O): 0.85

Meter box ID: 5

ΔH @: 1.745

Y-factor: 0.996

CTM-033

Nozzle: .187 inches

Pitot lines leak-checked? ☒

Cp: .84

K-factor: .70

3mm/pt

Time	Port	Point	DGM (ft ³)	ΔP (" H ₂ O)	ΔH (" H ₂ O)	DGM (°F)	Stack Temp. (°F)	Probe Temp. (°F)	Probe Exit (°F)	Hotbox Temp. (°F)	Hotbox Exit (°F)	Imp. Exit Temp. (°F)	Vacuum (in. Hg)
920	A1	1	234.808	.76	.53	72	134	241		253		49	<3
923		2	276.0	1.0	.70	72	134	243		255		46	<3
926		3	277.2	1.3	.91	73	134	243		251		46	<3
929		4	278.7	1.4	.98	73	134	242		251		46	<4
932		5	240.3	1.5	1.05	75	134	243		257		46	<4
935		6	242.1	1.5	1.05	75	135	242		254		46	<4
938		7	243.7	1.55	1.07	77	135	240		254		49	<4
941		8	245.4	1.5	1.05	78	135	241		252		50	<4
944		9	247.1	1.45	1.02	78	135	242		251		51	4
947		10	248.8	1.45	1.02	79	135	241		256		51	4
950		11	250.5	1.3	.91	80	135	239		258		51	3.5
953		12	252.1	.94	.66	80	135	243		254		52	3.5
956		stop	253.808										
1028	B3	1	253.874	1.1	.77	84	135	240		257		61	3.5
1031		2	255.0	1.4	.98	85	135	243		256		53	4
1034		3	256.8	1.4	.98	85	135	240		263		49	4
1037		4	258.4	1.45	1.02	86	135	243		249		47	4.5
1040		5	260.0	1.45	1.02	86	135	242		251		48	4.5
1043		6	261.722	1.5	1.05	86	135	245		249		62	4
1120		7	263.4	1.4	.98	88	135	243		248		52	4
1123		8	265.1	1.4	.98	88	136	243		250		51	4
1126		9	266.8	1.3	.91	89	136	243		249		52	4
1129		10	268.5	1.2	.84	90	136	241		251		53	3+
1132		11	270.0	.90	.63	90	135	241		245		55	3+
1135		12	271.4	.54	.38	90	135	241		245		56	2+
1138		stop	272.734										

Pre A Impingers iced? ☒

0.000 ft³ @ 6 " Hg

Post A

0.010 ft³ @ 7 " Hg

Pre B Impingers iced? ☒

0.000 ft³ @ 7 " Hg

Post B

.006 ft³ @ 11 " Hg

Pre

Post B

0.000 ft³ @ 5 " Hg

Post B

0.000 @ 5 " Hg

Impinger Weights (gms)		vol (mls)
#	A pre	B post
1	90	30
2	5	3
3	0	
4		
IMPINGER WEIGHT		5 gm
SG	834.9	846.3

Filter ID:

Tare (gm):

TOTAL
170
8
0
11.4

Total 189.4

Facility: Hess
 Source: WGS/FCCU
CTM 033

Run # 2
 Date: 9-14-10
 Day: TUES

Stack Dimensions (inches): 91
 Barometric Pressure (" Hg): 29.89
 Static Pressure (" H₂O): +0.95

Meter box ID: 5

ΔH @: 1.745

Y-factor: 0.996

Nozzle: .107 inches

CMT 033

Pitot lines leak-checked? ☒

Cp: .84

K-factor: .70

3 min/pt

Time	Port	Point	DGM (ft ³)	ΔP (" H ₂ O)	ΔH (" H ₂ O)	DGM (°F)	Stack Temp. (°F)	Probe Temp. (°F)	Probe Exit (°F)	Hotbox Temp. (°F)	Hotbox Exit (°F)	Imp. Exit Temp. (°F)	Vacuum (in. Hg)
1256	B	1	272.771	1.1	.77	78	135	244		251		55	3.5
1259		2	274.2	1.2	.84	78	135	242		247		54	3.5
1302		3	275.7	1.3	.91	75	135	244		244		53	3.5
1305		4	277.4	1.3	.91	79	135	244		247		53	3.5
1308		5	279.0	1.4	.98	75	135	243		251		52	4.5
1311		6	280.5	1.4	.98	81	135	243		249		52	5.0
1340		7	282.2	1.35	.95	82	136	242		246		50	4.5
1343		8	283.8	1.35	.95	82	136	242		246		48	4.5
1346		9	285.5	1.2	.84	83	135	240		251		47	4.5
1349		10	287.0	1.1	.77	83	135	242		249		48	4
1352		11	288.5	.91	.64	83	135	241		256		48	3+
1355		12	289.9	.62	.43	84	135	241		247		49	3
1358		stop	291.023										
1419	A	1	291.078	.76	.53	82	135	235		244		53	3
1422		2	292.2	.80	.63	82	135	230		236		52	3+
1425		3	293.5	1.2	.84	82	135	241		250		51	4
1428		4	295.0	1.4	.98	82	135	237		246		50	4+
1431		5	296.7	1.4	.98	81	135	235		236		51	4+
1434		6	298.4	1.35	.95	79	135	230		235		56	4
1447		7	300.1	1.4	.98	79	135	236		242		53	4
1450		8	301.8	1.35	.95	79	135	250		236		52	4
1453		9	303.3	1.3	.91	79	135	256		249		52	4
1456		10	304.9	1.2	.84	79	135	263		248		54	3+
1459		11	306.5	1.1	.77	79	134	253		249		55	3+
1502		12	307.9	.83	.58	79	135	249		256		55	3
1505		stop	309.252										

⑥ Pre B Impingers iced? ☒

0.000 ft³ @ 5 " Hg

③ Pre B Impingers iced? ☒

0.000 ft³ @ 5 " Hg

⑦ Post B
 0.000 ft³ @ 8 " Hg

④ Post B
 0.000 ft³ @ 5 " Hg

⑤ Post A
 0.000 ft³ @ 9 " Hg

⑥ Post A
 0.004
 ⑦ Pre A 0.000

Impinger Weights (gms)			Vol. (ml)
#	pre	post	
1	150		
2	20		
3	0		
4			
Imp Weight (gms)			
SG	827.6	837.8	

TOTALS
 150
 20
 0

10.2

Filter ID: _____
 Tare (gm): _____

⑧ Post A 0.000 5

180.2

Facility: Hess
 Source: WGS/FCCU
CTM 033

Run # 3
 Date: 9-14-10
 Day: TUES

Stack Dimensions (inches): 91
 Barometric Pressure (" Hg): 29.89
 Static Pressure (" H₂O): +0.83

Meter box ID: 5

ΔH @: 1.745

Y-factor: 1996

Nozzle: .787 inches

CTM 033

Pitot lines leak-checked? ☒

Cp: .84

K-factor: .70

3 min / pt

Time	Port	Point	DGM (ft ³)	ΔP (" H ₂ O)	ΔH (" H ₂ O)	DGM (°F)	Stack Temp. (°F)	Probe Temp. (°F)	Probe Exit (°F)	Hotbox Temp. (°F)	Hotbox Exit (°F)	Imp. Exit Temp. (°F)	Vacuum (in. Hg)
1610	A	1	309.582	1.0	.84	75	135	251		263		56	2+
1613		2	311.1	.77	.54	75	135	250		251		54	2+
1616		3	312.0	.92	.64	76	135	248		254		53	2+
1619		4	313.4	1.2	.84	76	135	255		261		52	3
1622		5	314.9	1.4	.98	76	134	255		263		51	3
1625		6	316.522	1.5	1.08	76	134	254		255		59	3
1638		7	318.616	1.5	1.05	76	134	255		261		52	3+
1641		8	319.9	1.4	.98	77	134	251		255		53	3+
1644		9	321.5	1.3	.91	77	134	252		248		53	3+
1650		10	323.2	1.3	.91	77	134	252		260		54	3
1653		11	324.7	1.2	.84	77	134	252		258		55	2+
1656		12	326.3	0.87	.61	77	134	252		244		56	2+
1659		END	327.600										
1716	B	1	327.777	1.2	.84	75	134	259		260		63	3
1719		2	329.2	1.4	.98	75	134	260		263		54	3+
1722		3	330.8	1.4	.98	75	134	257		260		53	3+
1725		4	332.6	1.4	.98	76	134	257		261		53	3+
1728		5	334.3	1.45	1.02	76	135	256		260		54	3+
1731		6*	335.848	1.5	1.05	78	135	253		257		56	3+
1734		7	337.7	1.4	.98	75	134	252		257		57	3+
1752		8	339.4	1.4	.98	75	134	252		259		57	3+
1755		9	341.0	1.3	.91	75	134	255		256		58	3+
1801		10	342.5	1.3	.91	76	134	255		258		59	3+
1804		11	344.1	0.93	.65	76	134	254		257		61	3
1807		12	345.5	0.57	.40	76	134	253		257		61	2.5
1810		STOP	346.541										

