# UNITED STATES STEEL CORPORATION
# MON VALLEY COMPLEX - CLAIRTON PLANT
# CLAIRTON, PENNSYLVANIA

## Relative Accuracy Test Audit
## of the Continuous Emissions Monitoring System
## for B-Battery Combustion Stack at
## United States Steel Corporation
## Mon Valley Complex - Clairton Plant – Clairton, PA
## per
## Pennsylvania Department of Environmental Protection
## Continuous Source Monitoring Manual Requirements

**August 17, 2007**

**AUGUST 2007**

**APPENDIX B**

**Chester Reference Method Comparison Data**

CHESTER ENGINEERS
*"Tradition in Engineering Excellence Since 1910"*

**ANNUAL RATA**
**B BATTERY COMBUSTION STACK**
**STRATIFICATION TEST RESULTS**
**AUGUST 17, 2007**

| TIME OF TEST (EDT) | $NO_x$ (ppm) | $O_2$ (%) | TRAVERSE POINT | $NO_x$ (ppm, avg.) | $O_2$ (%, avg.) | ABSOLUTE NOX DELTA | ABSOLUTE O2 DELTA |
|---|---|---|---|---|---|---|---|
| 8:24 | 153.1 | 12 | 1 | | | | |
| 8:25 | 149.4 | 12 | 1 | 151.25 | 12 | 0.58 | 0.12 |
| 8:26 | 152.6 | 11.9 | 2 | | | | |
| 8:27 | 155 | 11.8 | 2 | 153.8 | 11.85 | 3.13 | 0.03 |
| 8:28 | 147.7 | 11.7 | 3 | | | | |
| 8:29 | 146.2 | 11.9 | 3 | 146.95 | 11.8 | 3.72 | 0.08 |

Average of all TRAVERSE POINTS, $(NO_X)_{AVG}$ AND $(O_2)_{AVG}$ 150.67 11.88

MAXIMUM ppm DIFFERENCE OF$(NO_X)_i$ and $(NO_X)_{AVG}$ 3.72 (3 ppm)
WHERE, I IS THE TRAVERSE POINT LOCATION

MAXIMUM DIFFERENCE OF$(NO_X)_i$ and $(NO_X)_{AVG}$ AS A PERCENT 2.47 (5%)
WHERE, I IS THE TRAVERSE POINT LOCATION

MAXIMUM % DIFFERENCE OF$(O_2)_i$ and $(O_2)_{AVG}$ 0.12 (0.3 %)
WHERE, I IS THE TRAVERSE POINT LOCATION

MAXIMUM DIFFERENCE OF$(O_2)_i$ and $(O_2)_{AVG}$ AS A PERCENT 0.98 (5%)
WHERE, I IS THE TRAVERSE POINT LOCATION

RESULTS INDICATE THAT 1 SAMPLING POINT IS NEEDED.

United States Steel Corporation
Mon Valley Complex - Clairton Plant

Annual RATA B-Battery Combustion Stack
Chester Engineers Mobile Air Quality Laboratory Data

August 17, 2007
Minute Data Averages

| Hour | $NO_x$ | $O_2$ | Temp L1 | Temp 2 | Notes |
|---|---|---|---|---|---|
| 7:42 | 13 | 20 | 230 | 73 | Ambient Air |
| 7:43 | 13.3 | 20 | 230 | 73 | Ambient Air |
| 7:44 | 13.7 | 20 | 230 | 73 | Ambient Air |
| 7:45 | 9.7 | 2.8 | 230 | 73 | Pre-Test Calibrations |
| 7:46 | 1.1 | 0 | 230 | 72 | Pre-Test Calibrations |
| 7:47 | **0.9** | **0** | 230 | 72 | **Zero Gas** |
| 7:48 | 0.9 | 12.5 | 230 | 72 | Pre-Test Calibrations |
| 7:49 | 0.9 | 22.2 | 231 | 72 | Pre-Test Calibrations |
| 7:50 | 0.9 | **22.2** | 232 | 72 | **High O2/CO2 Gas** |
| 7:51 | 0.9 | 16.4 | 232 | 72 | Pre-Test Calibrations |
| 7:52 | 0.9 | 12.2 | 233 | 72 | Pre-Test Calibrations |
| 7:53 | 0.9 | **12.1** | 234 | 72 | **Mid O2/CO2 Gas** |
| 7:54 | 57 | 5.5 | 234 | 72 | Pre-Test Calibrations |
| 7:55 | 402.8 | 0.1 | 235 | 72 | **Mid NOx Gas** |
| 7:56 | 448.8 | 0 | 235 | 72 | Pre-Test Calibrations |
| 7:57 | **449.6** | 0 | 236 | 72 | **High NOx Gas** |
| 7:58 | 449.5 | 0 | 236 | 72 | Pre-Test Calibrations |
| 7:59 | 257.2 | 0 | 237 | 72 | Pre-Test Calibrations |
| 8:00 | 226.3 | 0 | 237 | 72 | Pre-Test Calibrations |
| 8:01 | **226.4** | 0 | 238 | 72 | **Mid NOx Gas** |
| 8:02 | 200.8 | 6.6 | 238 | 72 | Bias Checks |
| 8:03 | 27 | 0 | 238 | 72 | Bias Checks |
| 8:04 | 1.6 | -0.1 | 238 | 72 | Bias Checks |
| 8:05 | **1.5** | **-0.1** | 237 | 72 | **Zero Gas** |
| 8:06 | 1.2 | 6.7 | 236 | 72 | Bias Checks |
| 8:07 | 1.2 | 12.1 | 235 | 72 | Bias Checks |
| 8:08 | 1.2 | **12.1** | 234 | 72 | **Mid O2/CO2 Gas** |
| 8:09 | 23 | 4.5 | 233 | 72 | Bias Checks |
| 8:10 | 219.2 | 0 | 232 | 71 | Bias Checks |
| 8:11 | 221.1 | 0 | 231 | 71 | Bias Checks |
| 8:12 | **221.2** | 0 | 230 | 71 | **Mid NOx Gas** |
| 8:13 | 221.3 | 7.2 | 229 | 71 | Bias Checks |
| 8:14 | 55.3 | 21.2 | 228 | 71 | Stack Gas |
| 8:15 | 1.5 | 20.9 | 228 | 71 | Stack Gas |
| 8:16 | 71.5 | 12.7 | 228 | 71 | Stack Gas |
| 8:17 | 157.3 | 12.5 | 229 | 71 | Stack Gas |
| 8:18 | 147.4 | 12.3 | 230 | 71 | Stack Gas |
| 8:19 | 148.4 | 12.2 | 230 | 71 | Stack Gas |
| 8:20 | 147.2 | 12.3 | 231 | 71 | Stack Gas |
| 8:21 | 158.5 | 12.5 | 232 | 71 | Stack Gas |
| 8:22 | 170.1 | 12.6 | 232 | 71 | Stack Gas |
| 8:23 | 159.1 | 12.2 | 233 | 71 | Stack Gas |
| 8:24 | 153.1 | 12 | 234 | 71 | **Stratification Test** |
| 8:25 | 149.4 | 12 | 234 | 71 | **Stratification Test** |
| 8:26 | 152.6 | 11.9 | 234 | 71 | **Stratification Test** |
| 8:27 | 155 | 11.8 | 235 | 71 | **Stratification Test** |
| 8:28 | 147.7 | 11.7 | 236 | 71 | **Stratification Test** |
| 8:29 | 146.2 | 11.9 | 236 | 71 | **Stratification Test** |
| 8:30 | 157.8 | 12.2 | 236 | 71 | Stack Gas |
| 8:31 | 161 | 14 | 237 | 71 | Stack Gas |

United States Steel Corporation
Mon Valley Complex - Clairton Plant

Annual RATA B-Battery Combustion Stack — August 17, 2007
Chester Engineers Mobile Air Quality Laboratory Data — Minute Data Averages

| Hour | $NO_x$ | $O_2$ | Temp L1 | Temp 2 | Notes |
|---|---|---|---|---|---|
| 8:32 | 90.9 | 19.9 | 237 | 71 | Stack Gas |
| 8:33 | 54.9 | 16.2 | 237 | 71 | Stack Gas |
| 8:34 | 140.2 | 13.1 | 237 | 71 | Stack Gas |
| 8:35 | 150.7 | 12.9 | 238 | 71 | **Run #1** |
| 8:36 | 154.4 | 12.7 | 238 | 71 | **Run #1** |
| 8:37 | 155 | 12.3 | 238 | 71 | **Run #1** |
| 8:38 | 153.4 | 12.2 | 238 | 71 | **Run #1** |
| 8:39 | 155 | 12.1 | 238 | 71 | **Run #1** |
| 8:40 | 158.4 | 12.2 | 238 | 71 | **Run #1** |
| 8:41 | 160.9 | 12.4 | 239 | 71 | **Run #1** |
| 8:42 | 161.3 | 12.3 | 239 | 71 | **Run #1** |
| 8:43 | 161.2 | 12.1 | 239 | 71 | **Run #1** |
| 8:44 | 160.7 | 12.2 | 239 | 71 | **Run #1** |
| 8:45 | 162.9 | 12.4 | 239 | 71 | **Run #1** |
| 8:46 | 164.3 | 12.5 | 239 | 71 | **Run #1** |
| 8:47 | 162.6 | 12.3 | 239 | 71 | **Run #1** |
| 8:48 | 160.8 | 12.2 | 240 | 71 | **Run #1** |
| 8:49 | 161.5 | 12.5 | 240 | 71 | **Run #1** |
| 8:50 | 164.9 | 12.4 | 240 | 71 | **Run #1** |
| 8:51 | 165.4 | 13.1 | 240 | 71 | **Run #1** |
| 8:52 | 104.1 | 17.3 | 240 | 71 | **Run #1** |
| 8:53 | 70.9 | 15.9 | 240 | 71 | **Run #1** |
| 8:54 | 121 | 11.9 | 240 | 71 | **Run #1** |
| 8:55 | 136.6 | 11.8 | 240 | 71 | **Run #1** |
| | 149.8 | 12.7 | 239.1 | 71.0 | **21 Min. Analyzer Average, Ca** |
| | 1.35 | -0.05 | | | **Avg. Zero Bias Check, Co** |
| | 220.95 | 12.05 | | | **Avg. Mid Span Bias Check, Cm** |
| | 225 | 12.0 | | | **Actual Mid Span Value, Cma** |
| | 152.1 | 12.7 | | | **Corrected Conc., Cstack** |
| | 0.351 (lb/MMBtu) | | **NOx Emission Factor** | | |
| 8:56 | 140.4 | 6.7 | 240 | 71 | Bias Checks |
| 8:57 | 20.9 | 0 | 240 | 71 | Bias Checks |
| 8:58 | 1.5 | 0 | 239 | 71 | Bias Checks |
| 8:59 | **1.2** | **0** | 238 | 71 | **Zero Gas** |
| 9:00 | 1.2 | 7.7 | 237 | 71 | Bias Checks |
| 9:01 | 1.2 | 12 | 235 | 71 | Bias Checks |
| 9:02 | 1.2 | **12** | 234 | 71 | **Mid O2/CO2 Gas** |
| 9:03 | 1.2 | 11.6 | 233 | 71 | Bias Checks |
| 9:04 | 105.2 | 0.1 | 232 | 71 | Bias Checks |
| 9:05 | 220.6 | 0 | 230 | 71 | Bias Checks |
| 9:06 | **220.7** | 0 | 229 | 71 | **Mid NOx Gas** |
| 9:07 | 220.7 | 0 | 228 | 71 | Bias Checks |
| 9:08 | 151.1 | 9.9 | 228 | 71 | Stack Gas |
| 9:09 | 162.3 | 12 | 228 | 71 | **Run #2** |
| 9:10 | 161.9 | 11.8 | 228 | 71 | **Run #2** |
| 9:11 | 153.3 | 12.5 | 228 | 71 | **Run #2** |

