



**CEMS RATA Summary**  
**YCUA**  
 Performance Specifications 3 & 4A  
 FBI Exhaust Stack  
 December 13, 2022

Run No.	Use Run	Time		Reference Method					YCUA CEMS			DIFFERENCE			
		Start	Stop	O <sub>2</sub> %vd	CO ppmvd	SO <sub>2</sub> ppmvd	CO @ 7% O <sub>2</sub> ppmvd	SO <sub>2</sub> @ 7% O <sub>2</sub> ppmvd	O <sub>2</sub> %vd	CO @ 7% O <sub>2</sub> ppmvd	SO <sub>2</sub> @ 7% O <sub>2</sub> ppmvd	O <sub>2</sub> %vd	CO @ 7% O <sub>2</sub> ppmvd	SO <sub>2</sub> @ 7% O <sub>2</sub> ppmvd	
1	Y	09:15	09:36	6.61	16.4	3.01	15.95	2.93	6.7	13.9	3.4	-0.10	2.05	-0.47	
2	Y	09:47	10:08	5.69	9.17	4.89	8.38	4.47	5.8	5.6	5.2	-0.14	2.78	-0.73	
3	Y	10:20	10:41	6.38	3.72	4.93	3.56	4.72	6.3	3.3	5.7	0.07	0.26	-0.98	
4	Y	11:05	11:26	5.62	9.17	7.65	8.34	6.96	5.5	7.1	8.4	0.13	1.24	-1.44	
5	Y	11:42	12:03	5.21	9.92	8	8.79	7.09	5.1	8.1	9.0	0.10	0.69	-1.91	
6	Y	13:03	13:24	6.22	6.06	11.5	5.74	10.89	6.3	4.7	10.5	-0.04	1.04	0.39	
7	Y	13:40	14:01	5.73	8.28	12	7.59	11.00	5.6	6.9	10.6	0.11	0.69	0.40	
8	Y	14:21	14:42	4.75	18.91	12.52	16.28	10.78	4.7	13.3	9.7	0.07	2.98	1.08	
9	Y	15:00	15:21	5.33	9.06	8.03	8.09	7.17	5.3	6.9	7.8	0.04	1.19	-0.63	
10	Y	15:32	15:53	5.34	9.5	8.68	8.49	7.75	5.3	7.2	8.4	0.03	1.29	-0.65	
11															
12															
13															
14															
15															
16															
Averages				5.69	10.02	8.12	9.12	7.37	5.66	7.70	7.87	ABS	0.03	1.42	0.50

<b>CO Standard (ppm at 7% O<sub>2</sub>)</b> 64	<b>SO<sub>2</sub> Standard (ppm at 7% O<sub>2</sub>)</b> 15
<b>Relative Accuracy Specifications</b>	
CO ≤ 10% RM or ≤ 5% of the Standard	
SO <sub>2</sub> ≤ 20% RM or ≤ 10% of the Standard	
O <sub>2</sub> ≤ 20% RM or	
O <sub>2</sub> ≤ 1.0% Absolute Difference	

	<b>O<sub>2</sub> %vd</b>	<b>CO @ 7% O<sub>2</sub> ppmvd</b>	<b>SO<sub>2</sub> @ 7% O<sub>2</sub> ppmvd</b>
<b>Standard Deviation (sd) =</b>	0.09	0.90	0.90
<b>Confidence Coefficient (CC) =</b>	0.07	0.65	0.64
<b>RA average RM value (%) =</b>	1.62	22.65	15.44
<b>RA % of standard (%) =</b>	-	3.23	7.59
<b>RA<sub>ABS diff + CC</sub> (ppm) =</b>	-	2.07	-
<b>TEST RESULT</b>	<b>PASS</b>	<b>PASS</b>	<b>PASS</b>

**Standard Deviation:**

$$sd = \left[ \frac{\sum_{i=1}^n di^2 - \frac{\left(\sum_{i=1}^n di\right)^2}{n}}{n - 1} \right]^{1/2}$$

(or)  $sd = \sqrt{\frac{\sum X^2 - n \bar{X}^2}{n - 1}}$

$\frac{|\bar{d}|}{RM}$  = absolute mean of differences (RM-CEM)  
 $\frac{|CC|}{RM}$  = absolute value of the confidence coefficient  
 $\frac{|\bar{d}|}{RM}$  = absolute mean of RM values

**Confidence Coefficient (CC):**

$$CC = t_{0.975} \frac{sd}{\sqrt{n}}$$

**Relative Accuracy (RA):**

$$\frac{[|\bar{d}| + |CC|]}{RM} \times 100$$



**GAMMIE AIR  
MONITORING, LLC**

**Appendix B**

**Reference Method CEMS Data**

**RECEIVED**  
**GamAir.com**  
Project No.: 825-2210-3  
**FEB 13 2023**  
**AIR QUALITY DIVISION**

<b>YCUA</b> <b>FBI Exhaust Stack</b> <b>Response Time</b> <b>Ypsilanti, MI</b> <b>13-Dec-2022</b>			
<b>Heat Line Length:</b> 200' <b>Sample Pump Flow:</b> 8 liters per minute			
<b><u>Parameter:</u></b> Oxygen - O <sub>2</sub> <b><u>Bias Span Value (%):</u></b> 11.01 %vd			
Scale	Expected Value	95 Percent of Expected Value	Monitor Response Time (seconds)
upscale	11.0	10.5	45
downscale	0.0	0.6	47
Response Time			47
2 X Response Time			<b>94</b>
<b><u>Parameter:</u></b> Carbon Monoxide - CO <b><u>Bias Span Value:</u></b> 50.31 ppmvd			
Scale	Expected Value	95 Percent of Expected Value	Monitor Response Time (seconds)
upscale	50.3	47.8	96
downscale	0.0	2.5	95
Response Time			96
2 X Response Time			<b>192</b>
<b><u>Parameter:</u></b> Sulfur Dioxide - SO <sub>2</sub> <b><u>Bias Span Value:</u></b> 11.07 ppmvd			
Scale	Expected Value	95 Percent of Expected Value	Monitor Response Time (seconds)
upscale	11.1	10.5	145
downscale	0.0	0.6	144
Response Time			145
2 X Response Time			<b>290</b>

## Stratification Test Results and Acceptance Criteria

**Firm Name:** YCUA                                      **Fuel:** Municipal Waste  
**Date:** 12/13/2022                                      **Time:** 08:05-08:26  
**Location:** FBI Exhaust Stack                                      **Pollutant:** CO

**Minimum Sample Duration Per Point:**

192 seconds

Traverse Point	Time	CO %vd	Absolute Difference From Mean
1	08:12	1.81	0.43
2	08:19	1.06	0.31
3	08:26	1.26	0.12
	<b>Mean</b>	<b>1.38</b>	

- 1) If the concentration at each traverse point differs from the mean concentration for all traverse points by no more than: (a) ±5% of the mean concentration; or (b) ±0.5ppm (whichever is less restrictive) the gas stream is considered unstratified and you may collect samples from a single point that most closely matches the measured line.
  
- 2) If the 5% or 0.5 ppm criteria is not met but the concentration at each traverse point differs from the mean concentration for all traverse points by no more than ±10% of the mean; or ±1.0 ppm (whichever is less restrictive), the gas stream is considered minimally stratified and you may collect samples from three points, spaced 16.7, 50.0, and 83.3% of the measured line.
  
- 3) If the gas stream is found to be stratified, locate 12 points for the test in accordance with Table 1-1 or Table 1-2 of EPA Method 1.
  
- 4) The alternative acceptance criterion for 3-point sampling will be ± 0.5 percent CO<sub>2</sub> or O<sub>2</sub> and the alternative acceptance criterion for single point sampling will be ± 0.3 percent CO<sub>2</sub> or O<sub>2</sub>.

EPA Method 3A, Section 8.1 or EPA Method 7E, Section 8.1.2

<u>Log Averages</u>	O2 (%vd)	CO (ppmvd)	SO2 (ppmvd)
	Stack	Stack	Stack
13Dec2022 - 08:06:30	7.86	0.5	6.41
13Dec2022 - 08:07:30	7.39	1.34	7.75
13Dec2022 - 08:08:30	6.7	1.14	8.56
13Dec2022 - 08:09:30	6.02	3.12	8.89
13Dec2022 - 08:10:30	6.49	3.21	10.06
13Dec2022 - 08:11:30	6.87	1.05	10.06
13Dec2022 - 08:12:30	6.58	2.31	10.72
13Dec2022 - 08:13:30	7.52	0.8	10.27
13Dec2022 - 08:14:30	7.66	0.93	10.3
13Dec2022 - 08:15:30	7.4	0.73	10.33
13Dec2022 - 08:16:30	7.01	1.09	10.83
13Dec2022 - 08:17:30	6.94	1.28	10.47
13Dec2022 - 08:18:30	6.34	1.5	11.47
13Dec2022 - 08:19:30	6.75	1.12	11.08
13Dec2022 - 08:20:30	6.96	1.03	8.48
13Dec2022 - 08:21:30	6.57	1.72	5.42
13Dec2022 - 08:22:30	6.29	2.04	4.21
13Dec2022 - 08:23:30	6.91	1.17	3.64
13Dec2022 - 08:24:30	6.78	1.07	3.21
13Dec2022 - 08:25:30	6.88	1.05	2.95
13Dec2022 - 08:26:30	7.44	0.71	3

**CEMS Stratification Sample Traverse Location**

<b>Firm Name:</b>	YCUA
<b>Location:</b>	FBI Exhaust Stack
<b>Stack Diameter:</b>	<u>41.5</u> inches
<b>Length of Port Nipple:</b>	<u>10</u> inches