①

Pre A Impingers iced? ☒
 0.000 ft³ @ 5 " Hg

③

Post A Impingers iced? ☒
 0.005 ft³ @ 7 " Hg

②

Post A
 0.005 ft³ @ 7 " Hg

④

Post A
 0.000 ft³ @ 5 " Hg

⑤

Pre B
 0.000 ft³ @ 5 " Hg

G* - star resuming volume
 336.022

Post B
 0.000
 0.000
 0.000
 0.000

Impinger Weights (gms)		
#	pre	post
1	160	
2	15	
3	5	
4		
Imp Weight (gms)		
SG	846.3	852.3

Totals
 160
 15
 5

6.0

Filter ID: _____
 Tare (gm): _____

186.0

Facility: Hess
Source: WGS/FCCU
CTM 033

Run # 4
Date: 9-21-10
Day: TUES

Stack Dimensions (inches): 91
Barometric Pressure (" Hg): 30.24
Static Pressure (" H₂O): +0.93

Meter box ID: 5

ΔH @: 1.745

Y-factor: 0.996

Nozzle: .187 inches

Cp: .84

K-factor: 0.73

CTM-033
3 min/pt

Pitot lines leak-checked? ☒

	Time	Port	Point	DGM (ft ³)	ΔP (" H ₂ O)	ΔH (" H ₂ O)	DGM (°F)	Stack Temp. (°F)	Probe Temp. (°F)	Probe Exit (°F)	Hotbox Temp. (°F)	Hotbox Exit (°F)	Imp. Exit Temp. (°F)	Vacuum (in. Hg)	
3	0909	A	1	770.317	0.98	0.72	65	134	245		250		52	3.5	
6	0912		2	791.7	1.25	0.91	65	135	248		245		41	4.5	
9	0915		3	793.3	1.3	0.95	66	135	248		247		45	4.5	
12	0918		4	794.9	1.3	0.95	67	135	247		244		45	5	
15	0921		5	796.6	1.35	0.99	67	134	247		248		46	5	
15	0924 0932		6	798.164 798.280	1.35	0.99	69	135	248		247		48	5	14, 14, 14 PH
21	0935		7	799.9	1.35	0.99	69	134	244		247		46	5	
24	0938		8	801.5	1.35	0.99	70	135	244		245		46	5	
27	0941		9	803.2	1.3	0.95	71	134	244		244		46	5	
30	0944		10	804.8	1.1	0.74	71	134	243		246		46	4.5	
33	0947		11	806.2	0.87	0.58	72	135	244		248		48	3.5	
36	0950		12	807.6	0.51	0.34	72	133	244		248		48	3	
	0953		stop	808.470											14, 14, 14 PH
3	1003	B	1	808.550	1.15	0.77	70	134	245		247		53	4.5	
6	1006		2	810.0	1.35	0.90	70	133	245		240		52	5	
9	1009		3	811.7	1.3	0.87	70	134	247		245		51	5	
12	1012		4	813.0	1.35	0.90	70	134	244		245		51	5.5	
15	1015		5	814.7	1.4	0.94	70	134	245		243		50	5.5	
15	1018 1022		6	816.239 816.377	1.4	0.94	65	134	242		251		56	5.5	14, 14, 14 PH
21	1102		7	818.5	1.35	0.90	65	135	242		246		51	5	
24	1105		8	819.9	1.3	0.87	66	135	242		246		51	5	high VAC
27	1108		9	821.5	1.3	0.87	66	134	240		247		52	4.7	
30	1111		10	823.0	1.2	.80	66	134	243		246		52	8.5	
33	1114		11	824.5	.94	.63	67	134	244		245		58	3.5	imp removed
36	1125		12	826.4	.55	.37	67	133	245		248		56	2	
	1128		END	827.370											14, 14, 14 PH

Pre A Impingers iced? ☒

0.000 ft³ @ 8 " Hg

Post A

0.000 ft³ @ 10 " Hg

Pre B

0.000 10

Post B

0.000 6

Pre B Impingers iced? ☒

0.000 ft³ @ 6 " Hg

Post B

0.000 ft³ @ 8 " Hg

Post B

0.000 ft³ @ 6 " Hg

Post B

0.000 6

vols (mils)

Impinger Weights (gms)		
#	A pre	B post
1	120	40
2	30	10
3	10	
4		
weights (gms)		
SG	849.7	856.8

stop
825.371
fake out
imp 3
825.707

Filter ID: _____
Tare (gm): _____

TOTALS
1 160
2 40
3 10
4 8
7.1
217.1
sg

Facility: Hess
 Source: WGS/FCCU
CARB 426

Run # 1
 Date: 9-14-10
 Day: TUES

Stack Dimensions (inches): 91"
 Barometric Pressure (" Hg): 29.90
 Static Pressure (" H₂O): 0.86

Meter box ID: 3

ΔH @: 1.722

Y-factor: 1.000

Nozzle: .187 inches

Pitot lines leak-checked? ☒

Cp: .84

K-factor: .80

CARB 426

3min/point

Time	Port	Point	DGM (ft ³)	ΔP (" H ₂ O)	ΔH (" H ₂ O)	DGM (°F)	Stack Temp. (°F)	Probe Temp. (°F)	Probe Exit (°F)	Hotbox Temp. (°F)	Hotbox Exit (°F)	Imp. Exit Temp. (°F)	Vacuum (in. Hg)
921	B	1	417.116	1.3	1.04	74	136	258		260		51	<3
924		2	418.9	1.5	1.2	75	136	259		261		52	<3
927		3	420.5	1.5	1.2	75	136	257		260		49	<3
930		4	422.2	1.55	1.24	76	136	259		260		53	<3
933		5	424.0	1.55	1.24	77	136	250		244		55	<3
936		6	425.6	1.6	1.28	78	136	253		249		54	<3
939		7	427.7	1.55	1.24	80	136	250		248		56	<3
942		8	429.5	1.5	1.2	81	136	247		249		58	<3
945		9	431.3	1.5	1.2	82	136	248		245		61	<3
948		10	433.2	1.3	1.04	83	135	249		250		58	<3
954		11	434.8	1.05	.84	83	135	248		253		56	<3
957		12	436.3	0.55	.44	83	137	251		249		62	<2
1000.5		stop	437.553										
1029	A	1	437.579	.78	.62	86	136	251		246		66	<2
1032		2	438.9	.99	.79	87	136	261		248		59	<3
1035		3	440.4	1.5	1.42	87	136	261		249		55	<3
1038		4	442.1	1.5	1.2	88	136	249		250		51	<3
1041		5		1.5	1.2	89	136	241		250		50	<3
1118		6	445.650	1.5	1.2	89	137	249		252		63	<3
1121		7	447.6	1.5	1.2	89	137	243		248		54	<3
1124		8	449.4	1.5	1.2	88	137	242		246		53	<3
1127		9	451.2	1.45	1.16	89	136	240		249		53	<3
1130		10	453.0	1.45	1.16	89	136	252		258		54	<3
1133		11	454.7	1.3	1.04	89	136	248		246		54	<3
1136		12	456.4	1.1	0.88	90	136	250		246		55	<3
1139		stop	457.987										