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Annual RATA B-Battery Combustion Stack — August 17, 2007
Chester Engineers Mobile Air Quality Laboratory Data — Minute Data Averages

| Hour | $NO_x$ | $O_2$ | Temp L1 | Temp 2 | Notes |
|---|---|---|---|---|---|
| 9:12 | 94.1 | 17.5 | 228 | 71 | **Run #2** |
| 9:13 | 72.5 | 15.6 | 229 | 71 | **Run #2** |
| 9:14 | 141.5 | 12.8 | 230 | 71 | **Run #2** |
| 9:15 | 148.5 | 12.5 | 230 | 71 | **Run #2** |
| 9:16 | 149.4 | 12.3 | 231 | 71 | **Run #2** |
| 9:17 | 150 | 12.2 | 232 | 71 | **Run #2** |
| 9:18 | 152.6 | 12.2 | 232 | 71 | **Run #2** |
| 9:19 | 156.1 | 12.3 | 233 | 71 | **Run #2** |
| 9:20 | 156.6 | 12.1 | 233 | 71 | **Run #2** |
| 9:21 | 156.2 | 12.1 | 234 | 71 | **Run #2** |
| 9:22 | 156.5 | 12.3 | 234 | 71 | **Run #2** |
| 9:23 | 156.7 | 12.6 | 235 | 71 | **Run #2** |
| 9:24 | 157.4 | 12.9 | 235 | 71 | **Run #2** |
| 9:25 | 158.7 | 12.8 | 235 | 71 | **Run #2** |
| 9:26 | 157.8 | 12.6 | 236 | 71 | **Run #2** |
| 9:27 | 157.2 | 12.6 | 236 | 72 | **Run #2** |
| 9:28 | 158.5 | 12.7 | 236 | 72 | **Run #2** |
| 9:29 | 158.9 | 12.6 | 237 | 72 | **Run #2** |
| | 148.4 | 12.8 | 232.4 | 71.1 | **21 Min. Analyzer Average, Ca** |
| | 1.20 | 0.00 | | | **Avg. Zero Bias Check, Co** |
| | 220.45 | 12.00 | | | **Avg. Mid Span Bias Check, Cm** |
| | 225 | 12.0 | | | **Actual Mid Span Value, Cma** |
| | 151.1 | 12.8 | | | **Corrected Conc., Cstack** |
| | 0.354 (lb/MMBtu) | | **NOx Emission Factor** | | |
| 9:30 | 147.6 | 6.5 | 237 | 72 | Bias Checks |
| 9:31 | 9.1 | 0 | 237 | 72 | Bias Checks |
| 9:32 | 1.4 | 0 | 237 | 72 | Bias Checks |
| 9:33 | **1.2** | **0** | 236 | 72 | **Zero Gas** |
| 9:34 | 1.2 | 3.6 | 235 | 72 | Bias Checks |
| 9:35 | 1.2 | 11.5 | 234 | 72 | Bias Checks |
| 9:36 | 1.5 | 11.8 | 232 | 72 | Bias Checks |
| 9:37 | 1.2 | **12** | 232 | 72 | **Mid O2/CO2 Gas** |
| 9:38 | 10.3 | 7.1 | 230 | 72 | Bias Checks |
| 9:39 | 205.1 | 0 | 230 | 72 | Bias Checks |
| 9:40 | 220.4 | 0 | 228 | 72 | Bias Checks |
| 9:41 | **220.2** | 0 | 228 | 72 | **Mid NOx Gas** |
| 9:42 | 173.5 | 5.4 | 227 | 72 | Stack Gas |
| 9:43 | 132.8 | 11.6 | 226 | 72 | Stack Gas |
| 9:44 | 141.1 | 11.7 | 226 | 73 | **Run #3** |
| 9:45 | 128.5 | 11.7 | 226 | 73 | **Run #3** |
| 9:46 | 124.5 | 11.7 | 227 | 73 | **Run #3** |
| 9:47 | 125.8 | 11.9 | 228 | 73 | **Run #3** |
| 9:48 | 131.1 | 12.1 | 229 | 73 | **Run #3** |
| 9:49 | 134 | 12 | 230 | 73 | **Run #3** |
| 9:50 | 130.9 | 11.9 | 230 | 73 | **Run #3** |
| 9:51 | 128.3 | 12.9 | 231 | 73 | **Run #3** |
| 9:52 | 102.2 | 17.7 | 232 | 73 | **Run #3** |

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**Annual RATA B-Battery Combustion Stack** — **August 17, 2007**

**Chester Engineers Mobile Air Quality Laboratory Data** — **Minute Data Averages**

| Hour | $NO_x$ | $O_2$ | Temp L1 | Temp 2 | Notes |
|---|---|---|---|---|---|
| 9:53 | 68.4 | 15.8 | 232 | 73 | **Run #3** |
| 9:54 | 127.2 | 12.9 | 233 | 73 | **Run #3** |
| 9:55 | 136.8 | 12.5 | 234 | 73 | **Run #3** |
| 9:56 | 138.6 | 12.7 | 234 | 73 | **Run #3** |
| 9:57 | 142.5 | 12.8 | 235 | 73 | **Run #3** |
| 9:58 | 144.2 | 12.7 | 235 | 73 | **Run #3** |
| 9:59 | 143.6 | 12.7 | 236 | 73 | **Run #3** |
| 10:00 | 144 | 12.8 | 236 | 74 | **Run #3** |
| 10:01 | 145.7 | 13 | 236 | 74 | **Run #3** |
| 10:02 | 148.2 | 13.2 | 237 | 74 | **Run #3** |
| 10:03 | 150.5 | 13.2 | 237 | 74 | **Run #3** |
| 10:04 | 149.6 | 13 | 238 | 74 | **Run #3** |
| | 132.7 | 12.9 | 232.5 | 73.2 | **21 Min. Analyzer Average, Ca** |
| | 1.20 | 0.00 | | | **Avg. Zero Bias Check, Co** |
| | 220.20 | 12.00 | | | **Avg. Mid Span Bias Check, Cm** |
| | 225 | 12.0 | | | **Actual Mid Span Value, Cma** |
| | 135.1 | 12.9 | | | **Corrected Conc., Cstack** |
| | 0.320 (lb/MMBtu) | | **NOx Emission Factor** | | |
| 10:05 | 121.7 | 3.7 | 238 | 74 | Stack Gas |
| 10:06 | 13 | 0 | 238 | 74 | Bias Checks |
| 10:07 | 1.4 | 0 | 238 | 74 | Bias Checks |
| 10:08 | **1.2** | **0** | 237 | 74 | **Zero Gas** |
| 10:09 | 1.2 | 8.1 | 236 | 74 | Bias Checks |
| 10:10 | 1.2 | 12 | 235 | 74 | Bias Checks |
| 10:11 | 1.2 | **12** | 234 | 74 | **Mid O2/CO2 Gas** |
| 10:12 | 4.8 | 5.8 | 233 | 74 | Bias Checks |
| 10:13 | 199.8 | 0 | 232 | 74 | Bias Checks |
| 10:14 | 220.3 | 0 | 230 | 74 | Bias Checks |
| 10:15 | **220.2** | 0 | 230 | 74 | **Mid NOx Gas** |
| 10:16 | 192.7 | 6.3 | 229 | 74 | Stack Gas |
| 10:17 | 128.2 | 12.3 | 228 | 74 | **Run #4** |
| 10:18 | 125.8 | 12 | 228 | 74 | **Run #4** |
| 10:19 | 124.3 | 12 | 228 | 74 | **Run #4** |
| 10:20 | 125.5 | 12.2 | 229 | 74 | **Run #4** |
| 10:21 | 137.2 | 12.4 | 230 | 74 | **Run #4** |
| 10:22 | 141.7 | 12.4 | 231 | 74 | **Run #4** |
| 10:23 | 136 | 12.1 | 232 | 74 | **Run #4** |
| 10:24 | 130 | 11.9 | 232 | 74 | **Run #4** |
| 10:25 | 128.1 | 12.2 | 233 | 74 | **Run #4** |
| 10:26 | 133 | 12.2 | 234 | 74 | **Run #4** |
| 10:27 | 134.7 | 12.3 | 235 | 74 | **Run #4** |
| 10:28 | 133.2 | 12.2 | 235 | 74 | **Run #4** |
| 10:29 | 130.6 | 12.2 | 236 | 74 | **Run #4** |
| 10:30 | 132.3 | 12.3 | 236 | 74 | **Run #4** |
| 10:31 | 135.9 | 13.1 | 237 | 74 | **Run #4** |
| 10:32 | 93.6 | 17.8 | 237 | 74 | **Run #4** |
| 10:33 | 58 | 16.1 | 237 | 74 | **Run #4** |