<b>Circular Twelve Point Traverse</b>			
Traverse Point Number	Fraction of Stack Diameter	Distance From Inside Wall (inches)	Distance Including Nipple Length (inches)
1	0.021	0.9	10.9
2	0.067	2.8	12.8
3	0.118	4.9	14.9
4	0.177	7.3	17.3
5	0.25	10.4	20.4
6	0.356	14.8	24.8
7	0.644	26.7	36.7
8	0.75	31.1	41.1
9	0.823	34.2	44.2
10	0.882	36.6	46.6
11	0.933	38.7	48.7
12	0.979	40.6	50.6

<b>Three Point Traverse</b>			
Traverse Point Number	Fraction of Stack Diameter	Distance From Inside Wall (inches)	Distance Including Nipple Length (inches)
1	0.167	6.9	16.9
2	0.50	20.8	30.8
3	0.833	34.6	44.6

<u>Cylinder Gas</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Zero ID	EB0111199	EB0111199	EB0111199
Zero Expiration	NA	NA	NA
Low ID			
Low Expiration			
Low Concentration			
Mid ID	CC110881	CC423759	CC426960
Mid Expiration	7/26/2034	3/30/2033	6/22/2029
Mid Concentration	11.01	50.31	25.58
High ID	ALM-049064	XC031050B	CC711314
High Expiration	7/1/2034	4/16/2031	6/19/2033
High Concentration	20.96	99.57	50.76
<u>Calibration Error</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 07:39:49	-0.01	0.01	-0.03
Zero Response	-0.05	0.01	-0.06
Zero Error (%)	0	0	0
Low Response	0	0	0
Low Error (%)	11.12	50.43	26.34
Mid Response	0.52	0.12	1.5
Mid Error (%)	21.06	99.97	51.21
High Response	0.48	0.4	0.89
High Error (%)			
<u>Initial Bias</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 08:01:53	0.17	0.09	0.31
Zero Response	0.86	0.08	0.67
Zero Bias (%)	11.01	50.31	25.58
Span Concentration	10.9	49.14	24.7
Span Response	-1.05	-1.3	-3.23
Span Bias (%)			
<u>Final Bias &amp; Drift</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 09:43:09	0.06	0.08	0.7
Zero Response	0.33	0.07	1.44
Zero Bias (%)	-0.52	-0.01	0.77
Zero Drift (%)	11.01	50.31	25.58
Span Concentration	10.87	48.5	24.11
Span Response	-1.19	-1.94	-4.39
Span Bias (%)	-0.14	-0.65	-1.15
Span Drift (%)			
<u>Results</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Corrected Averages	6.61	16.4	3.01
<u>Log Averages</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 09:16:00	5.45	8.49	5.78
13Dec2022 - 09:17:00	5.91	2.91	5.43
13Dec2022 - 09:18:00	3.75	32.01	5.63
13Dec2022 - 09:19:00	6.08	43.11	6.17
13Dec2022 - 09:20:00	9.53	3.14	5.05
13Dec2022 - 09:21:00	7.41	1.03	3.57
13Dec2022 - 09:22:00	5.37	4.56	2.67
13Dec2022 - 09:23:00	4.36	16.02	2.36
13Dec2022 - 09:24:00	3.64	35.02	2.29
13Dec2022 - 09:25:00	3.21	49.59	2.55
13Dec2022 - 09:26:00	2.82	86.39	3.07
13Dec2022 - 09:27:00	6.87	39.87	3.73
13Dec2022 - 09:28:00	9.65	3.9	3.55
13Dec2022 - 09:29:00	11.16	0.99	2.64
13Dec2022 - 09:30:00	7.88	0.62	2.11
13Dec2022 - 09:31:00	5.24	1.97	1.93
13Dec2022 - 09:32:00	8.41	1.97	1.61
13Dec2022 - 09:33:00	8.67	0.42	1.6
13Dec2022 - 09:34:00	8.11	0.6	1.79
13Dec2022 - 09:35:00	7.38	1.44	2.43
13Dec2022 - 09:36:00	7.28	1.31	3.67
Average	6.58	15.97	3.32

<u>Cylinder Gas</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Zero ID	EB0111199	EB0111199	EB0111199
Zero Expiration	NA	NA	NA
Low ID			
Low Expiration			
Low Concentration			
Mid ID	CC110881	CC423759	CC426960
Mid Expiration	7/26/2034	3/30/2033	6/22/2029
Mid Concentration	11.01	50.31	25.58
High ID	ALM-049064	XC031050B	CC711314
High Expiration	7/1/2034	4/16/2031	6/19/2033
High Concentration	20.96	99.57	50.76
<u>Calibration Error</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 07:39:49	-0.01	0.01	-0.03
Zero Response	-0.05	0.01	-0.06
Zero Error (%)	0	0	0
Low Response	0	0	0
Low Error (%)	11.12	50.43	26.34
Mid Response	0.52	0.12	1.5
Mid Error (%)	21.06	99.97	51.21
High Response	0.48	0.4	0.89
High Error (%)			
<u>Initial Bias</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 09:43:09	0.06	0.08	1.55
Zero Response	0.33	0.07	3.11
Zero Bias (%)	11.01	50.31	25.58
Span Concentration	10.87	48.5	24.11
Span Response	-1.19	-1.94	-4.39
Span Bias (%)			
<u>Final Bias &amp; Drift</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 10:16:09	0.09	0.3	0.77
Zero Response	0.48	0.29	1.58
Zero Bias (%)	0.14	0.22	-1.54
Zero Drift (%)	11.01	50.31	25.58
Span Concentration	10.89	48.14	24.12
Span Response	-1.1	-2.3	-4.37
Span Bias (%)	0.09	-0.36	0.02
Span Drift (%)			
<u>Results</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Corrected Averages	5.69	9.17	4.89
<u>Log Averages</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 09:48:09	3.84	50.31	5.29
13Dec2022 - 09:49:09	4.68	7.91	5.8
13Dec2022 - 09:50:09	5.82	3.97	5.2
13Dec2022 - 09:51:09	6.42	2.31	4.72
13Dec2022 - 09:52:09	5.93	3.01	4.76
13Dec2022 - 09:53:09	5.23	9.47	4.89
13Dec2022 - 09:54:09	5.41	6.01	5.71
13Dec2022 - 09:55:09	6.36	3.28	5.75
13Dec2022 - 09:56:09	6.37	1.52	5.51
13Dec2022 - 09:57:09	6.28	3.82	5.24
13Dec2022 - 09:58:09	5.51	6.55	5.45
13Dec2022 - 09:59:09	5.46	8.62	5.83
13Dec2022 - 10:00:09	5.48	4.09	6.04
13Dec2022 - 10:01:09	4.7	11.62	6.25
13Dec2022 - 10:02:09	4.58	32.62	6.54
13Dec2022 - 10:03:09	4.28	22.78	6.73
13Dec2022 - 10:04:09	6.14	3.61	6.33
13Dec2022 - 10:05:09	7.29	1.07	5.65
13Dec2022 - 10:06:09	7.04	1.68	5.2
13Dec2022 - 10:07:09	6.21	1.6	4.94
13Dec2022 - 10:08:09	5.87	2.35	4.83
Average	5.66	8.96	5.55

<u>Cylinder Gas</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Zero ID	EB0111199	EB0111199	EB0111199
Zero Expiration	NA	NA	NA
Low ID			
Low Expiration			
Low Concentration			
Mid ID	CC110881	CC423759	CC426960
Mid Expiration	7/26/2034	3/30/2033	6/22/2029
Mid Concentration	11.01	50.31	25.58
High ID	ALM-049064	XC031050B	CC711314
High Expiration	7/1/2034	4/16/2031	6/19/2033
High Concentration	20.96	99.57	50.76
<u>Calibration Error</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 07:39:49	-0.01	0.01	-0.03
Zero Response	-0.05	0.01	-0.06
Zero Error (%)	0	0	0
Low Response	0	0	0
Low Error (%)	11.12	50.43	26.34
Mid Response	0.52	0.12	1.5
Mid Error (%)	21.06	99.97	51.21
High Response	0.48	0.4	0.89
High Error (%)			
<u>Initial Bias</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 10:16:09	0.09	0.3	1.57
Zero Response	0.48	0.29	3.15
Zero Bias (%)	11.01	50.31	25.58
Span Concentration	10.89	48.14	24.12
Span Response	-1.1	-2.3	-4.37
Span Bias (%)			
<u>Final Bias &amp; Drift</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 10:53:51	0.09	-0.06	1.38
Zero Response	0.48	-0.07	2.78
Zero Bias (%)	0	-0.36	-0.37
Zero Drift (%)	11.01	50.31	25.58
Span Concentration	10.89	48.16	24.1
Span Response	-1.1	-2.28	-4.41
Span Bias (%)	0	0.02	-0.04
Span Drift (%)			
<u>Results</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Corrected Averages	6.38	3.72	4.93
<u>Log Averages</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 10:21:00	7.01	1.25	6.47
13Dec2022 - 10:22:00	6.27	0.92	5.78
13Dec2022 - 10:23:00	6.09	1.51	5.42
13Dec2022 - 10:24:00	6.42	1.12	5.24
13Dec2022 - 10:25:00	6.2	1.73	5.26
13Dec2022 - 10:26:00	5.62	3.23	5.56
13Dec2022 - 10:27:00	5.74	4.25	5.65
13Dec2022 - 10:28:00	7.04	1.47	5.37
13Dec2022 - 10:29:00	7.21	1.18	5.05
13Dec2022 - 10:30:00	6.87	1.36	5.04
13Dec2022 - 10:31:00	5.39	7.64	5.66
13Dec2022 - 10:32:00	5.24	16.11	6.88
13Dec2022 - 10:33:00	5.76	8.73	7.28
13Dec2022 - 10:34:00	4.92	14.78	7.48
13Dec2022 - 10:35:00	6.69	1.74	7.44
13Dec2022 - 10:36:00	7.38	1.16	6.43
13Dec2022 - 10:37:00	7.41	0.85	5.65
13Dec2022 - 10:38:00	7.35	0.96	5.16
13Dec2022 - 10:39:00	6.48	1.82	5.05
13Dec2022 - 10:40:00	6	2.84	5.27
13Dec2022 - 10:41:00	6.32	2.49	5.58
Average	6.35	3.67	5.84