Pre B Impingers iced? ☒
0.000 ft³ @ 6 " Hg

Post AB
0.000 ft³ @ 6 " Hg

Post A Impingers iced? ☒
0.000 ft³ @ 4 " Hg

Post
 ft³ @ " Hg

Post
 ft³ @ " Hg

Impinger Weights (gms)		
#	pre	post
1	714.6	870.2
2	680.2	709.0
3	604.1	606.7
4		
SG	864.6	875.1

Filter ID:
 Tare (gm):

post PH test 7, 7
 ⇒ 10 @ recovery

Facility: Hess
 Source: WGS/FCCU
CARB 426

Run # 2
 Date: 9-14-10
 Day: TUES

Stack Dimensions (inches): 91
 Barometric Pressure (" Hg): 29.89
 Static Pressure (" H₂O): +0.86

Meter box ID: 3

ΔH @: 1.722

Y-factor: 1.000

Nozzle: .187 inches

CARB 426

Pitot lines leak-checked? ☒

Cp: .84

K-factor: .80

3 min / pt

Time	Port	Point	DGM (ft ³)	ΔP (" H ₂ O)	ΔH (" H ₂ O)	DGM (°F)	Stack Temp. (°F)	Probe Temp. (°F)	Probe Exit (°F)	Hotbox Temp. (°F)	Hotbox Exit (°F)	Imp. Exit Temp. (°F)	Vacuum (in. Hg)
1258	A	1	458.029	.68	.44	77	136	210		245		66	<3
1304		2	459.2	.97	.78	79	136	240		247		55	<3
1307		3	460.5	1.3	1.04	82	136	241		249		50	<3
1324		4	462.2	1.3	1.04	85	136	246		239		57	<3
1327		5	463.9	1.4	1.12	84	136	248		246		55	<3
1338		6	465.630	1.4	1.12	87	137	238		252		60	<3
1341		7	467.4	1.4	1.12	86	137	239		260		55	<3
1344		8	469.1	1.35	1.08	87	136	248		244		52	<3
1347		9	470.8	1.3	1.04	87	136	254		240		51	<3
1350		10	472.4	1.2	1.04	88	136	254		249		51	<3
1353		11	474.2	1.1	.88	88	136	246		249		52	<3
1356		12	475.7	0.86	.69	89	135	249		239		52	<3
1359		stop	477.036										
1420	B	1	477.036	1.2	1.04	89	136	250		256		59	<3
1423		2	479.0	1.3	1.04	89	136	259		257		52	<3
1426		3	480.4	1.4	1.12	90	136	246		255		51	<3
1429		4	482.1	1.4	1.12	90	136	240		257		50	<3
1432		5	483.9	1.4	1.12	90	136	248		256		51	<3
1435		6	485.460	1.4	1.12	88	136	251		255		57	<3
1448		7	487.0	1.4	1.12	88	136	247		254		52	<3
1451		8	489.0	1.4	1.12	88	136	250		255		53	<3
1454		9	490.8	1.3	1.04	89	136	245		256		53	<3
1457		10	492.5	1.2	.96	89	136	241		251		54	<3
1500		11	494.1	.93	.74	89	136	247		255		53	<3
1503		12	495.3	.55	.44	89	135	240		255		55	<3
1506		stop	496.714										

Pre A Impingers iced? ☒

0.000 ft³ @ 5 " Hg

Post Impingers iced?

_____ ft³ @ _____ " Hg

Post B

0.000 ft³ @ 4 " Hg

Post

_____ ft³ @ _____ " Hg

Post

_____ ft³ @ _____ " Hg

Impinger Weights (gms)		
#	pre	post
1	692.3	842.5
2	695.3	718.1
3	597.0	599.7
4		
SG	834.7	845.9

Filter ID: _____

Tare (gm): _____

PH 7.7
 post test

⇒ 10 @ recovery

Facility: Hess
 Source: WGS/FCCU
CARB 426

Run # 3
 Date: 9-14-10
 Day: TUES

Stack Dimensions (inches): 91
 Barometric Pressure (" Hg): 29.59
 Static Pressure (" H₂O): 10.82

Meter box ID: 3

ΔH @: 1.722

Y-factor: 1.000

Nozzle: .187 inches

CARB 426

Pitot lines leak-checked? ☒

C_p: .84

K-factor: 0.80

Time	Port	Point	DGM (ft ³)	ΔP (" H ₂ O)	ΔH (" H ₂ O)	DGM (°F)	Stack Temp. (°F)	Probe Temp. (°F)	Probe Exit (°F)	Hotbox Temp. (°F)	Hotbox Exit (°F)	Imp. Exit Temp. (°F)	Vacuum (in. Hg)
1612	B	1	496.773	1.3	1.04	83	135	253		256		62	2
1615		2	498.4	1.5	1.2	84	135	252		256		65.7	2
1618		3	500.1	1.6	1.28	84	135	251		255		52	2
1621		4	502.0	1.5	1.2	85	135	251		256		50	2
1624		5	503.8	1.5	1.2	86	135	252		258		52	2
1627		6	505.674	1.5	1.2	86	135	250		258		57	2
1639		7	507.4	1.5	1.2	87	135	251		256		50	2+
1642		8	509.0	1.4	1.12	87	135	250		252		51	2+
1645		9	511.0	1.4	1.12	88	135	250		255		52	2+
1648		10	512.7	1.2	0.96	88	135	250		253		53	2+
1651		11	514.0	0.94	0.75	89	135	248		251		52	2
1654		12	515.8	0.55	0.44	89	135	248		255		53	2
1657		END	517.037										
1700													
1718	A	1	517.037	1.4	1.12	88	136	247		248		52	2
1721.5		2	518.8	1.5	1.2	86	136	256		232		51	2
1737		3	520.4	1.5	1.2	85	136	250		247		52	2
1740		4	522.3	1.5	1.2	85	136	251		244		54	2+
1743		5	523.9	1.5	1.2	85	136	242		239		53	2+
1746		6		1.5	1.2	85	136	250		244		53	2+
1752		7	527.7	1.5	1.2	85	136	242		239		55	2+
1759		8	529.2	1.4	1.12	85	136	244		246		53	2+
1802		9	531.0	1.2	.96	85	136	246		237		55	2+
1809		10	532.6	1.1	.88	84	136	246		237		54	2+
1812		11	534.1	0.98	.78	84	135	255		247		53	2+
1815		12	535.6	0.75	.60	84	135	250		255		53	2+
1818		END	536.918										

Restart
1734.28
9 min 744.15
1749
757.5
STOP
757.15
resume
801.77
STOP
1805.77
resume

Pre B Impingers iced? ☒

0.000 ft³ @ 5 " Hg

Post Impingers iced?

ft³ @ _____ " Hg

Post A

0.000 ft³ @ 4 " Hg

Post

ft³ @ _____ " Hg

Post

ft³ @ _____ " Hg

Impinger Weights (gms)		
#	pre	post
1	694.2	845.8
2	684.3	710.0
3	604.0	607.3
4		
SG	825.7	836.0

Filter ID: _____

Tare (gm): _____

post test
PH
7, 7

⇒ 100 recovery

Stack Dimensions (inches): 91
Barometric Pressure (" Hg): 30.11
Static Pressure (" H₂O): 0.85

Y-factor: 996

Nozzle: 20 inches

Pitot lines leak-checked ? ☒

C_P: 384

K-factor: 1.06

Metals
3.5 min/pt

[illegible]

Pre A Impingers iced ? ☒

2,000 ft³ @ 5 " Hg

Post 13

0.000 ft³ @ 5 " Hg

Post Impingers iced ?