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Annual RATA B-Battery Combustion Stack — August 17, 2007
Chester Engineers Mobile Air Quality Laboratory Data — Minute Data Averages

| Hour | $NO_x$ | $O_2$ | Temp L1 | Temp 2 | Notes |
|---|---|---|---|---|---|
| 10:34 | 119.8 | 13.2 | 238 | 74 | **Run #4** |
| 10:35 | 135.4 | 13.2 | 238 | 74 | **Run #4** |
| 10:36 | 138.5 | 13.2 | 238 | 74 | **Run #4** |
| 10:37 | 139.9 | 12.9 | 239 | 74 | **Run #4** |
| | 126.7 | 12.9 | 233.9 | 74.0 | **21 Min. Analyzer Average, Ca** |
| | 1.20 | 0.00 | | | **Avg. Zero Bias Check, Co** |
| | 220.15 | 12.00 | | | **Avg. Mid Span Bias Check, Cm** |
| | 225 | 12.0 | | | **Actual Mid Span Value, Cma** |
| | 129.0 | 12.9 | | | **Corrected Conc., Cstack** |
| | 0.304 (lb/MMBtu) | | **NOx Emission Factor** | | |
| 10:38 | 110.6 | 3.3 | 239 | 74 | Bias Checks |
| 10:39 | 3.4 | 0 | 239 | 74 | Bias Checks |
| 10:40 | **1.2** | **0** | 239 | 74 | **Zero Gas** |
| 10:41 | 1.2 | 3.3 | 238 | 74 | Bias Checks |
| 10:42 | 1.2 | 12 | 237 | 74 | Bias Checks |
| 10:43 | 1.2 | **12** | 236 | 74 | **Mid O2/CO2 Gas** |
| 10:44 | 6.7 | 6.3 | 235 | 74 | Bias Checks |
| 10:45 | 201.6 | 0 | 234 | 74 | Bias Checks |
| 10:46 | 220.1 | 0 | 232 | 74 | Bias Checks |
| 10:47 | **220.1** | 0 | 232 | 74 | **Mid NOx Gas** |
| 10:48 | 211.8 | 6 | 230 | 74 | Stack Gas |
| 10:49 | 159.3 | 13.1 | 230 | 74 | Stack Gas |
| 10:50 | 153.4 | 12.9 | 230 | 74 | **Run #5** |
| 10:51 | 151.3 | 13.5 | 230 | 74 | **Run #5** |
| 10:52 | 93.4 | 17.4 | 230 | 74 | **Run #5** |
| 10:53 | 66.2 | 16.1 | 232 | 74 | **Run #5** |
| 10:54 | 104.8 | 12.4 | 232 | 75 | **Run #5** |
| 10:55 | 119.6 | 12.4 | 233 | 76 | **Run #5** |
| 10:56 | 129.9 | 12.4 | 233 | 76 | **Run #5** |
| 10:57 | 131.9 | 12.5 | 234 | 76 | **Run #5** |
| 10:58 | 134.1 | 12.5 | 235 | 76 | **Run #5** |
| 10:59 | 138 | 12.5 | 235 | 76 | **Run #5** |
| 11:00 | 143 | 12.5 | 236 | 76 | **Run #5** |
| 11:01 | 140.4 | 12.1 | 236 | 76 | **Run #5** |
| 11:02 | 133.8 | 11.9 | 237 | 76 | **Run #5** |
| 11:03 | 130.5 | 11.8 | 237 | 76 | **Run #5** |
| 11:04 | 133.6 | 11.9 | 238 | 76 | **Run #5** |
| 11:05 | 137.2 | 11.9 | 238 | 76 | **Run #5** |
| 11:06 | 136.3 | 11.9 | 238 | 76 | **Run #5** |
| 11:07 | 134 | 11.7 | 238 | 76 | **Run #5** |
| 11:08 | 132.3 | 11.8 | 239 | 76 | **Run #5** |
| 11:09 | 136.4 | 11.9 | 239 | 76 | **Run #5** |
| 11:10 | 138.6 | 11.8 | 239 | 76 | **Run #5** |
| | 129.5 | 12.7 | 235.2 | 75.6 | **21 Min. Analyzer Average, Ca** |
| | 1.20 | 0.00 | | | **Avg. Zero Bias Check, Co** |
| | 220.00 | 12.00 | | | **Avg. Mid Span Bias Check, Cm** |

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Annual RATA B-Battery Combustion Stack — August 17, 2007
Chester Engineers Mobile Air Quality Laboratory Data — Minute Data Averages

| Hour | $NO_x$ | $O_2$ | Temp L1 | Temp 2 | Notes |
|---|---|---|---|---|---|
| | 225 | 12.0 | | | **Actual Mid Span Value, Cma** |
| | 131.9 | 12.7 | | | **Corrected Conc., Cstack** |
| | 0.303 (lb/MMBtu) | | **NOx Emission Factor** | | |
| 11:11 | 110 | 3.4 | 239 | 76 | Bias Checks |
| 11:12 | 5.5 | 0 | 239 | 76 | Bias Checks |
| 11:13 | **1.2** | **0** | 239 | 77 | **Zero Gas** |
| 11:14 | 1.2 | 6.1 | 238 | 77 | Bias Checks |
| 11:15 | 1.2 | 12 | 237 | 77 | Bias Checks |
| 11:16 | 1.2 | **12** | 236 | 77 | **Mid O2/CO2 Gas** |
| 11:17 | 45.1 | 4 | 235 | 77 | Bias Checks |
| 11:18 | 217.1 | 0 | 234 | 77 | Bias Checks |
| 11:19 | 219.9 | 0 | 233 | 77 | Bias Checks |
| 11:20 | **219.9** | 0 | 232 | 77 | **Mid NOx Gas** |
| 11:21 | 207.8 | 5.6 | 231 | 77 | Stack Gas |
| 11:22 | 155.2 | 12.6 | 230 | 77 | **Run #6** |
| 11:23 | 156.5 | 12.8 | 230 | 77 | **Run #6** |
| 11:24 | 156.5 | 13 | 230 | 77 | **Run #6** |
| 11:25 | 157.1 | 12.9 | 231 | 77 | **Run #6** |
| 11:26 | 156.9 | 12.8 | 232 | 77 | **Run #6** |
| 11:27 | 157 | 12.9 | 232 | 77 | **Run #6** |
| 11:28 | 158.9 | 13 | 233 | 77 | **Run #6** |
| 11:29 | 158.2 | 13 | 234 | 77 | **Run #6** |
| 11:30 | 156.5 | 12.8 | 234 | 77 | **Run #6** |
| 11:31 | 154.3 | 13.5 | 235 | 77 | **Run #6** |
| 11:32 | 95.5 | 17.3 | 235 | 77 | **Run #6** |
| 11:33 | 70.2 | 16.2 | 236 | 77 | **Run #6** |
| 11:34 | 125.5 | 12.4 | 237 | 77 | **Run #6** |
| 11:35 | 127 | 11.8 | 237 | 77 | **Run #6** |
| 11:36 | 127.6 | 11.7 | 238 | 77 | **Run #6** |
| 11:37 | 133.1 | 11.9 | 238 | 78 | **Run #6** |
| 11:38 | 139.9 | 11.9 | 239 | 78 | **Run #6** |
| 11:39 | 142.8 | 12 | 239 | 78 | **Run #6** |
| 11:40 | 141.2 | 11.9 | 239 | 78 | **Run #6** |
| 11:41 | 139.4 | 12 | 239 | 78 | **Run #6** |
| 11:42 | 149.6 | 12.3 | 240 | 78 | **Run #6** |
| | 140.9 | 12.9 | 235.1 | 77.3 | **21 Min. Analyzer Average, Ca** |
| | 1.20 | 0.00 | | | **Avg. Zero Bias Check, Co** |
| | 219.50 | 12.00 | | | **Avg. Mid Span Bias Check, Cm** |
| | 225 | 12.0 | | | **Actual Mid Span Value, Cma** |
| | 144.0 | 12.9 | | | **Corrected Conc., Cstack** |
| | 0.341 (lb/MMBtu) | | **NOx Emission Factor** | | |
| 11:43 | 108.5 | 3.1 | 240 | 78 | Bias Checks |
| 11:44 | 1.7 | 0 | 240 | 78 | Bias Checks |
| 11:45 | **1.2** | **0** | 240 | 78 | **Zero Gas** |
| 11:46 | 1.2 | 8 | 239 | 78 | Bias Checks |

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Minute Data Averages

| Hour | $NO_x$ | $O_2$ | Temp L1 | Temp 2 | Notes |
|---|---|---|---|---|---|
| 11:47 | 1.2 | 12 | 238 | 78 | Bias Checks |
| 11:48 | 1.2 | **12** | 237 | 78 | **Mid O2/CO2 Gas** |
| 11:49 | 22.9 | 4.4 | 236 | 78 | Bias Checks |
| 11:50 | 217.2 | 0 | 234 | 78 | Bias Checks |
| 11:51 | 219.2 | 0 | 233 | 78 | Bias Checks |
| 11:52 | **219.1** | 0 | 233 | 78 | **Mid NOx Gas** |
| 11:53 | 205.4 | 7.5 | 232 | 78 | Stack Gas |
| 11:54 | 140 | 12.5 | 232 | 78 | **Run #7** |
| 11:55 | 140.2 | 12.4 | 232 | 78 | **Run #7** |
| 11:56 | 143.3 | 12.8 | 232 | 78 | **Run #7** |
| 11:57 | 148.6 | 12.8 | 232 | 78 | **Run #7** |
| 11:58 | 150.5 | 12.9 | 232 | 79 | **Run #7** |
| 11:59 | 151.5 | 12.8 | 233 | 79 | **Run #7** |
| 12:00 | 152.2 | 12.8 | 234 | 79 | **Run #7** |
| 12:01 | 154.5 | 12.9 | 235 | 79 | **Run #7** |
| 12:02 | 156.3 | 12.9 | 236 | 79 | **Run #7** |
| 12:03 | 156 | 12.7 | 236 | 79 | **Run #7** |
| 12:04 | 154.6 | 12.5 | 237 | 79 | **Run #7** |
| 12:05 | 153.1 | 12.3 | 237 | 79 | **Run #7** |
| 12:06 | 153.5 | 12.4 | 238 | 79 | **Run #7** |
| 12:07 | 155.2 | 12.5 | 238 | 79 | **Run #7** |
| 12:08 | 157.9 | 12.2 | 239 | 79 | **Run #7** |
| 12:09 | 158.5 | 12.1 | 239 | 79 | **Run #7** |
| 12:10 | 159.8 | 12.1 | 240 | 79 | **Run #7** |
| 12:11 | 162.2 | 13 | 240 | 80 | **Run #7** |
| 12:12 | 102.2 | 17.2 | 240 | 80 | **Run #7** |
| 12:13 | 73.1 | 15.9 | 241 | 80 | **Run #7** |
| 12:14 | 117.7 | 11.8 | 241 | 80 | **Run #7** |
| | 144.8 | 12.9 | 236.4 | 79.0 | **21 Min. Analyzer Average, Ca** |
| | 1.20 | 0.00 | | | **Avg. Zero Bias Check, Co** |
| | 219.00 | 12.00 | | | **Avg. Mid Span Bias Check, Cm** |
| | 225 | 12.0 | | | **Actual Mid Span Value, Cma** |
| | 148.4 | 12.9 | | | **Corrected Conc., Cstack** |
| | 0.353 (lb/MMBtu) | | **NOx Emission Factor** | | |
| 12:15 | 105.7 | 3.5 | 241 | 80 | Bias Checks |
| 12:16 | 5.8 | 0 | 241 | 80 | Bias Checks |
| 12:17 | **1.2** | **0** | 241 | 80 | **Zero Gas** |
| 12:18 | 1.2 | 6.9 | 240 | 80 | Bias Checks |
| 12:19 | 1.2 | 12 | 239 | 80 | Bias Checks |
| 12:20 | 1.2 | **12** | 238 | 80 | **Mid O2/CO2 Gas** |
| 12:21 | 22.9 | 4.3 | 237 | 80 | Bias Checks |
| 12:22 | 216.9 | 0 | 236 | 80 | Bias Checks |
| 12:23 | 219 | 0 | 235 | 80 | Bias Checks |
| 12:24 | **218.9** | 0 | 234 | 80 | **Mid NOx Gas** |
| 12:25 | 199.3 | 3.8 | 233 | 80 | Stack Gas |
| 12:26 | 144.7 | 11.7 | 232 | 80 | **Run #8** |
| 12:27 | 147.9 | 11.5 | 232 | 80 | **Run #8** |