<u>Cylinder Gas</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Zero ID	EB0111199	EB0111199	EB0111199
Zero Expiration	NA	NA	NA
Low ID			
Low Expiration			
Low Concentration			
Mid ID	CC110881	CC423759	CC426960
Mid Expiration	7/26/2034	3/30/2033	6/22/2029
Mid Concentration	11.01	50.31	25.58
High ID	ALM-049064	XC031050B	CC711314
High Expiration	7/1/2034	4/16/2031	6/19/2033
High Concentration	20.96	99.57	50.76
<u>Calibration Error</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 07:39:49	-0.01	0.01	-0.03
Zero Response	-0.05	0.01	-0.06
Zero Error (%)	0	0	0
Low Response	0	0	0
Low Error (%)	11.12	50.43	26.34
Mid Response	0.52	0.12	1.5
Mid Error (%)	21.06	99.97	51.21
High Response	0.48	0.4	0.89
High Error (%)			
<u>Initial Bias</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 10:53:51	0.09	-0.06	1.38
Zero Response	0.48	-0.07	2.78
Zero Bias (%)	11.01	50.31	25.58
Span Concentration	10.89	48.16	24.1
Span Response	-1.1	-2.28	-4.41
Span Bias (%)			
<u>Final Bias &amp; Drift</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 11:38:11	0.06	-0.15	1.41
Zero Response	0.33	-0.16	2.84
Zero Bias (%)	-0.14	-0.09	0.06
Zero Drift (%)	11.01	50.31	25.58
Span Concentration	10.89	48.82	24.11
Span Response	-1.1	-1.62	-4.39
Span Bias (%)	0	0.66	0.02
Span Drift (%)			
<u>Results</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Corrected Averages	5.62	9.17	7.65
<u>Log Averages</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 11:06:20	7.03	1.28	7.26
13Dec2022 - 11:07:20	6.18	4.31	6.91
13Dec2022 - 11:08:20	5.41	19.81	7.39
13Dec2022 - 11:09:20	5.6	5.72	7.75
13Dec2022 - 11:10:20	6.07	2.64	8.47
13Dec2022 - 11:11:20	5.74	3.91	8.13
13Dec2022 - 11:12:20	4.93	12.19	8.79
13Dec2022 - 11:13:20	5.4	4.47	9.39
13Dec2022 - 11:14:20	5.62	8.46	9.17
13Dec2022 - 11:15:20	5.21	10.13	9.17
13Dec2022 - 11:16:20	5.39	9.42	8.97
13Dec2022 - 11:17:20	5.86	4.75	8.19
13Dec2022 - 11:18:20	6.47	1.91	7.35
13Dec2022 - 11:19:20	6.12	5.68	6.88
13Dec2022 - 11:20:20	5.8	7.5	7.4
13Dec2022 - 11:21:20	5.17	22.89	7.89
13Dec2022 - 11:22:20	3.99	36.93	8.41
13Dec2022 - 11:23:20	4.94	8.17	8.82
13Dec2022 - 11:24:20	5.21	6.04	8.33
13Dec2022 - 11:25:20	5.43	5.64	8.45
13Dec2022 - 11:26:20	6	2.01	8.93
Average	5.6	8.75	8.19

<u>Cylinder Gas</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Zero ID	EB0111199	EB0111199	EB0111199
Zero Expiration	NA	NA	NA
Low ID			
Low Expiration			
Low Concentration			
Mid ID	CC110881	CC423759	CC426960
Mid Expiration	7/26/2034	3/30/2033	6/22/2029
Mid Concentration	11.01	50.31	25.58
High ID	ALM-049064	XC031050B	CC711314
High Expiration	7/1/2034	4/16/2031	6/19/2033
High Concentration	20.96	99.57	50.76
<u>Calibration Error</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 07:39:49	-0.01	0.01	-0.03
Zero Response	-0.05	0.01	-0.06
Zero Error (%)	0	0	0
Low Response	0	0	0
Low Error (%)	11.12	50.43	26.34
Mid Response	0.52	0.12	1.5
Mid Error (%)	21.06	99.97	51.21
High Response	0.48	0.4	0.89
High Error (%)			
<u>Initial Bias</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 11:38:11	0.06	-0.15	1.41
Zero Response	0.33	-0.16	2.84
Zero Bias (%)	11.01	50.31	25.58
Span Concentration	10.89	48.82	24.11
Span Response	-1.1	-1.62	-4.39
Span Bias (%)			
<u>Final Bias &amp; Drift</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 12:16:11	0.06	-0.33	1.51
Zero Response	0.33	-0.34	3.03
Zero Bias (%)	0	-0.18	0.2
Zero Drift (%)	11.01	50.31	25.58
Span Concentration	10.88	48.61	24.23
Span Response	-1.15	-1.83	-4.16
Span Bias (%)	-0.05	-0.21	0.23
Span Drift (%)			
<u>Results</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Corrected Averages	5.21	9.92	8
<u>Log Averages</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 11:43:00	5.79	3.31	8.19
13Dec2022 - 11:44:00	5.76	4.23	7.4
13Dec2022 - 11:45:00	5.77	6.1	7.17
13Dec2022 - 11:46:00	5.76	4.84	7.07
13Dec2022 - 11:47:00	5.67	4.11	7.01
13Dec2022 - 11:48:00	5.22	11.38	7.08
13Dec2022 - 11:49:00	4.98	9.68	7.78
13Dec2022 - 11:50:00	4.69	15.9	8.56
13Dec2022 - 11:51:00	4.72	6.58	9.12
13Dec2022 - 11:52:00	4.86	6.09	9.24
13Dec2022 - 11:53:00	4.82	13.21	9.39
13Dec2022 - 11:54:00	4.87	10.49	9.61
13Dec2022 - 11:55:00	4.88	12.34	9.69
13Dec2022 - 11:56:00	4.86	15.19	10.03
13Dec2022 - 11:57:00	4.96	12.12	10.08
13Dec2022 - 11:58:00	5.17	11.64	9.59
13Dec2022 - 11:59:00	5.35	11.21	9.04
13Dec2022 - 12:00:00	5.3	9.85	8.27
13Dec2022 - 12:01:00	5.17	11.01	8.1
13Dec2022 - 12:02:00	5.01	6.83	8.4
13Dec2022 - 12:03:00	5.09	11.47	9
Average	5.18	9.41	8.56

RECEIVED  
FEB 13 2023  
AIR QUALITY DIVISION

<u>Cylinder Gas</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Zero ID	EB0111199	EB0111199	EB0111199
Zero Expiration	NA	NA	NA
Low ID			
Low Expiration			
Low Concentration			
Mid ID	CC110881	CC423759	CC426960
Mid Expiration	7/26/2034	3/30/2033	6/22/2029
Mid Concentration	11.01	50.31	25.58
High ID	ALM-049064	XC031050B	CC711314
High Expiration	7/1/2034	4/16/2031	6/19/2033
High Concentration	20.96	99.57	50.76
<u>Calibration Error</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 07:39:49			
Zero Response	-0.01	0.01	-0.03
Zero Error (%)	-0.05	0.01	-0.06
Low Response	0	0	0
Low Error (%)	0	0	0
Mid Response	11.12	50.43	26.34
Mid Error (%)	0.52	0.12	1.5
High Response	21.06	99.97	51.21
High Error (%)	0.48	0.4	0.89
<u>Initial Bias</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 12:16:11			
Zero Response	0.06	-0.33	1.51
Zero Bias (%)	0.33	-0.34	3.03
Span Concentration	11.01	50.31	25.58
Span Response	10.88	48.61	24.23
Span Bias (%)	-1.15	-1.83	-4.16
<u>Final Bias &amp; Drift</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 13:36:23			
Zero Response	0.06	0.37	1.56
Zero Bias (%)	0.33	0.36	3.13
Zero Drift (%)	0	0.7	0.1
Span Concentration	11.01	50.31	25.58
Span Response	10.87	49.13	24.15
Span Bias (%)	-1.19	-1.31	-4.31
Span Drift (%)	-0.05	0.52	-0.16
<u>Results</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Corrected Averages	6.22	6.06	11.5
<u>Log Averages</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 13:04:34	5.66	6.41	12.66
13Dec2022 - 13:05:34	5.85	5.74	13.17
13Dec2022 - 13:06:34	6.4	3.43	12.84
13Dec2022 - 13:07:34	6.73	1.8	12.22
13Dec2022 - 13:08:34	6.77	1.73	11.42
13Dec2022 - 13:09:34	7.06	1.51	11.14
13Dec2022 - 13:10:34	7.26	1.37	10.34
13Dec2022 - 13:11:34	7.37	1.18	9.67
13Dec2022 - 13:12:34	7.27	1.33	9.16
13Dec2022 - 13:13:34	7.11	1.5	9.19
13Dec2022 - 13:14:34	7.06	4.84	9.8
13Dec2022 - 13:15:34	6.95	2.59	10.83
13Dec2022 - 13:16:34	6.59	3.83	11.75
13Dec2022 - 13:17:34	5.34	21.55	12.99
13Dec2022 - 13:18:34	4.28	30.33	13.98
13Dec2022 - 13:19:34	4.53	7.87	15.38
13Dec2022 - 13:20:34	4.78	8.12	15.18
13Dec2022 - 13:21:34	5.07	5.03	13.62
13Dec2022 - 13:22:34	5.28	4.84	11.91
13Dec2022 - 13:23:34	5.61	6.45	10.49
13Dec2022 - 13:24:34	6.53	2.49	9.19
Average	6.17	5.9	11.76