_____ ft3 @ _____ " Hg

Post

ft3 @ _____ " Hg

Post

_____ ft3 @ _____ " Hg

Impinger Weights (gms)		
#	pre	post
1	546.3	651.0
2	723.5	828.0
3	693.1	713.9
4	606.9	608.7
SG	874.9	883.8

Filter ID:

Tare (gm): _____

Facility: Hess
Source: WGS/FCCU
RM29

Run # 2
Date: 9-15-10
Day: wed

Stack Dimensions (inches): 91
Barometric Pressure (" Hg): 30.05
Static Pressure (" H₂O): +0.85

Meter box ID: 5

ΔH @: 1.745

Y-factor: .996

Nozzle: .200 inches

Pitot lines leak-checked? ☒

Cp: .84

K-factor: 1.06

metals

Time	Port	Point	DGM (ft ³)	ΔP (" H ₂ O)	ΔH (" H ₂ O)	DGM (°F)	Stack Temp. (°F)	Probe Temp. (°F)	Probe Exit (°F)	Hotbox Temp. (°F)	Hotbox Exit (°F)	Imp. Exit Temp. (°F)	Vacuum (in. Hg)
1421	A	1	398.187	1.2	1.27	86	135	261		252		57	2+
1424.5		2	400.0	1.3	1.38	86	135	258		251		48	2+
1428		3	402.3	1.3	1.38	86	135	254		251		47	2+
1431.5		4	404.6	1.35	1.43	87	134	257		251		47	3
1435		5	406.9	1.4	1.48	89	135	259		252		50	3
1438.5		6	409	1.4	1.48	90	135	251		257		50	3
1442		7	411.6	1.4	1.48	90	136	253		250		51	3
1445.5		8	413.9	1.3	1.38	91	135	253		249		52	2+
1449		9	416.2	1.25	1.33	92	134	249		251		52	2+
1452.5		10	418.3	1.1	1.17	92	135	255		251		53	2+
1456		11	420.1	0.90	.95	92	135	256		250		54	2
1459.5		12	422.1	0.51	.54	92	134	251		257		54	2
1503		stop	423.671										
1514	B	1	423.671	0.56	.59	90	134	256		247		62	2
1517.5		2	425.1	0.89	.94	90	135	252		247		53	2+
1521		3	427.0	1.3	1.50	91	135	250		249		53	3
1524.5		4	429.2	1.4	1.61	92	135	252		248		53	3
1528		5	431.5	1.5	1.73	92	135	254		248		53	3+
1531.5		6	434.2	1.45	1.67	92	135	253		249		54	3+
1535		7	436.8	1.4	1.61	93	134	249		253		55	3
1538.5		8	439.1	1.45	1.68	93	134	252		252		56	3+
1542		9	441.7	1.45	1.68	94	134	253		247		56	3+
1545.5		10	444.2	1.3	1.50	93	134	253		247		57	2+
1549		11	446	1.3	1.50	93	134	256		248		57	3
1552.5		12	448.8	1.0	1.15	93	134	254		248		58	2+
1556		END	450.854										

Pre A Impingers iced? ☒

0.000 ft³ @ 6 " Hg

Post

0.000 ft³ @ 10 " Hg

Post Impingers iced?

ft³ @ " Hg

Post

ft³ @ " Hg

Post

ft³ @ " Hg

Impinger Weights (gms)		
#	pre	post
1	572.1	682.7
2	694.5	793.5
3	722.8	739.8
4	598.2	599.4
SG	863.6	875.3

Filter ID:

Tare (gm):

Facility: Hess
 Source: WGS/FCCU
RM 29

Run # 3
 Date: 9-15-10
 Day: Wed

Stack Dimensions (inches): 91
 Barometric Pressure (" Hg): 30.10
 Static Pressure (" H₂O): +0.83

Meter box ID: 5

ΔH @: 1.745

Y-factor: 0.996

Nozzle: 1.200 inches

Pitot lines leak-checked? ☒

Cp: .84

K-factor: 1.11

3.5 w/pt metals

	Time	Port	Point	DGM (ft ³)	ΔP (" H ₂ O)	ΔH (" H ₂ O)	DGM (°F)	Stack Temp. (°F)	Probe Temp. (°F)	Probe Exit (°F)	Hotbox Temp. (°F)	Hotbox Exit (°F)	Imp. Exit Temp. (°F)	Vacuum (in. Hg)	
3.5	1702	A	1	450.935	.70	1.78	84	134	255		251		63	<2	
7	1706.5		2	452.7	1.05	1.17	85	135	254		252		56	2	
10.5	1710		3	454.6	1.4	1.55	85	135	253		252		53	2	
14	1713.5		4	457.0	1.5	1.67	86	135	254		252		53	2+	
17.5	1717		5	459.3	1.5	1.67	87	134	251		251		54	2+	
21	1720.5		6	461.7	1.7	1.89	87	134	254		250		54	3	
24.5	1724		7	464.4	1.7	1.89	88	135	251		254		54	3	
28	1727.5		8	466.9	1.7	1.89	88	135	257		253		54	3	
31.5	1731		9	469.5	1.6	1.77	90	135	258		253		54	2.5	
35	1734.5		10	472.0	1.7	1.89	90	135	256		254		55	3	
38.5	1738		11	474.6	1.6	1.77	91	135	256		253		55	2.5	
42	1741.5		12	477.1	1.3	1.44	90	135	256		254		55	2	
	Stop 1745		STOP	479.414											
3.5	1811	B	1	479.414	.78	.87	85	136	258		254		59	2	
7	1814.5		2	481.1	.98	1.09	85	135	255		254		50	2	
10.5	1818		3	483.1	1.2	1.33	87	135	253		256		49	2	
14	1821.5		4	485.3	1.45	1.61	85	135	253		253		50	2+	
17.5	1825		5	487.9	1.6	1.78	85	136	254		249		51	2+	
21	1828.5		6	490.3	1.7	1.89	85	135	255		253		52	3	
24.5	1832		7	492.9	1.6	1.78	85	135	250		253		53	2+	
28	1835.5		8	495.5	1.6	1.78	85	136	254		256		54	2+	
31.5	1839		9	498.0	1.6	1.78	85	135	254		252		54	2+	
35	1842.5		10	500.5	1.4	1.55	85	135	254		253		55	2+	
38.5	1846		11	502.9	1.4	1.22	85	135	255		252		55	2	
42	1849.5		12	505.0	.59	0.65	85	135	255		250		55	<2	
	1853		END	506.630											

Pre A Impingers iced? ☒

0.000 ft³ @ 5 " Hg

Post B

0.000 ft³ @ 6 " Hg

Post Impingers iced?

ft³ @ " Hg

Post

ft³ @ " Hg

Post

ft³ @ " Hg

Impinger Weights (gms)		
#	pre	post
1	548.1	673.4
2	706.2	806.4
3	685.0	704.6
4	605.1	607.2
SG	883.8	893.5

Filter ID:

Tare (gm):

Facility: Hess
 Source: WGS/FCCU
RM8

Run # 1
 Date: 9-15-10
 Day: WED

Stack Dimensions (inches): 91"
 Barometric Pressure (" Hg): 30.11
 Static Pressure (" H₂O): 0.85