United States Steel Corporation
Mon Valley Complex - Clairton Plant

Annual RATA B-Battery Combustion Stack
Chester Engineers Mobile Air Quality Laboratory Data

August 17, 2007
Minute Data Averages

| Hour | $NO_x$ | $O_2$ | Temp L1 | Temp 2 | Notes |
|---|---|---|---|---|---|
| 12:28 | 142.2 | 11.4 | 232 | 80 | **Run #8** |
| 12:29 | 139.4 | 11.3 | 233 | 80 | **Run #8** |
| 12:30 | 142.4 | 11.2 | 233 | 80 | **Run #8** |
| 12:31 | 144.1 | 12.1 | 234 | 80 | **Run #8** |
| 12:32 | 101 | 17.5 | 235 | 80 | **Run #8** |
| 12:33 | 67.3 | 15.6 | 235 | 80 | **Run #8** |
| 12:34 | 133.6 | 12.5 | 236 | 80 | **Run #8** |
| 12:35 | 146.7 | 12.5 | 237 | 80 | **Run #8** |
| 12:36 | 149.5 | 12.4 | 237 | 80 | **Run #8** |
| 12:37 | 151.8 | 12.3 | 238 | 80 | **Run #8** |
| 12:38 | 152 | 12.1 | 238 | 80 | **Run #8** |
| 12:39 | 152.3 | 12.1 | 238 | 80 | **Run #8** |
| 12:40 | 155 | 12 | 239 | 80 | **Run #8** |
| 12:41 | 156.5 | 12 | 239 | 80 | **Run #8** |
| 12:42 | 156.3 | 12 | 240 | 80 | **Run #8** |
| 12:43 | 155.7 | 11.8 | 240 | 80 | **Run #8** |
| 12:44 | 154.7 | 11.7 | 240 | 80 | **Run #8** |
| 12:45 | 157 | 11.9 | 241 | 80 | **Run #8** |
| 12:46 | 157.5 | 11.9 | 241 | 80 | **Run #8** |
| | 143.2 | 12.4 | 236.7 | 80.0 | **21 Min. Analyzer Average, Ca** |
| | 1.20 | 0.00 | | | **Avg. Zero Bias Check, Co** |
| | 218.90 | 12.00 | | | **Avg. Mid Span Bias Check, Cm** |
| | 225 | 12.0 | | | **Actual Mid Span Value, Cma** |
| | 146.8 | 12.4 | | | **Corrected Conc., Cstack** |
| | 0.326 (lb/MMBtu) | | **NOx Emission Factor** | | |
| 12:47 | 127.4 | 3.5 | 241 | 80 | Bias Checks |
| 12:48 | 6.2 | 0 | 241 | 80 | Bias Checks |
| 12:49 | **1.2** | **0** | 241 | 80 | **Zero Gas** |
| 12:50 | 1.2 | 7.1 | 240 | 80 | Bias Checks |
| 12:51 | 1.2 | 12 | 239 | 80 | Bias Checks |
| 12:52 | 1.2 | **12** | 238 | 80 | **Mid O2/CO2 Gas** |
| 12:53 | 24.6 | 4.8 | 236 | 80 | Bias Checks |
| 12:54 | 218.3 | 0 | 236 | 80 | Bias Checks |
| 12:55 | 218.7 | 0 | 234 | 80 | Bias Checks |
| 12:56 | **218.9** | 0 | 233 | 80 | **Mid NOx Gas** |
| 12:57 | 203.2 | 4.4 | 233 | 80 | Stack Gas |
| 12:58 | 136.8 | 11.2 | 232 | 80 | Stack Gas |
| 12:59 | 142.3 | 11.5 | 232 | 80 | **Run #9** |
| 13:00 | 144.3 | 11.6 | 232 | 80 | **Run #9** |
| 13:01 | 146.9 | 11.5 | 232 | 80 | **Run #9** |
| 13:02 | 142.1 | 11.4 | 233 | 80 | **Run #9** |
| 13:03 | 141.1 | 11.6 | 234 | 80 | **Run #9** |
| 13:04 | 147 | 11.7 | 234 | 80 | **Run #9** |
| 13:05 | 148 | 11.4 | 235 | 80 | **Run #9** |
| 13:06 | 139.5 | 11.4 | 236 | 80 | **Run #9** |
| 13:07 | 139.2 | 11.3 | 236 | 80 | **Run #9** |
| 13:08 | 139 | 11.4 | 237 | 80 | **Run #9** |

United States Steel Corporation
Mon Valley Complex - Clairton Plant

Annual RATA B-Battery Combustion Stack — August 17, 2007
Chester Engineers Mobile Air Quality Laboratory Data — Minute Data Averages

| Hour | $NO_x$ | $O_2$ | Temp L1 | Temp 2 | Notes |
|---|---|---|---|---|---|
| 13:09 | 144.6 | 11.5 | 237 | 80 | **Run #9** |
| 13:10 | 147.6 | 11.6 | 238 | 80 | **Run #9** |
| 13:11 | 145.2 | 12.3 | 238 | 80 | **Run #9** |
| 13:12 | 90.3 | 17.6 | 238 | 80 | **Run #9** |
| 13:13 | 61.2 | 15.7 | 239 | 80 | **Run #9** |
| 13:14 | 133.8 | 12.4 | 239 | 80 | **Run #9** |
| 13:15 | 146.9 | 12.2 | 240 | 80 | **Run #9** |
| 13:16 | 146.6 | 12.1 | 240 | 80 | **Run #9** |
| 13:17 | 149 | 12 | 240 | 80 | **Run #9** |
| 13:18 | 151.4 | 11.9 | 241 | 80 | **Run #9** |
| 13:19 | 154.2 | 11.9 | 241 | 80 | **Run #9** |
| | 138.1 | 12.2 | 236.8 | 80.0 | **21 Min. Analyzer Average, Ca** |
| | 1.20 | 0.00 | | | **Avg. Zero Bias Check, Co** |
| | 218.75 | 12.00 | | | **Avg. Mid Span Bias Check, Cm** |
| | 225.0 | 12.0 | | | **Actual Mid Span Value, Cma** |
| | 141.6 | 12.2 | | | **Corrected Conc., Cstack** |
| | 0.308 (lb/MMBtu) | | **NOx Emission Factor** | | |
| 13:20 | 139.2 | 5.6 | 241 | 80 | Bias Checks |
| 13:21 | 20.5 | 0 | 241 | 80 | Bias Checks |
| 13:22 | 1.2 | 0 | 241 | 80 | Bias Checks |
| 13:23 | **1.2** | **0** | 240 | 81 | **Zero Gas** |
| 13:24 | 1.2 | 7.2 | 239 | 82 | Bias Checks |
| 13:25 | 1.2 | 12 | 238 | 82 | Bias Checks |
| 13:26 | 1.2 | **12** | 237 | 82 | **Mid O2/CO2 Gas** |
| 13:27 | 1.2 | 8.3 | 236 | 82 | Bias Checks |
| 13:28 | 183.6 | 0 | 235 | 82 | Bias Checks |
| 13:29 | 218.9 | 0 | 234 | 82 | Bias Checks |
| 13:30 | **218.6** | 0 | 233 | 82 | **Mid NOx Gas** |
| 13:31 | 218.7 | 0 | 232 | 82 | Bias Checks |
| 13:32 | 159.3 | 16.6 | 232 | 82 | Stack Gas |

**UNITED STATES STEEL CORPORATION**
**MON VALLEY COMPLEX - CLAIRTON PLANT**
**CLAIRTON, PENNSYLVANIA**

**TABLE A**

**B-BATTERY COMBUSTION STACK**
**$O_2$ CEM ANNUAL RATA RESULTS**
**AUGUST 17, 2007**

All Test Runs

| Test Run No. | Test Date | Start Time (EDT) | Stop Time (EDT) | RM Test Run Avg. O2 (%) | USS CEM Test Run Avg. O2 (%) | Arithmetic Difference (%) |
|---|---|---|---|---|---|---|
| 1 | 08/17/07 | 8:35 | 8:55 | 12.7 | 13.0 | -0.3 |
| 2 | 08/17/07 | 9:09 | 9:29 | 12.8 | 13.1 | -0.3 |
| 3 | 08/17/07 | 9:44 | 10:04 | 12.9 | 13.2 | -0.3 |
| 4 | 08/17/07 | 10:17 | 10:37 | 12.9 | 13.2 | -0.3 |
| 5 | 08/17/07 | 10:50 | 11:10 | 12.7 | 12.9 | -0.2 |
| 6 | 08/17/07 | 11:22 | 11:42 | 12.9 | 13.1 | -0.2 |
| 7 | 08/17/07 | 11:54 | 12:14 | 12.9 | 13.2 | -0.3 |
| 8 | 08/17/07 | 12:26 | 12:46 | 12.4 | 12.6 | -0.2 |
| 9 | 08/17/07 | 12:59 | 13:19 | 12.2 | 12.5 | -0.3 |

| Results: | | | | |
|---|---|---|---|---|
| | | Data Points (n) | | 9 |
| | | Arithmetic Mean Difference (d) | | -0.279 |
| | | Standard Deviation (Sd) | | 0.040 |
| | | Confidence Coefficient (CC) | | 0.031 |
| | | Average RM Value (ARM) | | 12.7 |
| | | Relative Accuracy (RA - 1) | passed | 2.4% < = 20% |
| | or | Relative Accuracy (RA - 3) | passed | 0.279 < = 1 |