<u>Cylinder Gas</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Zero ID	EB0111199	EB0111199	EB0111199
Zero Expiration	NA	NA	NA
Low ID			
Low Expiration			
Low Concentration			
Mid ID	CC110881	CC423759	CC426960
Mid Expiration	7/26/2034	3/30/2033	6/22/2029
Mid Concentration	11.01	50.31	25.58
High ID	ALM-049064	XC031050B	CC711314
High Expiration	7/1/2034	4/16/2031	6/19/2033
High Concentration	20.96	99.57	50.76
<u>Calibration Error</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 07:39:49	-0.01	0.01	-0.03
Zero Response	-0.05	0.01	-0.06
Zero Error (%)	0	0	0
Low Response	0	0	0
Low Error (%)	11.12	50.43	26.34
Mid Response	0.52	0.12	1.5
Mid Error (%)	21.06	99.97	51.21
High Response	0.48	0.4	0.89
High Error (%)			
<u>Initial Bias</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 13:36:23	0.06	0.37	1.56
Zero Response	0.33	0.36	3.13
Zero Bias (%)	11.01	50.31	25.58
Span Concentration	10.87	49.13	24.15
Span Response	-1.19	-1.31	-4.31
Span Bias (%)			
<u>Final Bias &amp; Drift</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 14:16:20	0.04	0	1.55
Zero Response	0.24	-0.01	3.11
Zero Bias (%)	-0.1	-0.37	-0.02
Zero Drift (%)	11.01	50.31	25.58
Span Concentration	10.89	48.96	24.1
Span Response	-1.1	-1.48	-4.41
Span Bias (%)	0.09	-0.17	-0.1
Span Drift (%)			
<u>Results</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Corrected Averages	5.73	8.28	12
<u>Log Averages</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 13:41:00	6.07	5.05	10.81
13Dec2022 - 13:42:00	6.07	5.85	11.25
13Dec2022 - 13:43:00	6.45	2.26	11.51
13Dec2022 - 13:44:00	6.41	2.14	10.81
13Dec2022 - 13:45:00	6.37	3.35	10.42
13Dec2022 - 13:46:00	6.43	2.06	10.42
13Dec2022 - 13:47:00	6.44	3.3	10.29
13Dec2022 - 13:48:00	6.26	1.91	10.16
13Dec2022 - 13:49:00	5.36	5.71	10.33
13Dec2022 - 13:50:00	5.58	5.41	10.71
13Dec2022 - 13:51:00	5.76	13.37	11.32
13Dec2022 - 13:52:00	5.68	9.95	12.61
13Dec2022 - 13:53:00	5.6	12.28	13.64
13Dec2022 - 13:54:00	5.57	5.72	15
13Dec2022 - 13:55:00	5.58	5.64	15.33
13Dec2022 - 13:56:00	5.4	12.83	14.53
13Dec2022 - 13:57:00	5.08	26.44	14.34
13Dec2022 - 13:58:00	4.94	6.82	14.48
13Dec2022 - 13:59:00	4.79	19.37	13.33
13Dec2022 - 14:00:00	4.69	10.58	12.37
13Dec2022 - 14:01:00	5.06	12.7	11.37
Average	5.69	8.23	12.14

<u>Cylinder Gas</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Zero ID	EB0111199	EB0111199	EB0111199
Zero Expiration	NA	NA	NA
Low ID			
Low Expiration			
Low Concentration			
Mid ID	CC110881	CC423759	CC426960
Mid Expiration	7/26/2034	3/30/2033	6/22/2029
Mid Concentration	11.01	50.31	25.58
High ID	ALM-049064	XC031050B	CC711314
High Expiration	7/1/2034	4/16/2031	6/19/2033
High Concentration	20.96	99.57	50.76
<u>Calibration Error</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 07:39:49	-0.01	0.01	-0.03
Zero Response	-0.05	0.01	-0.06
Zero Error (%)	0	0	0
Low Response	0	0	0
Low Error (%)	11.12	50.43	26.34
Mid Response	0.52	0.12	1.5
Mid Error (%)	21.06	99.97	51.21
High Response	0.48	0.4	0.89
High Error (%)			
<u>Initial Bias</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 14:16:20	0.04	0	1.55
Zero Response	0.24	-0.01	3.11
Zero Bias (%)	11.01	50.31	25.58
Span Concentration	10.89	48.96	24.1
Span Response	-1.1	-1.48	-4.41
Span Bias (%)			
<u>Final Bias &amp; Drift</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 14:54:34	0.07	0.1	1.49
Zero Response	0.38	0.09	2.99
Zero Bias (%)	0.14	0.1	-0.12
Zero Drift (%)	11.01	50.31	25.58
Span Concentration	10.89	48.63	24.05
Span Response	-1.1	-1.81	-4.51
Span Bias (%)	0	-0.33	-0.1
Span Drift (%)			
<u>Results</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Corrected Averages	4.75	18.91	12.52
<u>Log Averages</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 14:22:00	4.13	48.54	15.5
13Dec2022 - 14:23:00	4.08	23.14	16.74
13Dec2022 - 14:24:00	4.16	39.22	17.12
13Dec2022 - 14:25:00	3.84	29.79	16.58
13Dec2022 - 14:26:00	3.68	40.21	16.64
13Dec2022 - 14:27:00	4.34	22.6	15.69
13Dec2022 - 14:28:00	4.97	7.37	14.19
13Dec2022 - 14:29:00	4.82	11.35	13
13Dec2022 - 14:30:00	4.87	14.23	12.72
13Dec2022 - 14:31:00	4.82	12.48	12.56
13Dec2022 - 14:32:00	4.8	10.31	12.84
13Dec2022 - 14:33:00	4.8	20.11	12.59
13Dec2022 - 14:34:00	4.94	15.16	12.01
13Dec2022 - 14:35:00	5.09	10.42	11.11
13Dec2022 - 14:36:00	5.1	11.59	10.09
13Dec2022 - 14:37:00	5.14	6.46	9.6
13Dec2022 - 14:38:00	5.14	20.34	9.14
13Dec2022 - 14:39:00	5.18	11.21	8.85
13Dec2022 - 14:40:00	5.25	7.96	8.83
13Dec2022 - 14:41:00	5.1	6.85	8.76
13Dec2022 - 14:42:00	5	16.49	9.27
Average	4.73	18.37	12.56

<u>Cylinder Gas</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Zero ID	EB0111199	EB0111199	EB0111199
Zero Expiration	NA	NA	NA
Low ID			
Low Expiration			
Low Concentration			
Mid ID	CC110881	CC423759	CC426960
Mid Expiration	7/26/2034	3/30/2033	6/22/2029
Mid Concentration	11.01	50.31	25.58
High ID	ALM-049064	XC031050B	CC711314
High Expiration	7/1/2034	4/16/2031	6/19/2033
High Concentration	20.96	99.57	50.76
<u>Calibration Error</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 07:39:49			
Zero Response	-0.01	0.01	-0.03
Zero Error (%)	-0.05	0.01	-0.06
Low Response	0	0	0
Low Error (%)	0	0	0
Mid Response	11.12	50.43	26.34
Mid Error (%)	0.52	0.12	1.5
High Response	21.06	99.97	51.21
High Error (%)	0.48	0.4	0.89
<u>Initial Bias</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 14:54:34			
Zero Response	0.07	0.1	1.49
Zero Bias (%)	0.38	0.09	2.99
Span Concentration	11.01	50.31	25.58
Span Response	10.89	48.63	24.05
Span Bias (%)	-1.1	-1.81	-4.51
<u>Final Bias &amp; Drift</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 15:30:30			
Zero Response	0.03	0.11	1.52
Zero Bias (%)	0.19	0.1	3.05
Zero Drift (%)	-0.19	0.01	0.06
Span Concentration	11.01	50.31	25.58
Span Response	10.87	48.71	24.03
Span Bias (%)	-1.19	-1.73	-4.55
Span Drift (%)	-0.09	0.08	-0.04
<u>Results</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Corrected Averages	5.33	9.06	8.03
<u>Log Averages</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 15:01:00	5.06	7.85	8.22
13Dec2022 - 15:02:00	5.12	8.12	8.17
13Dec2022 - 15:03:00	6.41	2.02	8.33
13Dec2022 - 15:04:00	6.96	1.24	8.07
13Dec2022 - 15:05:00	6.88	1.41	7.98
13Dec2022 - 15:06:00	6.28	2	8.14
13Dec2022 - 15:07:00	5.57	2.53	8.32
13Dec2022 - 15:08:00	4.58	10.62	8.33
13Dec2022 - 15:09:00	4.93	14.55	8.3
13Dec2022 - 15:10:00	5.27	5.23	8.32
13Dec2022 - 15:11:00	5.21	7.73	8.45
13Dec2022 - 15:12:00	5.24	5.99	8.56
13Dec2022 - 15:13:00	5.43	7.54	8.61
13Dec2022 - 15:14:00	5.36	7.47	8.59
13Dec2022 - 15:15:00	4.96	8.29	8.7
13Dec2022 - 15:16:00	4.21	37.84	8.9
13Dec2022 - 15:17:00	4.32	19.81	9.07
13Dec2022 - 15:18:00	4.54	8.89	9.55
13Dec2022 - 15:19:00	4.71	17.05	9.56
13Dec2022 - 15:20:00	4.87	6.08	9.29
13Dec2022 - 15:21:00	5.1	3.58	8.73
Average	5.29	8.85	8.58