Meter box ID: 1

ΔH @: 1.773

Y-factor: 0.989

Nozzle: .187 inches

Pitot lines leak-checked? ☒

C_p: .84

K-factor: 0.83

Sulfuric Acid mist
 3 min/pt

Time	Port	Point	DGM (ft ³)	ΔP (" H ₂ O)	ΔH (" H ₂ O)	DGM (°F)	Stack Temp. (°F)	Probe Temp. (°F)	Probe Exit (°F)	Hotbox Temp. (°F)	Hotbox Exit (°F)	Imp. Exit Temp. (°F)	Vacuum (in. Hg)
0949	B	1	719.892	.50	.66	77	137	244		260		61	3
0952		2	721.2	1.0	.83	78	137	234		240		57	3
0953.11		stop	721.830										
1051	A	1	721.896	1.2	.996	77	136	250		255		54	3
1054		2	723.5	1.3	1.08	77	137	247		252		50	3
1057		3	725.2	1.3	1.08	79	137	247		254		52	3
1100		4	726.8	1.4	1.16	80	137	247		256		53	3
1103		5	728.8	1.4	1.16	81	136	246		256		54	3
1106		6	730.3	1.4	1.16	82	137	248.7		258		52	3
1109		7	732.0	1.4	1.16	83	137	248		255		52	3
1112		8	733.9	1.3	1.08	84	137	246		252		53	3
1115		9	735.5	1.3	1.08	84	137	247		251		53	3
1118		10	737.2	1.2	.996	84	137	246		250		54	3
1121		11	738.9	0.90	0.75	85	137	247		248		56	3
1124		12	740.3	0.69	0.57	85	137	246		247		55	3
1127		stop	741.642										
1134.11	B	2	741.642	1.0	.83	85	137	247		249		56	3
1136		3	742.8	1.2	.996	85	137	234		248		56	3
1139		4	744.2	1.3	1.08	86	137	239		250		51	3
1142		5	746.0	1.3	1.08	86	137	249		254		51	3
1154		6	747.6	1.3	1.08	87	137	247		252		52	3
1157/1157		7	749.4	1.4	1.16	89	137	246		240		54	3
1202		8	750.9	1.4	1.16	88	138	242		243		56	3
1205		9	752.7	1.3	1.08	88	137	242		239		53	3
1208		10	754.3	1.2	.996	88	137	247		250		54	3
1211		11	755.9	1.2	.996	88	137	250		254		54	3
1214		12	757.6	0.95	.79	88	137	251		256		55	3
1217		END	759.093										

Pre B Impingers iced? ☒

0.000 ft³ @ 5 " Hg

Post B

0.000 ft³ @ 5 " Hg

Post B Impingers iced? ☒

0.000 ft³ @ 8 " Hg

Post

ft³ @ _____ " Hg

Post

ft³ @ _____ " Hg

Impinger Weights (gms)		
#	pre	post
1	663.9	754.9
2	722.9	747.9
3	700.1	722.0
4		
SG	837.7	853.6

Filter ID: _____

Tare (gm): _____

Right BACK box
 B2 powered on
 @ min 4:11
 into test
 721.830 vol
 Switch out
 hot box to
 see if the
 cause, the
 move to
 port "A" so
 not hold
 up metals
 train.

** Pt 5 stop @ 114340 Box trip
 resume 115240
 ** Pt 7 stop 1157 Box tripped
 resume 1159 AGAIN

15 min Ambient Air purge
 1227 - 1242
 start vol. 759.146 - 767.731

Facility: Hess
 Source: WGS/FCCU
RM 8

Run # 2
 Date: 9-15-10
 Day: WED

Stack Dimensions (inches): 91
 Barometric Pressure (" Hg): 30.05
 Static Pressure (" H₂O): 0.85

Meter box ID: 1

ΔH @: 1.773

Y-factor: .989

Nozzle: .187 inches

Pitot lines leak-checked? ☒

C_p: .84

K-factor: 0.83

Sulfuric Acid Mist
3 mmw/pt

	Time	Port	Point	DGM (ft ³)	ΔP (" H ₂ O)	ΔH (" H ₂ O)	DGM (°F)	Stack Temp. (°F)	Probe Temp. (°F)	Probe Exit (°F)	Hotbox Temp. (°F)	Hotbox Exit (°F)	Imp. Exit Temp. (°F)	Vacuum (in. Hg)
0	1515	A	1	767.976										
3	1518		2	769.0	1.3	1.08	87	136	261		260		56	<2
6	1521		3	770.8	1.4	1.16	88	135	254		262		55	2+
9	1524		4	772.6	1.4	1.16	89	136	254		256		55	2+
12	1527		5	774.3	1.5	1.25	90	135	253		253		55	3
15	1530		6	776.	1.5	1.25	90	135	254		255		57	3
18	1533		7	777.9	1.5	1.25	91	136	251		253		59	3
21	1536		8	779.8	1.4	1.26	92	135	254		254		60	3
24	1539		9	781.8	1.4	1.26	93	136	250		251		62	3
27	1542		10	783.6	1.2	1.08	93	136	252		253		62	3
30	1545		11	785.2	0.96	0.86	93	136	252		254		53	3
33	1548		12		0.53	.48	93	136	251		252		53	2
36	1551		stop	788.107										
	1605	B	1	788.107	0.71	.64	92	135	243		246		62	2
3	1608		2	789.3	0.93	.84	92	136	260		254		54	2
6	1611		3	790.9	1.3	1.17	93	136	251		253		56	3
9	1614		4	792.6	1.4	1.26	94	136	250		250		55	3
12	1617		5	794.5	1.5	1.35	95	137	256		247		57	3
15	1620		6	796.5	1.5	1.35	95	137	249		251		59	3
18	1623		7	798.3	1.45	1.31	95	137	248		259		59	3
21	1626		8	800.3	1.45	1.31	96	137	254		255		59	3
24	*1629/1649.21		9	802.0	1.45	1.31	96	137	240		247		62	3
27	1652		10	804.0	1.4	1.26	87	136	240		253		62	4
30	1655		11	805.7	1.4	1.26	87	137	243		252		62	4
33	1658		12	807.	1.1	.99	87	136	249		254		63	3+
36	1701		END	809.220										

Pre A Impingers iced? ☒

0.000 ft³ @ 6 " Hg

Post B

0.000 ft³ @ 6 " Hg

Post Impingers iced?

ft³ @ _____ " Hg

Post

ft³ @ _____ " Hg

Post

ft³ @ _____ " Hg

Impinger Weights (gms)		
#	pre	post
1	671.8	764.4
2	700.9	755.6
3	681.9	707.6
4		
SG	827.5	850.7

* 21 sec into purg
 B9 - trip 160
 1649.21 resu

1.2 start 15 min purge
 1807 - 1822
 meter 809.253
 818.893

Filter ID: _____
 Tare (gm): _____

Stack Dimensions (inches): 91"
Barometric Pressure (" Hg): 30.12
Static Pressure (" H₂O): +0.87

Sulfuric Acid Mist
3 min/pt

[illegible]

Pre **A** Impingers iced? ☒

0.000 ft³ @ 0 " Hg

Post B
0.00 ft³ @ 8 " Hg

Post **Impingers iced ?**

ft3 @ " Hg

Post	
_____ ft3 @ _____ " Hg	

Post	
ft3 @	" Hg

Impinger Weights (gms)		
#	pre	post
1	665.6	747.5
2	719.1	783.6
3	698.3	723.0
4		
SG	845.4	866.1

Filter ID: _____
Tare (gm): _____

5 min
 pump
~~832.130~~
 start 203230 548.301 1.1 volume
 end 2047.30 556.874

Stack Dimensions (inches): 91
Barometric Pressure (" Hg): 29.96
Static Pressure (" H₂O): +0.85

$$\text{NH}_3$$

2.5 min/st

Arrow Environmental Consulting, LLC PO Box 3658 Easton PA 18043 Phone: (610) 597-1770 Fax: (610) 258-2470

Facility: Hess
 Source: WGS/FCCU
CTM 027

Run # 2
 Date: 9-16-10
 Day: THUR

Stack Dimensions (inches): 91
 Barometric Pressure (" Hg): 29.89
 Static Pressure (" H₂O): +0.88