Notes:

RM = Reference Method
USS CEM = U.S. Steel Clairton Plant's Continuous Emission Monitor
CC = (t value) x (Sd / n^0.5) where t value = 2.306 for n = 9
RA - 1 = (Abs(d) + Abs(CC)) / ARM
RA - 3 = Average Absolute Arithmetic Difference
ATS Clock= USS Clock + 1 hour

Calculations according to U.S. EPA Performance Specification 2 and
PA DEP Continuous Source Monitoring Manual (Revision No. 8), Table III

## CEM CALIBRATION ERROR TEST DATA

| | | | |
|---|---|---|---|
| CLIENT | U.S. Steel - Mon Valley Complex | Page 1 of | 2 |
| PLANT SITE | Clairton Plant | ANALYZER | Advanced Pollution Instrumentation, Inc. |
| TEST UNIT | B-Battery Combustion Stack | INSTRUMENT | Chemiluminescent NOx Analyzer-Model 200AH |
| TEST DATE | August 8, 2007 OPERATOR HS | Serial No. | 258 |
| PROJECT NO. | 07-6296-MW-PG50, Task 085 | Calibrated Span | 451 ~~451~~ (ppmv, dry) |

| Time (EDT) | Certified Cylinder Value (A) (ppmv, dry) | Analyzer Calibration Response (B) (ppmv, dry) | Absolute Arithmetic Difference (A - B) (ppmv, dry) | Calibration Error [100 * (A-B) / Calibrated Span] (%) | Δ as Percent of Cal. Gas Conc. [100 * (A-B) / Gas Conc.] (%) | Notes |
|---|---|---|---|---|---|---|
| 0747 | 0 | 0.9 | 0.9 | 0.20 | X | Zero Gas is 100% N2 |
| 0757 | 451 ~~451~~ | 449.6 | 1.4 | ~~0.97~~ 0.53 | X | |
| 0801 | 225 | 226.3 | 1.3 | 0.29 | X | |

Specifications: For O2, CO2, SO2, NOx, CO the Allowable Cal. Error < = 2% of Calibrated Span = 9.08 ppm NO
For THC the Allowable Calibration Error < = 5% of Calibration Gas

## CEM SAMPLING SYSTEM BIAS AND DRIFT DATA

Mid-Level or High-Level Calibration Gas: 225 (ppmv, dry)
(Use the one closest to the actual stack gas concentration)

| Time (EDT) | Calibration Gas | Analyzer Response (B) (ppmv, dry) | System Response (C) (ppmv, dry) | System Cal. Bias [100 * (C-B) / Span] (%) | Drift [100 * (Final C - Initial C) / Span] (%) | Response time for upscale bias gas = 20 sec Notes |
|---|---|---|---|---|---|---|
| 0805 | Zero | 0.9 | 1.5 | 0.13 | | Start 0824 - 0829 |
| 0812 | Upscale | ~~449.6~~ 226.3 | 221.1 | 1.15 | | |
| | | | | | | |
| 0859 | Zero | 0.9 | 1.2 | 0.07 | 0.07 | Run No. 1: 0835 |
| 0906 | Upscale | ~~449.6~~ 226.3 | 220.6 | 1.26 | 0.11 | 0855 |
| | | | | | | |
| 0933 | Zero | 0.9 | 1.2 | 0.07 | 0.0 | Run No. 2: 0909 |
| 0941 | Upscale 226.3 | ~~449.6~~ 226.3 | 220.1 | 1.37 | 0.11 | 0929 |
| | | | | | | |
| 1008 | Zero | 0.9 | 1.2 | 0.07 | 0.0 | Run No. 3: 0944 |
| 1015 | Upscale | 226.3 | 220.1 | 1.37 | 0.0 | 1004 |
| | | | | | | |
| 1040 | Zero | 0.9 | 1.2 | 0.07 | 0.0 | Run No. 4: 1017 |
| 1047 | Upscale | 226.3 | 220.1 | 1.37 | 0.0 | 1037 |
| | | | | | | |
| 1113 | Zero | 0.9 | 1.2 | 0.07 | 0.0 | Run No. 5: 1050 |
| 1120 | Upscale | 226.3 | 219.8 | 1.47 | 0.07 | 1110 |
| | | | | | | |
| 1145 | Zero | 0.9 | 1.2 | 0.07 | 0.0 | Run No. 6: 1122 |
| 1152 | Upscale | 226.3 | 219.0 | 1.62 | 0.18 | 1142 |

Specifications: For O2, CO2, SO2, NOx & CO the System Cal. Bias < = 5% of the Calibrated Span = 22.7 ppm NO
For THC the System Cal. Bias < = 3% of the Calibrated Span
For O2, CO2, SO2, NOx, CO & THC the Drift < = 3% of the Calibrated Span = 13.62

Chester Clock -58 min = USS Clock

## CEM CALIBRATION ERROR TEST DATA

| | | | |
|---|---|---|---|
| CLIENT | U.S. Steel - Mon Valley Complex | Page 2 of | 2 |
| PLANT SITE | Clairton Plant | ANALYZER | Advanced Pollution Instrumentation, Inc. |
| TEST UNIT | B-Battery Combustion Stack | INSTRUMENT | Chemiluminescent NOx Analyzer-Model 200AH |
| TEST DATE | August 18, 2007 OPERATOR HIT | Serial No. | 258 |
| PROJECT NO. | 07-6296-MW-PG50, Task 085 | Calibrated Span | 451 ~~454~~ (ppmv, dry) |

| Time (EDT) | Certified Cylinder Value (A) (ppmv, dry) | Analyzer Calibration Response (B) (ppmv, dry) | Absolute Arithmetic Difference (A - B) (ppmv, dry) | Calibration Error [100 * (A-B) / Calibrated Span] (%) | Δ as Percent of Cal. Gas Conc. [100 * (A-B) / Gas Conc.] (%) | Notes |
|---|---|---|---|---|---|---|
| 0747 | 0 | 0.9 | 0.9 | 0.20 | X | Zero Gas is 100% N2 |
| 0757 | 451 ~~454~~ | 449.6 | 2.4 | 0.53 | X | |
| 0801 | 225 | 226.3 | 1.3 | 0.29 | X | |

Specifications: For O2, CO2, SO2, NOx, CO the Allowable Cal. Error < = 2% of Calibrated Span = 9.08 ppm NO
For THC the Allowable Calibration Error < = 5% of Calibration Gas

## CEM SAMPLING SYSTEM BIAS AND DRIFT DATA

Mid-Level or High-Level Calibration Gas: 225 (ppmv, dry)
(Use the one closest to the actual stack gas concentration)

| Time (EDT) | Calibration Gas | Analyzer Response (B) (ppmv, dry) | System Response (C) (ppmv, dry) | System Cal. Bias [100 * (C-B) / Span] (%) | Drift [100 * (Final C - Initial C) / Span] (%) | Response time for upscale bias gas = Notes |
|---|---|---|---|---|---|---|
| 1217 | Zero | 0.9 | 1.2 | 0.07 | 0.0 | Run No. 7: 1154 - 1214 |
| 1224 | Upscale | 226.3 | 218.9 | 1.64 | 0.02 | |
| | | | | | | |
| 1249 | Zero | 0.9 | 1.2 | 0.07 | 0.0 | Run No. 8: 1226 - 1246 |
| 1256 | Upscale | 226.3 | 218.8 | 1.66 | 0.02 | |
| | | | | | | |
| 1323 | Zero | 0.9 | 1.2 | 0.07 | 0.0 | Run No. 9: 1259 1319 |
| 1330 | Upscale | 226.3 | 218.6 | 1.71 | 0.04 | |
| | | | | | | |
| | Zero | | | | | Run No. 10: |
| | Upscale | | | | | |
| | | | | | | |
| | Zero | | | | | Run No. 11: |
| | Upscale | | | | | |
| | | | | | | |
| | Zero | | | | | Run No. 12: |
| | Upscale | | | | | |
| | | | | | | |
| | Zero | | | | | Run No. 13: |
| | Upscale | | | | | |

Specifications: For O2, CO2, SO2, NOx & CO the System Cal. Bias < = 5% of the Calibrated Span = 22.7 ppm NO
For THC the System Cal. Bias < = 3% of the Calibrated Span
For O2, CO2, SO2, NOx, CO & THC the Drift < = 3% of the Calibrated Span = 13.62

## CEM CALIBRATION ERROR TEST DATA

| | | | |
|---|---|---|---|
| CLIENT | U.S. Steel - Mon Valley Complex | Page 1 of | 2 |
| PLANT SITE | Clairton Plant | ANALYZER | California Analytical Instruments |
| TEST UNIT | B-Battery Combustion Stack | INSTRUMENT | Paramagnetic Oxygen Analyzer - Model 100P |
| TEST DATE | August 17, 2007 OPERATOR HT | Serial No. | 4J06002 |
| PROJECT NO. | 07-6296-MW-PG50, Task 085 | Calibrated Span | 21.9 (%, dry) |

| Time (EDT) | Certified Cylinder Value (A) (%, dry) | Analyzer Calibration Response (B) (%, dry) | Absolute Arithmetic Difference (A - B) (%, dry) | Calibration Error [100 * (A-B) / Calibrated Span] (%) | Δ as Percent of Cal. Gas Conc. [100 * (A-B) / Gas Conc.] (%) | Notes |
|---|---|---|---|---|---|---|
| 0747 | 0.0 | 0.0 | 0.0 | 0.0 | X | Zero Gas is 100% N2 |
| 0750 | 21.9 | 22.1 | 0.2 | 0.91 | X | |
| 0753 | 12.0 | 12.1 | 0.1 | 0.46 | X | |