<u>Cylinder Gas</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Zero ID	EB0111199	EB0111199	EB0111199
Zero Expiration	NA	NA	NA
Low ID			
Low Expiration			
Low Concentration			
Mid ID	CC110881	CC423759	CC426960
Mid Expiration	7/26/2034	3/30/2033	6/22/2029
Mid Concentration	11.01	50.31	25.58
High ID	ALM-049064	XC031050B	CC711314
High Expiration	7/1/2034	4/16/2031	6/19/2033
High Concentration	20.96	99.57	50.76
<u>Calibration Error</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 07:39:49	-0.01	0.01	-0.03
Zero Response	-0.05	0.01	-0.06
Zero Error (%)	0	0	0
Low Response	0	0	0
Low Error (%)	11.12	50.43	26.34
Mid Response	0.52	0.12	1.5
Mid Error (%)	21.06	99.97	51.21
High Response	0.48	0.4	0.89
High Error (%)			
<u>Initial Bias</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 15:30:30	0.03	0.11	1.52
Zero Response	0.19	0.1	3.05
Zero Bias (%)	11.01	50.31	25.58
Span Concentration	10.87	48.71	24.03
Span Response	-1.19	-1.73	-4.55
Span Bias (%)			
<u>Final Bias &amp; Drift</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 16:09:17	0.03	0.13	1.48
Zero Response	0.19	0.12	2.97
Zero Bias (%)	0	0.02	-0.08
Zero Drift (%)	11.01	50.31	25.58
Span Concentration	10.88	48.79	24.01
Span Response	-1.15	-1.65	-4.59
Span Bias (%)	0.05	0.08	-0.04
Span Drift (%)			
<u>Results</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
Corrected Averages	5.34	9.5	8.68
<u>Log Averages</u>	O2 (%vd) Stack	CO (ppmvd) Stack	SO2 (ppmvd) Stack
13Dec2022 - 15:33:00	5.12	10.77	8.89
13Dec2022 - 15:34:00	4.95	13.02	9.26
13Dec2022 - 15:35:00	5.12	13.37	9.6
13Dec2022 - 15:36:00	5.23	12	9.43
13Dec2022 - 15:37:00	5.07	9.97	8.89
13Dec2022 - 15:38:00	4.9	12.06	8.79
13Dec2022 - 15:39:00	4.93	9.69	8.95
13Dec2022 - 15:40:00	4.97	8.67	9.31
13Dec2022 - 15:41:00	5	11.37	9.57
13Dec2022 - 15:42:00	4.96	9.78	9.56
13Dec2022 - 15:43:00	5.12	8.77	9.53
13Dec2022 - 15:44:00	5.41	6.71	9.31
13Dec2022 - 15:45:00	5.4	10.01	8.76
13Dec2022 - 15:46:00	5.53	7.45	8.71
13Dec2022 - 15:47:00	5.66	11.68	8.64
13Dec2022 - 15:48:00	5.79	4.39	8.53
13Dec2022 - 15:49:00	5.73	7	8.45
13Dec2022 - 15:50:00	5.6	6.01	8.66
13Dec2022 - 15:51:00	5.51	5.36	9.17
13Dec2022 - 15:52:00	5.51	10.79	9.73
13Dec2022 - 15:53:00	5.64	6.34	10.18
Average	5.29	9.3	9.14



**GAMMIE AIR  
MONITORING, LLC**

## **Appendix C**

### **YCUA CEMS Data**



# Data Summary Report



Company: Ypsilanti Community Utilities  
2777 State Street  
Ypsilanti, MI 48197

Data Group: All Data Groups

Report Name: No Title

Start of Report: 12/13/2022 09:16

End of Report: 12/13/2022 09:36

Validation: All Available Data

Group#-Channel#	G1-C2	G2-C6	G2-C5
Long Descrip.	O2 % SO2c	7%O2	COc 7%O2
Short Descrip.	O2 % SO2c	7%O2	COc 7%O2
Units	%	ppm	ppm
Range	-6-25	0-100	0-4000
<hr/>			
12/13/2022 09:16	5.49	5.1	3.7
12/13/2022 09:17	3.07	4.8	29.4
12/13/2022 09:18	9.07	6.6	43.2
12/13/2022 09:19	9.81	4.0	2.1
12/13/2022 09:20	5.63	1.8	1.4
12/13/2022 09:21	4.48	1.6	6.7
12/13/2022 09:22	3.75	1.8	13.9
12/13/2022 09:23	3.22	2.3	31.3
12/13/2022 09:24	2.94	2.6	36.5
12/13/2022 09:25	3.39	3.2	66.8
12/13/2022 09:26	9.31	4.6	40.8
12/13/2022 09:27	11.19	3.4	2.4
12/13/2022 09:28	10.26	1.8	1.8
12/13/2022 09:29	6.20	1.1	0.9
12/13/2022 09:30	6.41	1.4	2.9
12/13/2022 09:31	8.80	2.2	1.4
12/13/2022 09:32	8.26	2.2	0.9
12/13/2022 09:33	7.59	3.8	1.3
12/13/2022 09:34	7.02	4.9	2.0
12/13/2022 09:35	7.75	5.6	1.6
12/13/2022 09:36	7.35	5.9	1.7
<hr/>			
Period Average =	6.71	3.4	13.9
Period Max Value =	11.19	6.6	66.8
Period Min Value =	2.94	1.1	0.9
Period Totals =	1.4099E+2	7.0700E+1	2.9270E+2
Period % Recovery =	100.0	100.0	100.0

# Data Summary Report



Company: Ypsilanti Community Utilities  
 2777 State Street  
 Ypsilanti, MI 48197

Data Group: All Data Groups  
 Report Name: No Title  
 Start of Report: 12/13/2022 09:48  
 End of Report: 12/13/2022 10:08

Validation: All Available Data

Group#-Channel#	G1-C2	G2-C6	G2-C5
Long Descrip.	O2 % SO2c	7%O2	COc 7%O2
Short Descrip.	O2 % SO2c	7%O2	COc 7%O2
Units	%	ppm	ppm
Range	-6-25	0-100	0-4000
<hr/>			
12/13/2022 09:48	5.51	5.5	7.0
12/13/2022 09:49	6.40	5.3	3.3
12/13/2022 09:50	6.16	5.0	2.0
12/13/2022 09:51	5.51	4.9	3.0
12/13/2022 09:52	4.97	5.0	8.2
12/13/2022 09:53	6.18	5.3	4.5
12/13/2022 09:54	6.44	5.0	2.4
12/13/2022 09:55	6.35	4.9	1.8
12/13/2022 09:56	5.87	5.0	3.7
12/13/2022 09:57	5.17	5.2	6.1
12/13/2022 09:58	5.81	5.8	6.1
12/13/2022 09:59	4.74	5.3	3.8
12/13/2022 10:00	4.82	5.5	9.7
12/13/2022 10:01	3.94	5.3	21.2
12/13/2022 10:02	5.37	6.0	24.3
12/13/2022 10:03	7.15	6.0	2.3
12/13/2022 10:04	7.37	5.4	1.2
12/13/2022 10:05	6.43	4.8	1.8
12/13/2022 10:06	5.91	4.6	1.8
12/13/2022 10:07	6.03	4.5	2.1
12/13/2022 10:08	6.40	4.4	1.4
<hr/>			
Period Average =	5.83	5.2	5.6
Period Max Value =	7.37	6.0	24.3
Period Min Value =	3.94	4.4	1.2
Period Totals =	1.2253E+2	1.0870E+2	1.1770E+2
Period % Recovery =	100.0	100.0	100.0

# Data Summary Report



Company: Ypsilanti Community Utilities  
 2777 State Street  
 Ypsilanti, MI 48197

Data Group: All Data Groups

Report Name: No Title

Start of Report: 12/13/2022 10:21

End of Report: 12/13/2022 10:41

Validation: All Available Data

Group#-Channel#	G1-C2	G2-C6	G2-C5
Long Descrip.	O2 % SO2c	7%O2	COc 7%O2
Short Descrip.	O2 % SO2c	7%O2	COc 7%O2
Units	%	ppm	ppm
Range	-6-25	0-100	0-4000
12/13/2022 10:21	5.90	4.9	1.2
12/13/2022 10:22	6.50	5.3	1.6
12/13/2022 10:23	6.25	5.2	1.3
12/13/2022 10:24	5.74	5.2	2.0
12/13/2022 10:25	5.46	5.4	3.2
12/13/2022 10:26	6.95	5.7	3.0
12/13/2022 10:27	7.27	5.4	1.2
12/13/2022 10:28	7.09	5.2	1.2
12/13/2022 10:29	5.69	5.3	1.5
12/13/2022 10:30	4.99	6.3	10.2
12/13/2022 10:31	6.01	6.8	9.8
12/13/2022 10:32	4.64	6.2	7.7
12/13/2022 10:33	6.36	7.0	12.1
12/13/2022 10:34	7.43	6.6	1.4
12/13/2022 10:35	7.41	5.9	1.2
12/13/2022 10:36	7.45	5.5	0.8
12/13/2022 10:37	6.74	5.0	1.3
12/13/2022 10:38	5.86	5.4	1.8
12/13/2022 10:39	6.23	5.7	2.7
12/13/2022 10:40	6.86	6.0	2.0
12/13/2022 10:41	5.77	5.8	1.7
Period Average =	6.31	5.7	3.3
Period Max Value =	7.45	7.0	12.1
Period Min Value =	4.64	4.9	0.8
Period Totals =	1.3260E+2	1.1980E+2	6.8900E+1
Period % Recovery =	100.0	100.0	100.0