Meter box ID: 5

ΔH @: 1.745

Y-factor: 0.996

Nozzle: .200 inches

Pitot lines leak-checked? ☒

C_p: .84

K-factor: 1.15

NH₃ train

2.5 min / pt

	Time	Port	Point	DGM (ft ³)	ΔP (" H ₂ O)	ΔH (" H ₂ O)	DGM (°F)	Stack Temp. (°F)	Probe Temp. (°F)	Probe Exit Temp. (°F)	Hotbox Temp. (°F)	Hotbox Exit Temp. (°F)	Imp. Exit Temp. (°F)	Vacuum (in. Hg)	
	1500	A	1	610.791	.89	1.02	82	135	285	279	287	277	57	4	
2.5	1502.5		2	612.1	1.1	1.27	82	135	283	279	284	278	55	4.5	
5	1505		3	613.7	1.2	1.38	82	135	281	277	280	276	52	5	
7.5	1507.5		4	615.3	1.4	1.61	83	135	281	278	283	280	51	6	
10	1510		5	616.9	1.55	1.78	84	135	281	278	286	280	50	6	
12.5	1517.5		6	618.7	1.55	1.78	84	136	282	279	281	280	50	6.5	
15	1515		7	620.6	1.55	1.78	85	135	282	279	288	283	50	6.5	
17.5	1517.5		8	622.4	1.55	1.78	85	135	283	278	289	282	50	6.5	
20	1520		9	624.2	1.45	1.68	86	135	284	277	284	282	50	6	
22.5	1522.5		10	626.0	1.3	1.50	87	136	287	285	285	281	51	6	
25	1525		11	627.8	.90	1.04	87	135	287	283	284	282	52	4.5	
27.5	1527.5		12	629.1	.58	0.67	87	134	286	283	287	282	53	4	
30	1530		stop	630.284											
	1533	B	1	630.294	1.3	1.50	87	135	279	279	287	277	54	5.5	
2.5 1535	1536.5		2	632.0	1.55	1.78	87	135	284	282	286	277	52	6.5	
5.0	1538		3	633.7	1.55	1.78	88	136	283	282	286	280	52	6.5	
7.5	1540.5		4	635.5	1.55	1.78	89	136	283	284	285	281	52	6.5	
10	1543		5	637.3	1.55	1.78	89	136	285	284	286	281	53	6.5	
12.5	1545.5		6	639.2	1.5	1.73	89	136	286	284	287	279	53	6.5	
15	1548		7	640.9	1.5	1.73	90	136	287	285	287	279	54	6.5	
17.5	1550.5		8	642.8	1.5	1.73	90	136	287	285	288	279	54	6.5	
20	1553		9	644.6	1.3	1.50	90	136	285	283	287	280	55	6	
22.5	1555.5		10	646.2	1.15	1.32	90	136	285	283	288	280	55	5.5	
25	1558		11	647.9	0.88	1.01	91	135	285	283	287	279	56	5.0	
27.5	1600.5		12	649.2	0.69	0.79	91	135	285	283	287	277	57	4	
30	1603		END	650.496											

Pre A Impingers iced? ☒

0.000 ft³ @ 9 " Hg

Post B

0.000 ft³ @ 7 " Hg

Post Impingers iced?

ft³ @ " Hg

Post

ft³ @ " Hg

Post

ft³ @ " Hg

Impinger Weights (gms)		
#	pre	post
1	689.1	839.3
2	689.2	721.0
3	706.6	714.9
4	600.8	603.8
SG	873.7	844.7

Filter ID: _____
 Tare (gm): _____

Facility: Hess
 Source: WGS/FCCU
CTM 027

Run # 3
 Date: 4-17-10
 Day: FRI

Stack Dimensions (inches): 91
 Barometric Pressure (" Hg): 29.86
 Static Pressure (" H₂O): 50.85

Meter box ID: 5

ΔH @: 1.745

Y-factor: 0.996

Nozzle: .200 inches

Pitot lines leak-checked? ☒

C_p: .84

K-factor: 1.15

NH₃

2.5 min/pt

	Time	Port	Point	DGM (ft ³)	ΔP (" H ₂ O)	ΔH (" H ₂ O)	DGM (°F)	Stack Temp. (°F)	Probe Temp. (°F)	Probe Exit (°F)	Hotbox Temp. (°F)	Hotbox Exit (°F)	Imp. Exit Temp. (°F)	Vacuum (in. Hg)	
2.5	0836	A	1	650.524	.88	1.01	69	135	282	278	280	277	54	3.5	
5	0838.5		2	651.8	1.1	1.27	70	135	288	281	280	278	50	4	
7.5	0841		3	653.3	1.25	1.44	71	135	289	286	284	281	49	4.5	
10	0843.5		4	654.9	1.35	1.55	72	135	296	290	281	278	49	5	
12.5	0846		5	656.6	1.5	1.73	72	135	297	295	283	280	49	5.5	
15	0848.5		6	658.1	1.55	1.78	73	135	296	295	288	285	50	5.5	
17.5	0851		7	660.1	1.55	1.78	73	135	295	294	289	286	51	5.5	
20	0853.5		8	662.0	1.55	1.78	74	135	294	292	286	284	52	6	
22.5	0856		9	663.8	1.5	1.73	75	135	294	293	287	285	52	5.5	
25	0858.5		10	665.3	1.3	1.50	75	135	295	293	287	285	52	5	
27.5	0901		11	667.3	0.99	1.14	75	135	296	295	288	287	53	4	
30	0903.5		12	668.6	0.72	0.83	76	134	297	295	289	287	54	3	
	0906		Stop	669.936											
2.5	0910	B	1	669.936	1.4	1.61	76	135	302	296	288	287	56	5	
5	0912.5		2	671.6	1.5	1.73	76	135	305	299	292	290	52	5.5	
7.5	0915		3	673.	1.5	1.73	77	135	304	302	291	290	51	5.5	
10	0917.5		4	675.0	1.55	1.78	77	135	302	300	289	287	52	6	
12.5	0920		5	676.9	1.55	1.78	78	135	302	300	291	289	52	6	
15	0922.5		6	678.7	1.5	1.73	78	135	301	300	291	290	53	5.5	
17.5	0925		7	680.5	1.45	1.67	78	135	300	299	298	290	53	5.5	
20	0927.5		8	682.2	1.4	1.61	78	135	300	299	290	289	54	5.5	
22.5	0930		9	683.9	1.3	1.50	78	135	300	298	291	290	54	5	
25	0932.5		10	685.7	1.1	1.27	78	135	295	293	288	287	55	4.5	
27.5	0935		11	687.1	0.88	1.01	78	135	295	294	291	287	55	4	
	0937.5		12	688.6	0.61	0.70	78	134	295	294	293	291	55	3.5	
	0940		END	689.731											

Pre A Impingers iced? ☒

0.00 ft³ @ 6 " Hg

Post B

0.00 ft³ @ 7 " Hg

Post Impingers iced?

ft³ @ " Hg

Post

ft³ @ " Hg

Post

ft³ @ " Hg

Impinger Weights (gms)

#	pre	post
1	699.4	839.7
2	683.5	715.6
3	684.0	693.3
4	599.1	604.0
SG	840.5	851.9

Filter ID:

Tare (gm):

Facility: HESS
 Source: W65
 Location: OUTLET

Date: 9-17-10
 Day: FRI

RM18
UNSPIKED

Run: 1

Sampling Rate Calibration: 0.807 l/min

RM18 Time	Rotometer Reading	Calibrated Flowrate lpm	Temp (°F)	Vacuum (" Hg)
1145	30 sb	.807	77	<5
1150	30 sb	.807	76	<5
1155	30 sb	.807	76	<5
1200	30	.807	79	<5
1205	30	.807	80	<5
1210	30	.807	80	<5
1215	30	.807	77	<5
1220	30	.807	77	<5
1225	30	.807	76	<5
1230	30	.807	76	<5
1235	30	.807	83	<5
1240	30	.807	83	<5
1245	END			

Pre leak check

0 cc/min

Post leak check

N/A cc/min

Allowed 4% of sampling rate

RM 18 train:

Direct pump sampling: X
 or
 "Lung" sampler:

Were samples diluted?