Specifications: For O2, CO2, SO2, NOx, CO the Allowable Calibration Error < = 2% of Calibrated Span = 0.44 %O2
For THC the Allowable Calibration Error < = 5% of Calibration Gas

## CEM SAMPLING SYSTEM BIAS AND DRIFT DATA

Mid-Level or High-Level Calibration Gas: 12.0 (%, dry)
(Use the one closest to the actual stack gas concentration)

| Time (EDT) | Calibration Gas | Analyzer Response (B) (%, dry) | System Response (C) (%, dry) | System Cal. Bias [100 * (C-B) / Span] (%) | Drift [100 * (Final C - Initial C) / Span] (%) | Response time for upscale bias gas = 2050 Notes |
|---|---|---|---|---|---|---|
| 0805 | Zero | 0.0 | 0.0 | 0.0 | | strat |
| 0808 | Upscale | 12.1 | 12.1 | 0.0 | | 0824-0829 |
| 0859 | Zero | 0.0 | 0.0 | 0.0 | 0.0 | Run No. 1: 0835 - |
| 0902 | Upscale | 12.1 | 11.9 | 0.91 | 0.91 | 0855 |
| 0933 | Zero | 0.0 | 0.0 | 0.0 | 0.0 | Run No. 2: 0909 - |
| 0937 | Upscale | 12.1 | 11.9 | 0.91 | 0.0 | 0929 |
| 1008 | Zero | 0.0 | 0.0 | 0.0 | 0.0 | Run No. 3: 0944 - |
| 1011 | Upscale | 12.1 | 12.0 | 0.46 | 0.46 | 1004 |
| 1004 | Zero | 0.0 | 0.0 | 0.0 | 0.0 | Run No. 4: 1017 |
| 1043 | Upscale | 12.1 | 12.0 | 0.46 | 0.0 | 1037 |
| 1113 | Zero | 0.0 | 0.0 | 0.0 | 0.0 | Run No. 5: 1050 |
| 1116 | Upscale | 12.1 | 12.0 | 0.46 | 0.0 | 1110 |
| 1145 | Zero | 0.0 | 0.0 | 0.0 | 0.0 | Run No. 6: 1122 |
| 1148 | Upscale | 12.1 | 12.0 | 0.46 | 0.0 | 1142 |

Specifications: For O2, CO2, SO2, NOx & CO the System Cal. Bias < = 5% of the Calibrated Span = 1.1 %O2
For THC the System Cal. Bias < = 3% of the Calibrated Span
For O2, CO2, SO2, NOx, CO & THC the Drift < = 3% of the Calibrated Span = 0.66 %O2

## CEM CALIBRATION ERROR TEST DATA

| | | | |
|---|---|---|---|
| CLIENT | U.S. Steel - Mon Valley Complex | Page 2 of | 2 |
| PLANT SITE | Clairton Plant | ANALYZER | California Analytical Instruments |
| TEST UNIT | B-Battery Combustion Stack | INSTRUMENT | Paramagnetic Oxygen Analyzer - Model 100P |
| TEST DATE | August 17, 2007 OPERATOR HT | Serial No. | 4J06002 |
| PROJECT NO. | 07-6296-MW-PG50, Task 085 | Calibrated Span | 21.9 (%, dry) |

| Time (EDT) | Certified Cylinder Value (A) (%, dry) | Analyzer Calibration Response (B) (%, dry) | Absolute Arithmetic Difference (A - B) (%, dry) | Calibration Error [100 * (A-B) / Calibrated Span] (%) | Δ as Percent of Cal. Gas Conc. [100 * (A-B) / Gas Conc.] (%) | Notes |
|---|---|---|---|---|---|---|
| 0747 | 0.0 | 0.0 | 0.0 | 0.0 | X | Zero Gas is 100% N2 |
| 0750 | 21.9 | 22.1 | 0.2 | 0.91 | X | |
| 0753 | 12.0 | 12.1 | 0.1 | 0.46 | X | |

Specifications: For O2, CO2, SO2, NOx, CO the Allowable Calibration Error < = 2% of Calibrated Span = 0.44 %O2
For THC the Allowable Calibration Error < = 5% of Calibration Gas

## CEM SAMPLING SYSTEM BIAS AND DRIFT DATA

Mid-Level or High-Level Calibration Gas: 12.0 (%, dry)
(Use the one closest to the actual stack gas concentration)

| Time (EDT) | Calibration Gas | Analyzer Response (B) (%, dry) | System Response (C) (%, dry) | System Cal. Bias [100 * (C-B) / Span] (%) | Drift [100 * (Final C - Initial C) / Span] (%) | Response time for upscale bias gas = Notes |
|---|---|---|---|---|---|---|
| 1217 | Zero | 0.0 | 0.0 | 0.0 | 0.0 | Run No. 7: 1154 - 1214 |
| 1220 | Upscale | 12.1 | 12.0 | 0.46 | 0.0 | |
| | | | | | | |
| 1249 | Zero | 0.0 | 0.0 | 0.0 | 0.0 | Run No. 8: 1226 - 1246 |
| 1252 | Upscale | 12.1 | 12.0 | 0.46 | 0.0 | |
| | | | | | | |
| 1323 | Zero | 0.0 | 0.0 | 0.0 | 0.0 | Run No. 9: 1259 1319 |
| 1326 | Upscale | 12.1 | 12.0 | 0.46 | 0.0 | |
| | | | | | | |
| | Zero | | | | | Run No. 10: |
| | Upscale | | | | | |
| | | | | | | |
| | Zero | | | | | Run No. 11: |
| | Upscale | | | | | |
| | | | | | | |
| | Zero | | | | | Run No. 12: |
| | Upscale | | | | | |
| | | | | | | |
| | Zero | | | | | Run No. 13: |
| | Upscale | | | | | |

Specifications: For O2, CO2, SO2, NOx & CO the System Cal. Bias < = 5% of the Calibrated Span = 1.1 %O2
For THC the System Cal. Bias < = 3% of the Calibrated Span
For O2, CO2, SO2, NOx, CO & THC the Drift < = 3% of the Calibrated Span = 0.66 %O2

## CEM CALIBRATION GAS REQUIREMENTS

| Analyte | ATS Analyzer | Calibration Gases (% of Span) | | | | Interference Check |
|---|---|---|---|---|---|---|
| | | Zero | Mid - Level | High - Level | Approved Mixtures | |
| $O_2$ | California Analytical Instruments - Paramagnetic Oxygen Analyzer - Model 100P | < 10% or $N_2$ | 40% - 60 % | 100% | $O_2$ in $N_2$ | Interference Response Test - Vendor Data (M20, S5.4) |
| $CO_2$ | California Analytical Instruments - $CO_2$ Analyzer - Model 100 | purified ambient air or $N_2$ | 40% - 60 % | 100% | $CO_2$ in $N_2$<br>$CO_2$ in air | Ibid. |
| $NO_x$ | Advanced Pollution Instrumentation, Inc. - Chemiluminescent $NO_x$ Analyzer Model - 200AH | purified ambient air or $N_2$ | 40% - 60 % | 100% | NO in $N_2$ | Ibid. + $NO_2$ to NO Converter Test (M20, S5.6) |
| CO | Advanced Pollution Instrumentation, Inc. - Gas Filter Correlation CO Analyzer Model - 300 | $N_2$ | 40% - 60 % | 100% | CO in $N_2$ | N/A |
| $SO_2$ | Advanced Pollution Instrumentation, Inc. - Fluorescent $SO_2$ Analyzer Model - 100AH | < 0.25% or purified ambient air or $N_2$ | 40% - 60 % | 100% | $SO_2$ in $N_2$<br>$SO_2$ in air<br>$SO_2/CO_2$ in $N_2$<br>$SO_2/O_2$ in $N_2$<br>$SO_2/CO_2/O_2$ in $N_2$ | Comparison with M6 |
| THC | J.U.M. Engineering Heated F.I.D. Analyzer - Model 3 - 300A | purified ambient air or $N_2$ | 40% - 60 % | 100% | $C_3H_8$ in $N_2$<br>$C_3H_8$ in air | N/A |

C - stack gas = (C-analyzer - Co) * Cma / (Cm - Co)

C - stack gas = Stack gas concentration
C - analyzer = Average analyzer gas concentration
Co = Average of initial and final cal. bias check response for the zero calibration gas
Cm = Average of initial and final cal. bias check response for the upscale calibration gas
Cma = Actual upscale calibration gas concentration

# HiQ® Certificate.

EPA Protocol
Performed according to EPA-600/R-97/121, Procedure G1

**Notice:** This Cylinder is not to be used when pressure is under 150 psig.

*Manufactured and certified at:*
Linde Gas USA LLC
Maumee Specialty Gas Plant
6421 Monclova Road
MAUMEE OH 43537
419-893-7326

*Produced for customer:*
LINDE GAS
LINDE PITTSBURGH INTERBRANCH
4349 WILLIAM PENN HWY
MURRYSVILLE PA 15668
724-327-1480

| | | | |
|---|---|---|---|
| **Material:** | 6599 | **Blend Tolerance:** | 5 % Relative |
| EPA NO/N2 50-499 PPM | A31 | **Blend Type:** | EPA Protocol |
| **Production #:** | 100137036 | **Cyl. Pressure:** | 2000 psig |
| **Lot #:** | 024996724031D | **Balance Gas:** | Nitrogen |
| **Cylinder #:** | CC137207 | **CGA:** | 660 |
| **Expiration Date:** | 5/29/2009 | **Analytical Accuracy:** | 1.00 % Relative |
| **Shelf Life:** | 24 months | **Confidence:** | 95 % |

| CAS # | Certified Component | Requested Concentration | Concentration and Uncertainty | Date of Certification |
|---|---|---|---|---|
| 10102-43-9 | Nitric Oxide | 450 | 451 +/- 5 ppm | 05/29/2007 |
| 7727-37-9 | Nitrogen | | Balance | 05/29/2007 |

| CAS # | Analyzed (For Ref Use Only) | Concentration | Analysis Date |
|---|---|---|---|
| N/A | NOx | 451 ppm | 05/29/2007 |

| CAS # | Reference Standard | Cylinder/Standard # | Concentration | Expire Date |
|---|---|---|---|---|
| 10102-43-9 | Nitric Oxide | CC220031 , NTRM | 476.8 ppm | 09/01/2010 |

| Instrument | Serial # | Analytical Principle | Calibration Date |
|---|---|---|---|
| Horiba CLA-510SS | 568095024 | Chemiluminescence | 05/24/2007 |

All analyses are performed under controlled environmental conditions.This product is manufactured using equipment which has been calibrated with NIST traceable, or equivalent, standards, weights, or equipment.