# Data Summary Report

Company: Ypsilanti Community Utilities  
 2777 State Street  
 Ypsilanti, MI 48197



Data Group: All Data Groups  
 Report Name: No Title  
 Start of Report: 12/13/2022 11:06  
 End of Report: 12/13/2022 11:26

Validation: All Available Data

Group#-Channel#	G1-C2	G2-C6	G2-C5
Long Descrip.	O2 % SO2c	7%O2	COc 7%O2
Short Descrip.	O2 % SO2c	7%O2	COc 7%O2
Units	%	ppm	ppm
Range	-6-25	0-100	0-4000
<hr/>			
12/13/2022 11:06	5.70	7.5	2.4
12/13/2022 11:07	5.37	8.1	16.5
12/13/2022 11:08	5.77	8.9	6.2
12/13/2022 11:09	6.29	8.8	2.3
12/13/2022 11:10	5.01	8.0	3.1
12/13/2022 11:11	5.12	9.0	10.1
12/13/2022 11:12	5.61	9.2	3.5
12/13/2022 11:13	5.34	8.8	7.0
12/13/2022 11:14	5.27	9.2	8.1
12/13/2022 11:15	5.54	8.6	7.8
12/13/2022 11:16	6.17	7.9	4.1
12/13/2022 11:17	6.55	7.3	1.8
12/13/2022 11:18	5.64	7.4	4.7
12/13/2022 11:19	6.01	8.5	6.4
12/13/2022 11:20	4.10	7.8	7.9
12/13/2022 11:21	4.35	8.6	36.3
12/13/2022 11:22	5.32	8.6	7.4
12/13/2022 11:23	5.02	8.1	4.9
12/13/2022 11:24	5.78	9.6	4.7
12/13/2022 11:25	6.07	9.1	2.0
12/13/2022 11:26	5.28	7.7	2.0
<hr/>			
Period Average =	5.49	8.4	7.1
Period Max Value =	6.55	9.6	36.3
Period Min Value =	4.10	7.3	1.8
Period Totals =	1.1531E+2	1.7670E+2	1.4920E+2
Period % Recovery =	100.0	100.0	100.0

# Data Summary Report



Company: Ypsilanti Community Utilities  
2777 State Street  
Ypsilanti, MI 48197

Data Group: All Data Groups  
Report Name: No Title  
Start of Report: 12/13/2022 11:43  
End of Report: 12/13/2022 12:03

Validation: All Available Data

Group#-Channel#	G1-C2	G2-C6	G2-C5
Long Descrip.	O2 % SO2c 7%O2	COc 7%O2	
Short Descrip.	O2 % SO2c 7%O2	COc 7%O2	
Units	%	ppm	ppm
Range	-6-25	0-100	0-4000
12/13/2022 11:43	5.79	7.5	3.7
12/13/2022 11:44	5.71	7.2	5.9
12/13/2022 11:45	5.76	7.3	2.8
12/13/2022 11:46	5.25	7.4	5.1
12/13/2022 11:47	5.04	8.4	8.7
12/13/2022 11:48	4.68	8.9	10.9
12/13/2022 11:49	4.64	9.3	9.1
12/13/2022 11:50	4.86	9.5	4.3
12/13/2022 11:51	4.78	9.7	6.6
12/13/2022 11:52	4.87	10.2	11.2
12/13/2022 11:53	4.86	10.0	7.5
12/13/2022 11:54	4.80	10.4	10.7
12/13/2022 11:55	4.91	10.4	11.3
12/13/2022 11:56	5.09	9.9	9.1
12/13/2022 11:57	5.33	9.2	9.9
12/13/2022 11:58	5.30	8.4	8.6
12/13/2022 11:59	5.20	8.4	8.3
12/13/2022 12:00	4.98	8.6	7.7
12/13/2022 12:01	5.05	9.5	6.2
12/13/2022 12:02	5.19	9.7	10.4
12/13/2022 12:03	5.19	9.1	11.5
Period Average =	5.11	9.0	8.1
Period Max Value =	5.79	10.4	11.5
Period Min Value =	4.64	7.2	2.8
Period Totals =	1.0728E+2	1.8900E+2	1.6950E+2
Period % Recovery =	100.0	100.0	100.0

RECEIVED  
FEB 13 2023  
AIR QUALITY DIVISION

# Data Summary Report



Company: Ypsilanti Community Utilities  
 2777 State Street  
 Ypsilanti, MI 48197

Data Group: All Data Groups

Report Name: No Title

Start of Report: 12/13/2022 13:04

End of Report: 12/13/2022 13:24

Validation: All Available Data

Group#-Channel#	G1-C2	G2-C6	G2-C5
Long Descrip.	O2 % SO2c	7%O2	COc 7%O2
Short Descrip.	O2 % SO2c	7%O2	COc 7%O2
Units	%	ppm	ppm
Range	-6-25	0-100	0-4000
12/13/2022 13:04	5.86	12.1	5.2
12/13/2022 13:05	6.56	12.2	3.1
12/13/2022 13:06	6.78	11.3	2.0
12/13/2022 13:07	6.78	10.2	1.5
12/13/2022 13:08	7.16	10.2	1.6
12/13/2022 13:09	7.29	9.7	1.4
12/13/2022 13:10	7.41	9.2	1.2
12/13/2022 13:11	7.25	8.8	1.3
12/13/2022 13:12	7.08	9.5	1.2
12/13/2022 13:13	7.12	10.7	3.8
12/13/2022 13:14	6.88	11.3	3.4
12/13/2022 13:15	6.58	12.5	2.7
12/13/2022 13:16	4.84	12.0	4.7
12/13/2022 13:17	4.28	13.0	32.1
12/13/2022 13:18	4.54	13.7	9.3
12/13/2022 13:19	4.85	12.2	5.7
12/13/2022 13:20	5.07	10.4	5.4
12/13/2022 13:21	5.31	8.9	2.9
12/13/2022 13:22	5.73	8.1	6.0
12/13/2022 13:23	6.77	7.6	3.1
12/13/2022 13:24	7.31	7.5	1.3
Period Average =	6.26	10.5	4.7
Period Max Value =	7.41	13.7	32.1
Period Min Value =	4.28	7.5	1.2
Period Totals =	1.3145E+2	2.2110E+2	9.8900E+1
Period % Recovery =	100.0	100.0	100.0

# Data Summary Report



Company: Ypsilanti Community Utilities  
2777 State Street  
Ypsilanti, MI 48197

Data Group: All Data Groups  
Report Name: No Title  
Start of Report: 12/13/2022 13:41  
End of Report: 12/13/2022 14:01

Validation: All Available Data

Group#-Channel#	G1-C2	G2-C6	G2-C5
Long Descrip.	O2 % SO2c	7%O2	COc 7%O2
Short Descrip.	O2 % SO2c	7%O2	COc 7%O2
Units	%	ppm	ppm
Range	-6-25	0-100	0-4000
<hr/>			
12/13/2022 13:41	6.46	10.6	4.1
12/13/2022 13:42	6.43	9.3	1.5
12/13/2022 13:43	6.34	9.3	3.0
12/13/2022 13:44	6.45	9.5	2.4
12/13/2022 13:45	6.41	9.5	2.7
12/13/2022 13:46	6.48	9.4	2.7
12/13/2022 13:47	5.37	9.1	2.4
12/13/2022 13:48	5.44	10.1	5.0
12/13/2022 13:49	5.78	10.8	6.2
12/13/2022 13:50	5.69	12.6	11.0
12/13/2022 13:51	5.61	13.3	9.0
12/13/2022 13:52	5.56	14.7	8.7
12/13/2022 13:53	5.58	14.2	4.2
12/13/2022 13:54	5.42	12.4	5.2
12/13/2022 13:55	5.13	12.5	12.6
12/13/2022 13:56	4.91	12.6	20.4
12/13/2022 13:57	4.83	10.2	6.7
12/13/2022 13:58	4.61	9.1	16.5
12/13/2022 13:59	5.00	8.2	7.3
12/13/2022 14:00	5.10	7.4	9.9
12/13/2022 14:01	5.36	7.5	3.9
<hr/>			
Period Average =	5.62	10.6	6.9
Period Max Value =	6.48	14.7	20.4
Period Min Value =	4.61	7.4	1.5
Period Totals =	1.1796E+2	2.2230E+2	1.4540E+2
Period % Recovery =	100.0	100.0	100.0

# Data Summary Report



Company: Ypsilanti Community Utilities  
 2777 State Street  
 Ypsilanti, MI 48197

Data Group: All Data Groups  
 Report Name: No Title  
 Start of Report: 12/13/2022 14:22  
 End of Report: 12/13/2022 14:42

Validation: All Available Data

Group#-Channel#	G1-C2	G2-C6	G2-C5
Long Descrip.	O2 % SO2c 7%O2	COc 7%O2	
Short Descrip.	O2 % SO2c 7%O2	COc 7%O2	
Units	%	ppm	ppm
Range	-6-25	0-100	0-4000
12/13/2022 14:22	4.15	14.2	15.9
12/13/2022 14:23	3.93	13.0	29.7
12/13/2022 14:24	3.59	13.3	20.6
12/13/2022 14:25	4.08	11.8	35.4
12/13/2022 14:26	4.98	10.5	14.8
12/13/2022 14:27	4.81	9.2	6.0
12/13/2022 14:28	4.88	9.9	9.3
12/13/2022 14:29	4.79	9.8	11.7
12/13/2022 14:30	4.80	10.4	7.9
12/13/2022 14:31	4.76	10.2	9.0
12/13/2022 14:32	4.87	10.0	19.9
12/13/2022 14:33	5.08	8.7	5.8
12/13/2022 14:34	5.05	7.6	11.8
12/13/2022 14:35	5.11	7.6	5.4
12/13/2022 14:36	5.13	7.4	8.1
12/13/2022 14:37	5.13	7.7	16.0
12/13/2022 14:38	5.24	7.4	8.3
12/13/2022 14:39	5.09	7.4	4.9
12/13/2022 14:40	5.01	8.9	7.1
12/13/2022 14:41	4.44	9.8	13.1
12/13/2022 14:42	3.35	9.9	18.2
Period Average =	4.68	9.7	13.3
Period Max Value =	5.24	14.2	35.4
Period Min Value =	3.35	7.4	4.9
Period Totals =	9.8270E+1	2.0470E+2	2.7890E+2
Period % Recovery =	100.0	100.0	100.0