No: X

Yes:

Run: 2

Sampling Rate Calibration: 0.802 l/min

RM18 Time	Rotometer Reading	Calibrated Flowrate lpm	Temp (°F)	Vacuum (" Hg)
1335	28 sb	.802	84	<5
1340	28	.802	89	<5
1345	28	.802	96	<5
1350	28	.802	97	<5
1355	28	.802	96	<5
1400	28	.802	96	<5
1405	28	.802	89	<5
1410	28	.802	89	<5
1415	28	.802	88	<5
1420	28	.802	90	<5
1425	28	.802	86	<5
1430	28	.802	83	<5
1435	END			

Pre leak check

0 cc/min

Post leak check

N/A cc/min

Allowed 4% of sampling rate

RM 18 train:

Direct pump sampling: X
 or
 "Lung" sampler:

Were samples diluted?

No: X

Yes:

14.97

Run: 3

Sampling Rate Calibration: .798 l/min

RM18 Time	Rotometer Reading	Calibrated Flowrate lpm	Temp (°F)	Vacuum (" Hg)
1524	28	.798	74	<5
1529	28	.798	73	<5
1534	28	.798	73	<5
1539	28	.798	73	<5
1544	28	.798	74	<5
1549	28	.798	74	<5
1554	28	.798	77	<5
1559	28	.798	77	<5
1604	28	.798	76	<5
1609	28	.798	74	<5
1614	28	.798	75	<5
1619	28	.798	77	<5
1624	END			

Pre leak check

0 cc/min

Post leak check

N/A cc/min

Allowed 4% of sampling rate

RM 18 train:

Direct pump sampling: X
 or
 "Lung" sampler:

Were samples diluted?

No: X

Yes:

15.04

Facility: HESS
 Source: WGS
 Location: OUTLET

Date: 9-17-10
 Day: FRI

RM18

spiked train

Run: 1

Sampling Rate Calibration: 0.815 l/min

RM18 Time	Rotometer Reading	Calibrated Flowrate lpm	Temp (°F)	Vacuum (" Hg)
1145	25.56	.815	77	<5
1150	25.56	.815	75	<5
1155	25.56	.815	75	<5
1200	25	.815	78	<5
1205	25	.815	79	<5
1210	25	.815	29.80	<5
1215	25	.815	77	<5
1220	25	.815	77	<5
1225	25	.815	75	<5
1230	25	.815	76	<5
1235	25	.815	82	<5
1240	25	.815	81	<5
1245	END			

Pre leak check

0 cc/min

Post leak check

N/A cc/min

Allowed 4% of sampling rate

RM 18 train:

Direct pump sampling: X

or

"Lung" sampler:

Were samples diluted?

No: X

Yes:

G130C3241
1137749-01

29.95 BP

Run: 2

Sampling Rate Calibration: 0.795 l/min

RM18 Time	Rotometer Reading	Calibrated Flowrate lpm	Temp (°F)	Vacuum (" Hg)
1335	25.56	.795	79	<5
1340	25	.795	84	<5
1345	25	.795	91	<5
1350	25	.795	91	<5
1355	25	.795	91	<5
1400	25	.795	93	<5
1405	25	.795	86	<5
1410	25	.795	84	<5
1415	25	.795	83	<5
1420	25	.795	87	<5
1425	25	.795	83	<5
1430	25	.795	80	<5
1435	END			

Pre leak check

0 cc/min

Post leak check

N/A cc/min

Allowed 4% of sampling rate

RM 18 train:

Direct pump sampling: X

or

"Lung" sampler:

Were samples diluted?

No: X

Yes:

1509

29.87 BP

Run: 3

Sampling Rate Calibration: .802 l/min

RM18 Time	Rotometer Reading	Calibrated Flowrate lpm	Temp (°F)	Vacuum (" Hg)
1524	24	.802	73	<5
1529	24	.802	72	<5
1534	24	.802	73	<5
1539	24	.802	72	<5
1544	24	.802	71	<5
1549	24	.802	71	<5
1554	24	.802	71	<5
1559	24	.802	78	<5
1604	24	.802	75	<5
1609	24	.802	70	<5
1614	24	.802	70	<5
1619	24	.802	73	<5
1624	END			

Pre leak check

0 cc/min

Post leak check

N/A cc/min

Allowed 4% of sampling rate

RM 18 train:

Direct pump sampling: X

or

"Lung" sampler:

Were samples diluted?

No: X

Yes:

14.97

29.59 BP

Facility: HESS CORP
 Source: WGS
 Location: OUTLET

Run # 1
 Date: 9-17-10
RM 18 FLOW

Stack Dimensions (inches): 91
 Barometric Pressure (" Hg): 29.95
 Static Pressure (" H₂O): + 0.85

Meter box ID: 5 ΔH @: 1.745 Y-factor: 0.996

Pitot lines leak-checked ? ☒

C_p: .84

Time:		Traverse ID: <u>Pre 1</u>		
Port	Point	ΔP (" H ₂ O)	Temp. (°F)	Cyclonic Angle
<u>A</u>	<u>1</u>	<u>0.93</u>	<u>134</u>	
	<u>2</u>	<u>1.2</u>	<u>135</u>	
	<u>3</u>	<u>1.35</u>	<u>135</u>	
	<u>4</u>	<u>1.4</u>	<u>135</u>	
	<u>5</u>	<u>1.45</u>	<u>135</u>	
	<u>6</u>	<u>1.55</u>	<u>135</u>	
	<u>7</u>	<u>1.55</u>	<u>135</u>	
	<u>8</u>	<u>1.6</u>	<u>135</u>	
	<u>9</u>	<u>1.55</u>	<u>135</u>	
	<u>10</u>	<u>1.35</u>	<u>135</u>	
	<u>11</u>	<u>1.0</u>	<u>135</u>	
	<u>12</u>	<u>0.76</u>	<u>135</u>	

Pitot lines leak-checked ? ☒

C_p: .84

Time:		Traverse ID: <u>Pre 1</u>		
Port	Point	ΔP (" H ₂ O)	Temp. (°F)	Cyclonic Angle
<u>B</u>	<u>1</u>	<u>1.1</u>	<u>135</u>	
	<u>2</u>	<u>1.4</u>	<u>135</u>	
	<u>3</u>	<u>1.4</u>	<u>135</u>	
	<u>4</u>	<u>1.4</u>	<u>136</u>	
	<u>5</u>	<u>1.5</u>	<u>135</u>	
	<u>6</u>	<u>1.55</u>	<u>136</u>	
	<u>7</u>	<u>1.55</u>	<u>136</u>	
	<u>8</u>	<u>1.55</u>	<u>135</u>	
	<u>9</u>	<u>1.45</u>	<u>135</u>	
	<u>10</u>	<u>1.3</u>	<u>136</u>	
	<u>11</u>	<u>0.95</u>	<u>135</u>	
	<u>12</u>	<u>0.80</u>	<u>135</u>	