Analytical report approved by Roy Yoder

Roy Yoder

HiQ Certificate

# Certificate of Analysis

EPA Protocol

Performed according to EPA-600/R-97/121, Procedure G1

**Notice:** This Cylinder is not to be used when pressure is under 150 psig.

*Manufactured and certified at:*
Linde Gas LLC
Maumee Specialty Gas Plant
6421 Monclova Road
MAUMEE OH 43537
419-893-7226

*Produced for customer:*
LINDE GAS
LINDE PITTSBURGH INTERBRANCH
4349 WILLIAM PENN HWY
MURRYSVILLE PA 15668
724-327-1480

| | | | |
|---|---|---|---|
| **Material:** | 6599 | **Blend Tolerance:** | 5 % Relative |
| EPA NO/N2 50-499 PPM | A31 | **Blend Type:** | EPA Protocol |
| **Production #:** | 100124568 | **Cyl. Pressure:** | 2000 psig |
| **Lot #:** | 02499H6300JC | **Balance Gas:** | Nitrogen |
| **Cylinder #:** | CC148289 | **CGA:** | 660 |
| **Expiration Date:** | 9/18/2008 | **Analytical Accuracy:** | 1.00 % Relative |
| **Shelf Life:** | 24 months | **Confidence:** | 95 % |

| CAS # | Certified Component | Requested Concentration | Concentration and Uncertainty | Date of Certification |
|---|---|---|---|---|
| 10102-43-9 | Nitric Oxide | 225 | 225 +/- 2 ppm | 09/18/2006 |
| 7727-37-9 | Nitrogen | | Balance | 09/18/2006 |

| CAS # | Analyzed (For Ref Use Only) | Concentration | Analysis Date |
|---|---|---|---|
| N/A | NOx | 225 ppm | 09/18/2006 |

| CAS # | Reference Standard | Cylinder/Standard # | Concentration | Expire Date |
|---|---|---|---|---|
| 10102-43-9 | Nitric Oxide | CC174379 , GMIS | 95.6 ppm | 09/09/2007 |

| Instrument | Serial # | Analytical Principle | Calibration Date |
|---|---|---|---|
| Horiba CLA-510SS | 568093024 | Chemiluminescence | 09/05/2006 |

All analyses are performed under controlled environmental conditions.This product is manufactured using equipment which has been calibrated with NIST traceable, or equivalent, standards, weights, or equipment.

Analytical report approved by Roy Yoder

Roy Yoder

Certificate

AGA
Member of the Linde Gas Group

Linde

# Certificate of Analysis

EPA Protocol

Performed according to EPA-600/R-97/121, Procedure G1

**Notice:** This Cylinder is not to be used when pressure is under 150 psig.

*Manufactured and certified at:*
Linde Gas LLC
Maumee Specialty Gas Plant
6421 Monclova Road
MAUMEE OH 43537
419-893-7226

*Produced for customer:*
LINDE GAS
LINDE PITTSBURGH INTERBRANCH
4349 WILLIAM PENN HWY
MURRYSVILLE PA 15668
724-327-1480

| | | | | |
|---|---|---|---|---|
| **Material:** | 2179 | | **Blend Tolerance:** | 1 % Relative |
| MISC 3 COMPONENT EPA | | A31 | **Blend Type:** | EPA Protocol |
| **Production #:** | 100093325 | | **Cyl. Pressure:** | 2000 psig |
| **Lot #:** | 02499M4150GE | | **Balance Gas:** | Nitrogen |
| **Cylinder #:** | CC7516 | | **CGA:** | 590 |
| **Expiration Date:** | 12/22/2007 | | **Analytical Accuracy:** | 1.00 % Relative |
| **Shelf Life:** | 36 months | | **Confidence:** | 95 % |

| CAS # | Certified Component | Requested Concentration | Concentration and Uncertainty | Date of Certification |
|---|---|---|---|---|
| 124-38-9 | Carbon Dioxide | 18 | 17.7 +/- 0.2 % | 12/22/2004 |
| 7782-44-7 | Oxygen | 22 | 21.9 +/- 0.2 % | 12/22/2004 |
| 7727-37-9 | Nitrogen | | Balance | 12/22/2004 |

| CAS # | Reference Standard | Cylinder/Standard # | Concentration | Expire Date |
|---|---|---|---|---|
| 7782-44-7 | Oxygen | CC73279 , NTRM | 20.89 % | 10/02/2008 |
| 124-38-9 | Carbon Dioxide | CC59205 , NTRM | 19.91 % | 08/01/2005 |

| Instrument | Serial # | Analytical Principle | Calibration Date |
|---|---|---|---|
| Horiba VIA-510 | 568849043 | Non-Dispersive Infrared | 12/09/2004 |
| Rosemount 755R | 1000559 | Paramagnetic | 12/09/2004 |

All analyses are performed under controlled environmental conditions.This product is manufactured using equipment which has been calibrated with NIST traceable, or equivalent, standards, weights, or equipment.

Analytical report approved by Jennifer Carney

Jennifer Carney

HQ Analysis Certificate

# Certificate of Analysis

EPA Protocol

Performance Specification 2, Procedure G1

Notice: This Cylinder is not to be used when pressure is under 150 psig.

*Manufactured and certified at:*
Linde Gas USA LLC
Maumee Specialty Gas Plant
6421 Monclova Road
MAUMEE OH 43537
419-893-7226

*Produced for customer:*
LINDE GAS
LINDE PITTSBURGH INTERBRANCH
4349 WILLIAM PENN HWY
MURRYSVILLE PA 15668
724-327-1480

| | | | | |
|---|---|---|---|---|
| **Material:** | 2179 | | **Blend Tolerance:** | 5 % Relative |
| MISC 3 COMPONENT EPA | | A31 | **Blend Type:** | EPA Protocol |
| **Production #:** | 100133123 | | **Cyl. Pressure:** | 2000 psig |
| **Lot #:** | 02499C7020ZF | | **Balance Gas:** | Nitrogen |
| **Cylinder #:** | CC120223 | | **CGA:** | 590 |
| **Expiration Date:** | 3/12/2010 | | **Analytical Accuracy:** | 1.00 % Relative |
| **Shelf Life:** | 36 months | | **Confidence:** | 95 % |

| CAS # | Certified Component | Requested Concentration | Concentration and Uncertainty | Date of Certification |
|---|---|---|---|---|
| 124-38-9 | Carbon Dioxide | 10 | 9.98 +/- 0.10 % | 03/12/2007 |
| 7782-44-7 | Oxygen | 12 | 12.0 +/- 0.1 % | 03/12/2007 |
| 7727-37-9 | Nitrogen | | Balance | 03/12/2007 |

| CAS # | Reference Standard | Cylinder/Standard # | Concentration | Expire Date |
|---|---|---|---|---|
| 124-38-9 | Carbon Dioxide | CC59188 , NTRM 81674 | 6.900 % | 10/02/2008 |
| 7782-44-7 | Oxygen | CC195913 , NTRM | 20.90 % | 01/01/2010 |

| Instrument | Serial # | Analytical Principle | Calibration Date |
|---|---|---|---|
| Horiba VIA-510 | 568849043 | Non-Dispersive Infrared | 03/08/2007 |
| Rosemount 755R | 1000559 | Paramagnetic | 03/06/2007 |

All analyses are performed under controlled environmental conditions.This product is manufactured using equipment which has been calibrated with NIST traceable, or equivalent, standards, weights, or equipment.

Analytical report approved by Roy Yoder

Roy Yoder

ATS MOBILE AIR QUALITY LABORATORY
NOX Analyzer Converter Efficiency Test Results
Test Performed on July 21, 2006
Test Performed by Dan Nadzam using the Tedlar bag technique

| Date | Hour | 500 ppm $NO_x$ | 500 ppm $NO_2$ | <<<RANGE <<<UNITS |
|---|---|---|---|---|
| 7/21/2006 | 11:15 | 0 | 0.1 | |
| 7/21/2006 | 11:16 | 5 | 0.1 | Bag On |
| 7/21/2006 | 11:17 | 111.6 | 1 | Bag On |
| 7/21/2006 | 11:18 | 119.8 | 2.2 | **Test** |
| 7/21/2006 | 11:19 | 119.8 | 3.7 | **Test** |
| 7/21/2006 | 11:20 | 119.7 | 5.3 | **Test** |
| 7/21/2006 | 11:21 | 119.6 | 7.2 | **Test** |
| 7/21/2006 | 11:22 | 119.6 | 8.8 | **Test** |
| 7/21/2006 | 11:23 | 119.5 | 10.2 | **Test** |
| 7/21/2006 | 11:24 | 119.3 | 11.8 | **Test** |
| 7/21/2006 | 11:25 | 119.2 | 13.3 | **Test** |
| 7/21/2006 | 11:26 | 119.2 | 14.9 | **Test** |
| 7/21/2006 | 11:27 | 119.2 | 16.2 | **Test** |
| 7/21/2006 | 11:28 | 119.2 | 17.6 | **Test** |
| 7/21/2006 | 11:29 | 119 | 18.8 | **Test** |
| 7/21/2006 | 11:30 | 118.9 | 20.1 | **Test** |
| 7/21/2006 | 11:31 | 118.9 | 21.4 | **Test** |
| 7/21/2006 | 11:32 | 118.9 | 22.7 | **Test** |
| 7/21/2006 | 11:33 | 118.9 | 24 | **Test** |
| 7/21/2006 | 11:34 | 118.7 | 25 | **Test** |
| 7/21/2006 | 11:35 | 118.7 | 26.3 | **Test** |
| 7/21/2006 | 11:36 | 118.6 | 27.2 | **Test** |
| 7/21/2006 | 11:37 | 118.6 | 28.3 | **Test** |
| 7/21/2006 | 11:38 | 118.5 | 29.5 | **Test** |
| 7/21/2006 | 11:39 | 118.3 | 30.5 | **Test** |
| 7/21/2006 | 11:40 | 118.3 | 31.5 | **Test** |
| 7/21/2006 | 11:41 | 118.3 | 32.6 | **Test** |
| 7/21/2006 | 11:42 | 118.3 | 33.4 | **Test** |
| 7/21/2006 | 11:43 | 118.1 | 34.3 | **Test** |
| 7/21/2006 | 11:44 | 118 | 35.2 | **Test** |
| 7/21/2006 | 11:45 | 118.2 | 36.2 | **Test** |
| 7/21/2006 | 11:46 | 118 | 37 | **Test** |
| 7/21/2006 | 11:47 | 118 | 37.8 | **Test** |
| | | 119.8 | | **Maximum** |
| | | 118 | | **Minimum** |
| | | 117.4 | | **Allowable Minimum** |

Converter Efficiency Test is ACCEPTABLE

CHESTER ENGINEERS MOBILE AIR QUALITY LABORATORY
CEMS Interference Test Notes
API Chemiluminescent NOx Analyzer Model 200AH S/N 258
API Fluorescent SO2 Analyzer Model 100AH S/N 064
API Gas Filter Correlation CO Analyzer Model 300 S/N 905
California Analytical Instruments O2 Analyzer Model 100-P S/N 4J06002
California Analytical Instruments CO2 Analyzer Model 100 S/N 5J06007
Test Performed on January 12, 2007 by Dan Nadzam

Dan Nadzam performed tests to demonstrate that the Chester Engineers CEMS are within the U S. EPA specifications allowed for analyzer interference. Each analyzer was operated at the lowest typical range. Copies of the Protocol 1 calibration Gases used are attached.