# Data Summary Report



**Company:** Ypsilanti Community Utilities  
2777 State Street  
Ypsilanti, MI 48197

**Data Group:** All Data Groups

**Report Name:** No Title

**Start of Report:** 12/13/2022 15:01

**End of Report:** 12/13/2022 15:21

**Validation:** All Available Data

Group#-Channel#	G1-C2	G2-C6	G2-C5
Long Descrip.	O2 % SO2c 7%O2	COc 7%O2	
Short Descrip.	O2 % SO2c 7%O2	COc 7%O2	
Units	%	ppm	ppm
Range	-6-25	0-100	0-4000
<hr/>			
12/13/2022 15:01	6.08	7.6	4.3
12/13/2022 15:02	6.99	8.1	1.4
12/13/2022 15:03	6.91	8.1	1.5
12/13/2022 15:04	6.43	8.2	1.5
12/13/2022 15:05	5.73	8.0	2.1
12/13/2022 15:06	4.70	7.6	2.7
12/13/2022 15:07	4.76	7.8	13.3
12/13/2022 15:08	5.23	7.8	6.8
12/13/2022 15:09	5.23	7.5	5.5
12/13/2022 15:10	5.15	7.9	4.8
12/13/2022 15:11	5.41	7.9	6.7
12/13/2022 15:12	5.35	8.0	4.4
12/13/2022 15:13	5.14	8.2	7.8
12/13/2022 15:14	4.25	7.8	5.9
12/13/2022 15:15	4.18	8.1	29.3
12/13/2022 15:16	4.51	8.6	12.9
12/13/2022 15:17	4.64	8.3	8.0
12/13/2022 15:18	4.82	7.9	11.8
12/13/2022 15:19	5.03	7.3	3.2
12/13/2022 15:20	5.21	6.6	3.2
12/13/2022 15:21	5.27	6.5	6.8
<hr/>			
Period Average =	5.29	7.8	6.9
Period Max Value =	6.99	8.6	29.3
Period Min Value =	4.18	6.5	1.4
Period Totals =	1.1102E+2	1.6380E+2	1.4390E+2
Period % Recovery =	100.0	100.0	100.0

# Data Summary Report

Company: Ypsilanti Community Utilities  
 2777 State Street  
 Ypsilanti, MI 48197



Data Group: All Data Groups  
 Report Name: No Title  
 Start of Report: 12/13/2022 15:33  
 End of Report: 12/13/2022 15:53

Validation: All Available Data

Group#-Channel#	G1-C2	G2-C6	G2-C5
Long Descrip.	O2 % SO2c 7%O2	COc 7%O2	
Short Descrip.	O2 % SO2c 7%O2	COc 7%O2	
Units	%	ppm	ppm
Range	-6-25	0-100	0-4000
12/13/2022 15:33	5.06	8.9	9.7
12/13/2022 15:34	5.21	8.2	11.8
12/13/2022 15:35	5.10	7.5	6.9
12/13/2022 15:36	4.89	7.9	9.0
12/13/2022 15:37	4.88	8.8	9.6
12/13/2022 15:38	4.97	8.7	6.5
12/13/2022 15:39	4.96	8.3	7.5
12/13/2022 15:40	4.97	8.2	8.5
12/13/2022 15:41	5.01	8.4	8.0
12/13/2022 15:42	5.36	8.1	5.5
12/13/2022 15:43	5.37	7.6	6.4
12/13/2022 15:44	5.47	7.8	7.7
12/13/2022 15:45	5.61	7.7	7.0
12/13/2022 15:46	5.77	7.7	8.0
12/13/2022 15:47	5.70	7.6	3.1
12/13/2022 15:48	5.62	8.3	6.7
12/13/2022 15:49	5.47	9.3	4.1
12/13/2022 15:50	5.48	9.8	5.0
12/13/2022 15:51	5.60	10.2	9.3
12/13/2022 15:52	5.71	9.4	3.2
12/13/2022 15:53	5.38	8.7	6.9
Period Average =	5.31	8.4	7.2
Period Max Value =	5.77	10.2	11.8
Period Min Value =	4.88	7.5	3.1
Period Totals =	1.1159E+2	1.7710E+2	1.5040E+2
Period % Recovery =	100.0	100.0	100.0



**GAMMIE AIR  
MONITORING, LLC**

## **Appendix D**

### **YCUA Process Monitoring**



**YPSILANTI COMMUNITY UTILITIES AUTHORITY**  
**2777 STATE ROAD, YPSILANTI, MICHIGAN 48198**  
**SLUDGE FLOW CALCULATION DURING RATA TESTING: December**

Date	Run	Time	BP #2		BP #3		BP #4		BP #5		BP #8		BP #9		BP #1		Flow Totalizer	Flow (Gal)	Avg Blending Tank Solids (%)	Feed Bin Level (ft)	Operator Initials
			Flow Totalizer	Flow (Gal)	Flow Totalizer	Flow (Gal)	Flow Totalizer	Flow (Gal)	Flow Totalizer	Flow (Gal)	Flow Totalizer	Flow (Gal)	Flow Totalizer	Flow (Gal)	Flow Totalizer	Flow (Gal)					
12/13/2022	#1	9:15am	191652728		131688454		179593003		182930119		184122655		177786623						1.66%	6.4	JT
		9:36am	191655417	2689	131691146	2692	179595712	2709	182932717	2598	184125430	2775	177791423	2800				0	1.66%	6.5	JT
12/13/2022	#2	9:47am	191656339		131692059		179596641		182933602		184126364		177792370						1.66%	6.5	JT
		10:08am	191658861	2522	131694537	2478	179599164	2523	182936022	2420	184128934	2570	177794954	2584				0	1.66%	6.3	JT
12/13/2022	#3	10:20am	191659936		131695607		179600257		182937052		184130026		177796049						1.66%	6.3	JT
		10:41am	191662121	2185	131697849	2242	179602558	2301	182939300	2248	184132459	2433	177798540	2491				0	1.66%	6.2	JT
12/13/2022	#4	11:05am	191664756		131700444		179605157		182941783		184135098		177801175						1.66%	6.0	JT
		11:26am	191667131	2375	131702815	2371	179607514	2357	182944057	2274	184137425	2327	177803508	2333					1.77%	5.9	JT
12/13/2022	#5	11:42am	191668674		131704345		179609068		182945558		184139005		177805106						1.77%	5.7	JT
		12:03pm	191671069	2395	131706705	2360	179611510	2442	182947923	2365	184141516	2511	177807600	2494					1.77%	5.5	JT
12/13/2022	#6	1:03pm	191677102		131712701		179617690		182953942		184147887		177813947						1.60%	5.6	JT
		1:24pm	191679954	2852	131715363	2662	179620580	2890	182956760	2818	184150783	2896	177816911	2964					1.60%	5.9	JT
12/13/2022	#7	1:40pm	191681570		131716859		179622219		182958365		184152423		177818598						1.60%	6.0	JT
		2:01pm	191684078	2508	131719074	2215	179624749	2530	182960859	2494	184154936	2513	177821175	2577					1.60%	6.0	JT
12/13/2022	#8	2:21pm	191685740		131720696		179626597		182962687		184156785		177823077						1.60%	6.0	JT
		2:42pm	191688387	2647	131722831	2135	179629026	2429	182965093	2406	184159865	3080	177825558	2481					1.81%	6.0	JT
12/13/2022	#9	3:00pm	191690210		131724456		179630878		182966920		184161087		177827501						1.81%	6.0	JT
		3:21pm	191692677	2467	131726608	2152	179633346	2468	182969356	2436	184163514	2427	177829997	2496					1.81%	5.9	JT
12/13/2022	#10	3:32pm	191693654		131727467		179634333		182970312		184164489		177830987						1.81%	5.9	JT
		3:53pm	191695983	2329	131729516	2049	179636669	2336	182972622	2310	184166839	2350	177833386	2399					1.81%	5.9	JT
				0		0		0		0											
<b>Totals</b>																					
Run	Sludge Flow (Gal)	Sludge (Wet lbs)	Blended Solids (%)	Sludge (Dry lbs)	Capture Rate (%)	Captured (Dry lbs)	Feed Bin Level (ft)	Adjustment (Dry lbs)	Total Feed (Dry lbs)	Run Time (Hrs)	Feed Rate (Dry Solids/Hr)										
#1	16,263.0	135,714.7	1.66%	2,252.9	80.60%	1,815.8	-0.1	-103.0	1,712.9	0.35	4,893.9										
#2	15,097.0	125,984.5	1.66%	2,091.3	80.60%	1,685.6	0.2	205.9	1,891.5	0.35	5,404.4										
#3	13,900.0	115,995.5	1.66%	1,925.5	80.60%	1,552.0	0.1	103.0	1,654.9	0.35	4,728.4										
#4	14,037.0	117,138.8	1.72%	2,014.8	80.60%	1,623.9	0.1	103.0	1,726.9	0.35	4,933.9										
#5	14,567.0	121,561.6	1.77%	2,151.6	80.60%	1,734.2	0.2	205.9	1,940.1	0.35	5,543.2										
#6	19,982.0	166,749.8	1.60%	2,668.0	80.60%	2,150.4	-0.3	-308.9	1,841.5	0.35	5,261.5										
#7	17,356.0	144,835.8	1.60%	2,317.4	80.60%	1,867.8	0.0	0.0	1,867.8	0.35	5,336.6										
#8	17,886.0	149,258.7	1.71%	2,552.3	80.60%	2,057.2	0.0	0.0	2,057.2	0.35	5,877.6										
#9	16,901.0	141,038.8	1.81%	2,552.8	80.60%	2,057.6	0.1	103.0	2,160.5	0.35	6,172.9										
#10	16,103.0	134,379.5	1.81%	2,432.3	80.60%	1,960.4	0.0	0.0	1,960.4	0.35	5,601.2										
<b>Total</b>	<b>162,092.0</b>	<b>1,352,657.7</b>	<b>1.70%</b>	<b>22,995.2</b>	<b>80.00%</b>	<b>18,396.1</b>	<b>N/A</b>	<b>308.9</b>	<b>18,705.0</b>	<b>3.50</b>	<b>5,344.3</b>										