Time	DGM		ΔH (" H ₂ O)	Exit Impinger (°F)	Vacuum (" Hg)
	(ft ³)	Out (°F)			
<u>1145</u>	<u>689.790</u>	<u>71</u>	<u>1.0</u>	<u>62</u>	<u>< 1</u>
<u>1150</u>	<u>692.4</u>	<u>71</u>	<u>1.0</u>	<u>60</u>	<u>< 1</u>
<u>1155</u>	<u>695.1</u>	<u>71</u>	<u>1.0</u>	<u>59</u>	<u>< 1</u>
<u>1200</u>	<u>697.9</u>	<u>71</u>	<u>1.0</u>	<u>56</u>	<u>< 1</u>
<u>1205</u>	<u>701.6</u>	<u>71</u>	<u>1.0</u>	<u>56</u>	<u>< 1</u>
<u>1210</u>	<u>703.3</u>	<u>72</u>	<u>1.0</u>	<u>55</u>	<u>< 1</u>
<u>1215</u>	<u>706.1</u>	<u>72</u>	<u>1.0</u>	<u>55</u>	<u>< 1</u>
<u>1220</u>	<u>708.8</u>	<u>72</u>	<u>1.0</u>	<u>59</u>	<u>< 1</u>
<u>1225</u>	<u>711.5</u>	<u>73</u>	<u>1.0</u>	<u>60</u>	<u>< 1</u>
<u>1230</u>	<u>714.2</u>	<u>73</u>	<u>1.0</u>	<u>60</u>	<u>< 1</u>
<u>1235</u>	<u>716.9</u>	<u>73</u>	<u>1.0</u>	<u>60</u>	<u>< 1</u>
<u>1240</u>	<u>719.6</u>	<u>74</u>	<u>1.0</u>	<u>61</u>	<u>< 1</u>
<u>1245</u>	<u>722.363</u>				

Pre Impingers iced ? ☒
0.000 ft³ @ 6 " Hg

Post
0.000 ft³ @ 4 " Hg

Impinger Weights (gms)		
#	pre	post
<u>1</u>	<u>696.4</u>	<u>838.2</u>
<u>2</u>	<u>717.3</u>	<u>724.0</u>
<u>3</u>	<u>609.2</u>	<u>610.4</u>
<u>4</u>	<u>881.5</u>	<u>887.3</u>
<u>5</u>		
<u>6</u>		

Facility: HESS CORPRun # 2Stack Dimensions (inches): 91Source: WGSDate: 9.17.10Barometric Pressure (" Hg): 29.97Location: OUTLETStatic Pressure (" H₂O): + 0.84RM 8Meter box ID: 5ΔH @: 1.745Y-factor: 0.996Pitot lines leak-checked? ☒C_p: .84Time: Traverse ID: Post 1 / Pre 2

Port	Point	ΔP (" H ₂ O)	Temp. (°F)	Cyclonic Angle
A	1	.98	135	
	2	1.25	136	
	3	1.4	136	
	4	1.4	136	
	5	1.5	136	
	6	1.55	135	
	7	1.5	135	
	8	1.5	135	
	9	1.45	135	
	10	1.3	135	
	11	0.97	135	
	12	0.72	135	

Pitot lines leak-checked? ☒C_p: .84Time: Traverse ID: Post 1 / Pre 2

Port	Point	ΔP (" H ₂ O)	Temp. (°F)	Cyclonic Angle
B	1	1.1	135	
	2	1.5	135	
	3	1.5	136	
	4	1.5	136	
	5	1.5	136	
	6	1.55	136	
	7	1.6	136	
	8	1.6	136	
	9	1.5	136	
	10	1.4	136	
	11	1.0	135	
	12	0.82	135	

Time	DGM		ΔH (" H ₂ O)	Exit Impinger (°F)	Vacuum (" Hg)
	(ft ³)	Out (°F)			
1335	724.025	72	1.0	54	2
1340	726.9	72	1.0	50	2
1345	729.7	73	1.0	50	2
1350	732.4	74	1.0	51	2
1355	735.0	75	1.0	52	2
1400	737.9	75	1.0	52	2
1405	740.6	76	1.0	52	2
1410	743.3	77	1.0	53	2
1415	746.1	78	1.0	54	2
1420	748.9	78	1.0	54	2
1425	751.6	79	1.0	55	2
1430	754.3	79	1.0	55	2
1435	757.146				

Pre Impingers iced? ☒0.010
0.00 ft³ @ 4 " Hg

Post

0.010 ft³ @ 4 " Hg

Impinger Weights (gms)		
#	pre	post
1	713.712 ³	860.5
2	724.0	731.7
3	610.4	614.2
4	887.3	893.2
5		
6		

Facility: HESS CORP Run # 3
 Source: WGS Date: 9-17-10
 Location: OUTLET RM18

Stack Dimensions (inches): 91
 Barometric Pressure (" Hg): 29.99
 Static Pressure (" H₂O): 10.84

Meter box ID: 5 ΔH @: 1.745 Y-factor: 0.996

Pitot lines leak-checked? ☒ C_p: .84

Time:		Traverse ID: <u>Post 2 / Pre 3</u>		
Port	Point	ΔP (" H ₂ O)	Temp. (°F)	Cyclonic Angle
A	1	0.97	134	
	2	1.3	134	
	3	1.45	134	
	4	1.5	135	
	5	1.5	134	
	6	1.6	134	
	7	1.6	134	
	8	1.6	134	
	9	1.5	134	
	10	1.4	134	
	11	1.2	134	
	12	0.83	134	

Pitot lines leak-checked? ☒ C_p: .84

Time:		Traverse ID: <u>Post 2 / Pre 3</u>		
Port	Point	ΔP (" H ₂ O)	Temp. (°F)	Cyclonic Angle
B1	1	1.2	135	
	2	1.3	135	
	3	1.35	135	
	4	1.4	135	
	5	1.4	135	
	6	1.5	135	
	7	1.5	135	
	8	1.4	135	
	9	1.45	135	
	10	1.3	135	
	11	0.97	135	
	12	0.82	135	

Time	DGM		ΔH (" H ₂ O)	Exit Impinger (°F)	Vacuum (" Hg)
	(ft ³)	Out (°F)			
1524	757.207	74	1.0	51	2
1529	759.9	73	1.0	44	2
1534	762.6	73	1.0	44	2
1539	765.4	73	1.0	44	2
1544	768.1	73	1.0	44.5	2
1549	771.0	73	1.0	46	2
1554	773.6	73	1.0	46	2
1559	776.3	75	1.0	47	2
1604	779.1	76	1.0	47	2
1609	781.8	76	1.0	47	2
1614	784.6	76	1.0	47	2
1619	787.4	77	1.0	48	2
1624	790.124				

Pre Impingers iced? ☒
0.000 ft³ @ 4 " Hg

Post
0.000 ft³ @ 4 " Hg

Impinger Weights (gms)		
#	pre	post
1	709.9	865.7
2	651.7	659.9
3	694.2	694.0
4	893.2	900.4
5		
6		

Facility: HESS CORP
 Source: W65
 Location: OUTLET

Run # 3
 Date: 9-17-10

Stack Dimensions (inches): 91
 Barometric Pressure (" Hg): 29.99
 Static Pressure (" H₂O): +0.81

Rm 18

Meter box ID: 5 ΔH @: 1.745 Y-factor: 0.996

Pitot lines leak-checked? ☒ C_p : .84

Time:		Traverse ID: <u>Post 3</u>		
Port	Point	ΔP (" H ₂ O)	Temp. (°F)	Cyclonic Angle
A	1	0.95	135	
	2	1.3	136	
	3	1.4	135	
	4	1.4	135	
	5	1.45	135	
	6	1.5	135	
	7	1.6	135	
	8	1.6	138.5	
	9	1.55	135	
	10	1.4	135	
	11	1.1	135	
	12	0.83	135	

Pitot lines leak-checked? ☒ C_p : .84

Time:		Traverse ID: <u>Post 3</u>		
Port	Point	ΔP (" H ₂ O)	Temp. (°F)	Cyclonic Angle
B	1	1.2	135	
	2	1.4	135	
	3	1.35	135	
	4	1.4	134	
	5	1.5	134	
	6	1.5	135	
	7	1.55	135	
	8	1.6	135	
	9	1.45	135	
	10	1.35	135	
	11	0.99	135	
	12	0.84	135	

Time	DGM		ΔH (" H ₂ O)	Exit Impinger (°F)	Vacuum (" Hg)
	(ft ³)	Out (°F)			

Pre Impingers iced?
 _____ ft³ @ _____ " Hg

Post _____ ft³ @ _____ " Hg

Impinger Weights (gms)		
#	pre	post
1		
2		
3		
4		
5		
6		