**GAMMIE AIR  
MONITORING, LLC**

**Appendix E**  
**Equipment Calibrations**

**RECEIVED**

**FEB 13 2023**

**AIR QUALITY DIVISION**

## CERTIFICATE OF BATCH ANALYSIS

### Grade of Product: CEM-CAL ZERO

Part Number:	NI CZ15A	Reference Number:	160-402557521-1
Cylinder Analyzed:	EB0111199	Cylinder Volume:	142.0 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2000 PSIG
Analysis Date:	Sep 28, 2022	Valve Outlet:	580
Lot Number:	160-402557521-1		

### ANALYTICAL RESULTS

Component	Requested Purity	Certified Concentration
NITROGEN	99.9995 %	99.9995 %
NOx	0.1 PPM	<LDL 0.02 PPM
SO2	0.1 PPM	<LDL 0.02 PPM
THC	0.1 PPM	<LDL 0.04 PPM
CARBON MONOXIDE	0.5 PPM	<LDL 0.04 PPM
CARBON DIOXIDE	1.0 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:**

1L1042, 47737, ALM-051234, ALM018038, ALM028938, CC10789, CC114577, CC128703, CC208478, CC232317, CC263957, CC30442, CC359440, CC454468, CC46199, CC490555, CC75111, CC91764, EB0111199, SG885477, SG9101649, SG9166428BAL

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



Approved for Release

## CERTIFICATE OF ANALYSIS

### Grade of Product: EPA PROTOCOL STANDARD

Part Number: E03NI78E15A0225	Reference Number: 160-402494732-1
Cylinder Number: CC110881	Cylinder Volume: 152.0 CF
Laboratory: 124 - Plumsteadville - PA	Cylinder Pressure: 2015 PSIG
PGVP Number: A12022	Valve Outlet: 590
Gas Code: CO2,O2,BALN	Certification Date: Jul 25, 2022

**Expiration Date: Jul 25, 2030**

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	11.00 %	10.85 %	G1	+/- 0.4% NIST Traceable	07/25/2022
OXYGEN	11.00 %	11.01 %	G1	+/- 0.4% NIST Traceable	07/25/2022
NITROGEN	Balance				

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	200605-04	6088256Y	24.63 % CARBON DIOXIDE/NITROGEN	+/- 0.4%	Feb 08, 2027
NTRM	08010205	K001516	23.2 % OXYGEN/NITROGEN	+/- 0.4%	Jun 01, 2024

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
HORIBA VA5011 T5V6VU9P NDIR CO2	NDIR	Jul 07, 2022
SIEMENS OXYMAT 6 - N1-W5-951 - O2	PARAMAGNETIC	Jul 07, 2022

Triad Data Available Upon Request



\_\_\_\_\_  
 Approved for Release



**CERTIFICATE OF ANALYSIS**  
**Grade of Product: EPA Protocol**

Part Number: E03NI61E15A0287 Reference Number: 160-402148554-1  
Cylinder Number: ALM-049064 Cylinder Volume: 158.0 CF  
Laboratory: 124 - Plumsteadville - PA Cylinder Pressure: 2015 PSIG  
PGVP Number: A12021 Valve Outlet: 590  
Gas Code: CO2,O2,BALN Certification Date: Jun 30, 2021

**Expiration Date: Jun 30, 2029**

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 800/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.

<b>ANALYTICAL RESULTS</b>					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON DIOXIDE	18.00 %	18.02 %	G1	+/- 0.4% NIST Traceable	06/30/2021
OXYGEN	21.00 %	20.96 %	G1	+/- 0.4% NIST Traceable	08/30/2021
NITROGEN	Balance				

<b>CALIBRATION STANDARDS</b>					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	060118	K008735	23.04 % CARBON DIOXIDE/NITROGEN	+/- 0.1%	Jun 27, 2022
NTRM	08010230	K005228	23.20 % OXYGEN/NITROGEN	+/-0.4%	Jun 01, 2024

<b>ANALYTICAL EQUIPMENT</b>		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
HORIBA VA5011 T5V6VU9P NDIR CO2	NDIR	Jun 10, 2021
SIEMENS OXYMAT 6 - N1-W5-951 - O2	PARAMAGNETIC	Jun 10, 2021

Triad Data Available Upon Request



*chi*

Approved for Release

**CERTIFICATE OF ANALYSIS**  
**Grade of Product: EPA Protocol**

Part Number:	E02NI99E15A0302	Reference Number:	160-402070746-1
Cylinder Number:	CC423759	Cylinder Volume:	144.3 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2015 PSIG
PGVP Number:	A12021	Valve Outlet:	350
Gas Code:	CO,BALN	Certification Date:	Mar 29, 2021

**Expiration Date: Mar 29, 2029**

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.

<b>ANALYTICAL RESULTS</b>					
Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
CARBON MONOXIDE	50.00 PPM	50.31 PPM	G1	+/- 0.6% NIST Traceable	03/29/2021
NITROGEN	Balance				

<b>CALIBRATION STANDARDS</b>					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	09010241	KAL004894	98.48 PPM CARBON MONOXIDE/NITROGEN	+/-0.5%	Oct 16, 2024

<b>ANALYTICAL EQUIPMENT</b>		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS ULTRAMAT6E N1-C8-180	NDIR	Mar 25, 2021

Triad Data Available Upon Request



# CERTIFICATE OF ANALYSIS

## Grade of Product: EPA Protocol

Part Number:	E02NI99E15A0077	Reference Number:	160-401476296-1
Cylinder Number:	XC031050B	Cylinder Volume:	144.3 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2015 PSIG
PGVP Number:	A12019	Valve Outlet:	350
Gas Code:	CO,BALN	Certification Date:	Apr 15, 2019

**Expiration Date: Apr 15, 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 volume/volume 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 MONOXIDE	100.0 PPM	99.57 PPM	G1	+/- 0.2% NIST Traceable	04/15/2019
NITROGEN	Balance				

  

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	041812	KAL003188	246.9 PPM CARBON MONOXIDE/NITROGEN	0.20%	Oct 16, 2024

  

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
SIEMENS ULTRAMAT6E 7MB2123 1BD20 0BM1Z LOW CO	NDIR	Mar 20, 2019

Triad Data Available Upon Request



Approved for Release

**CERTIFICATE OF ANALYSIS**  
**Grade of Product: EPA Protocol**

Part Number:	E02NI99E15A0257	Reference Number:	160-402131516-1
Cylinder Number:	CC426960	Cylinder Volume:	144.4 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2015 PSIG
PGVP Number:	A12021	Valve Outlet:	660
Gas Code:	SO2,BALN	Certification Date:	Jun 21, 2021

**Expiration Date: Jun 21, 2025**

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
SULFUR DIOXIDE	25.00 PPM	25.58 PPM	G1	+/- 1.1% NIST Traceable	06/14/2021, 06/21/2021
NITROGEN	Balance				

CALIBRATION STANDARDS						
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date	
NTRM	14010303	KAL003193	49.08 PPM SULFUR DIOXIDE/NITROGEN	+/- 1.0%	Apr 14, 2024	

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet IS50 FTIR AUP2010245 SO2	FTIR	Jun 10, 2021

Triad Data Available Upon Request



*Mark A. Tucker*  
Approved for Release

**CERTIFICATE OF ANALYSIS**  
**Grade of Product: EPA Protocol**

Part Number:	E02NI99E15A0350	Reference Number:	160-402131924-1
Cylinder Number:	CC711314	Cylinder Volume:	144.4 CF
Laboratory:	124 - Plumsteadville - PA	Cylinder Pressure:	2015 PSIG
PGVP Number:	A12021	Valve Outlet:	660
Gas Code:	SO2,BALN	Certification Date:	Jun 18, 2021

**Expiration Date: Jun 18, 2029**

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
SULFUR DIOXIDE	50.00 PPM	50.76 PPM	G1	+/- 1.2% NIST Traceable	06/11/2021, 06/18/2021
NITROGEN	Balance				

  

CALIBRATION STANDARDS					
Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	14010303	KAL003193	49.08 PPM SULFUR DIOXIDE/NITROGEN	+/- 1.0%	Apr 14, 2024

  

ANALYTICAL EQUIPMENT		
Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet iS50 FTIR AUP2010245 SO2	FTIR	Jun 10, 2021

Triad Data Available Upon Request



*Michael A. Hunter*  
\_\_\_\_\_  
Approved for Release