The following CALIBRATION worksheet demonstrates that the analyzers were in calibration (+/- 2.0% of the calibrated span) prior to the interference testing. The data is the response of each analyzer to the CALIBRATION SPAN gas. All gases were introduced through a common manifold.

The following INTERFERENCE worksheet demonstrates two things. One is that the analyzers have a linear response as verified by the acceptable response (+/- 2.0% of the calibrated span) to a mid level calibration gas. The second is the response of each analyzer to the interferent test gas.

The SO2 analyzer response test was performed by blending a mixture of interferent test gases. The purpose of mixing the gases was to determine the least amount of oxygen necessary to reduce the NO interference (note the unacceptable SO2 response to the Protocol 1 NO gases, which are balance nitrogen) to acceptable levels. The analyzer manufacturer suggested at least 3% would be necessary, yet it was found that 2.1% oxygen would be acceptable.

Each analyzer's Interference Response is summarized on the RESULTS worksheet.

CHESTER ENGINEERS MOBILE AIR QUALITY LABORATORY
CEMS Interference Test Calibrations
API Chemiluminescent NOx Analyzer Model 200AH S/N 258
API Fluorescent SO2 Analyzer Model 100AH S/N 064
API Gas Filter Correlation CO Analyzer Model 300 S/N 905
California Analytical Instruments O2 Analyzer Model 100-P S/N 4J06002
California Analytical Instruments CO2 Analyzer Model 100 S/N 5J06007
Test Performed on January 12, 2007 by Dan Nadzam

| Hour | 90.5 ppm CO | 99.5 ppm $SO_2$ | 87.0 ppm $NO_x$ | 21.9 % $O_2$ | 17.7 % $CO_2$ | 87.0 ppm $NO_2$ | deg F Ambient | <<<CALIBRATION SPAN <<<UNITS |
|---|---|---|---|---|---|---|---|---|
| 9:01 | -0.7 | 0.2 | 0 | 21.3 | 0.1 | 0 | 78 | Ambient Air |
| 9:02 | -0.7 | 0.2 | 0 | 21.3 | 0.1 | 0 | 78 | Ambient Air |
| 9:03 | -0.7 | 0.2 | 0 | 21.3 | 0.1 | 0 | 78 | Ambient Air |
| 9:04 | -0.7 | 0.2 | 0 | 21.3 | 0.1 | 0 | 78 | Ambient Air |
| 9:05 | -0.7 | 0.2 | 0 | 21.3 | 0.1 | 0 | 78 | Ambient Air |
| 9:06 | -0.7 | 0.2 | 0 | 10.9 | 0.1 | 0 | 78 | Zero Gas (Nitrogen) |
| 9:07 | -0.7 | 0.2 | 0 | 0.1 | 0 | 0 | 78 | Zero Gas (Nitrogen) |
| 9:08 | 0 | 0 | 0 | 0 | 0 | 0 | 78 | Zero Gas (Nitrogen) |
| 9:09 | **0** | **0** | **0** | **0** | **0** | **0** | 78 | **Zero Gas (Nitrogen)** |
| 9:10 | 0.1 | 0 | 0 | 0.5 | 0 | 0 | 78 | CO Span Gas (90.5) |
| 9:11 | 57.1 | 0 | 0 | 0 | 0 | 0 | 78 | CO Span Gas (90.5) |
| 9:12 | 87.6 | 0 | 0 | 0 | 0 | 0 | 78 | CO Span Gas (90.5) |
| 9:13 | 90.7 | 0 | 0 | 0 | 0 | 0 | 78 | CO Span Gas (90.5) |
| 9:14 | **90.8** | 0 | 0 | 0 | 0 | 0 | 78 | **CO Span Gas (90.5)** |
| 9:15 | 84 | 0 | 0 | 8.3 | 5.3 | 0 | 78 | 21.9 % $O_2$, 17.7 % CO2 |
| 9:16 | 17.2 | 0 | 0 | 22.1 | 17.6 | 0 | 78 | 21.9 % $O_2$, 17.7 % CO2 |
| 9:17 | -0.7 | 0 | 0 | 22 | 17.8 | 0 | 78 | 21.9 % $O_2$, 17.7 % CO2 |
| 9:18 | -1 | 0 | 0 | **22** | **17.8** | 0 | 78 | **21.9 % $O_2$, 17.7 % CO2** |
| 9:19 | -1 | 0 | 0 | 20.4 | 16.7 | 0 | 78 | 21.9 % $O_2$, 17.7 % CO2 |
| 9:20 | -0.9 | 65.6 | 0 | 0.9 | 0.9 | 0 | 78 | $SO_2$ Span Gas (99.5) |
| 9:21 | -0.7 | 93.9 | 0.1 | 0 | 0.1 | 0 | 78 | $SO_2$ Span Gas (99.5) |
| 9:22 | -0.5 | 100.1 | 0.1 | 0 | 0 | 0 | 78 | $SO_2$ Span Gas (99.5) |
| 9:23 | -0.3 | 99.8 | 0.1 | 0 | 0 | 0 | 78 | $SO_2$ Span Gas (99.5) |
| 9:24 | -0.2 | **100** | 0.1 | 0 | 0 | 0 | 78 | **$SO_2$ Span Gas (99.5)** |
| 9:25 | -0.1 | 81.9 | 0.1 | 0.1 | 0 | 0 | 78 | $NO_x$ Span Gas (87.0) |
| 9:26 | -0.1 | 27.8 | 53 | 0 | 0 | -0.1 | 78 | $NO_x$ Span Gas (87.0) |
| 9:27 | 0 | 27.5 | 81 | 0 | 0 | 0 | 78 | $NO_x$ Span Gas (87.0) |
| 9:28 | 0 | 27.8 | 81.1 | 0 | 0 | -0.2 | 78 | $NO_x$ Span Gas (87.0) |
| 9:29 | 0 | 27.9 | 83.5 | 0 | 0 | -0.1 | 78 | $NO_x$ Span Gas (87.0) |
| 9:30 | 0 | 28.1 | 87.3 | 0 | 0 | 0.2 | 78 | $NO_x$ Span Gas (87.0) |
| 9:31 | 0 | 28.4 | 87.3 | 0 | 0 | 0.1 | 78 | $NO_x$ Span Gas (87.0) |
| 9:32 | 0 | 27.1 | **87.4** | 0 | 0 | 0 | 78 | **$NO_x$ Span Gas (87.0)** |
| 9:33 | 0 | 1.9 | 34.7 | 0 | 0 | 4.2 | 78 | Zero Gas (Nitrogen) |
| 9:34 | 0 | 0.2 | 0.2 | 0 | 0 | 0.1 | 78 | Zero Gas (Nitrogen) |

Calibration is ACCEPTABLE

CHESTER ENGINEERS MOBILE AIR QUALITY LABORATORY
CEMS Interference Tests
API Chemiluminescent NOx Analyzer Model 200AH S/N 258
API Fluorescent SO2 Analyzer Model 100AH S/N 064
API Gas Filter Correlation CO Analyzer Model 300 S/N 905
California Analytical Instruments O2 Analyzer Model 100-P S/N 4J06002
California Analytical Instruments CO2 Analyzer Model 100 S/N 5J06007
Test Performed on January 12, 2007 by Dan Nadzam

| Hour | 90.5 ppm CO | 99.5 ppm $SO_2$ | 87.0 ppm $NO_x$ | 21.9 % $O_2$ | 17.7 % $CO_2$ | 87.0 ppm $NO_2$ | deg F Ambient | <<<CALIBRATION SPAN <<<UNITS |
|---|---|---|---|---|---|---|---|---|
| 9:34 | 0 | 0.2 | 0.2 | 0 | 0 | 0.1 | 78 | Zero Gas (Nitrogen) |
| 9:35 | 0 | 0.2 | 0.1 | 0 | 0 | 0 | 78 | Zero Gas (Nitrogen) |
| 9:36 | 0 | 0.1 | 0.1 | 0 | 0 | 0 | 78 | Zero Gas (Nitrogen) |
| 9:37 | **0** | **0.1** | **0.1** | **0** | **0** | **0** | 78 | **Zero Gas (Nitrogen)** |
| 9:38 | 5 | 0.1 | 0.1 | 0.6 | 0 | 0 | 78 | CO Mid Gas (60.5) |
| 9:39 | 52.1 | 0.1 | 0.1 | 0 | 0 | 0 | 78 | CO Mid Gas (60.5) |
| 9:40 | 60.4 | 0.1 | 0 | 0 | 0 | 0 | 78 | CO Mid Gas (60.5) |
| 9:41 | 60.8 | 0.1 | 0 | 0 | 0 | 0 | 78 | CO Mid Gas (60.5) |
| 9:42 | **60.8** | **0.1** | **0** | **0** | **0** | **0** | 78 | **CO Mid Gas (60.5)** |
| 9:43 | 53.9 | 0.1 | 0 | 4.6 | 3.1 | 0 | 78 | 12.0 % $O_2$, 9.90 % CO2 |
| 9:44 | 7.5 | 0.1 | 0 | 12 | 9.8 | 0 | 77 | 12.0 % $O_2$, 9.90 % CO2 |
| 9:45 | -0.6 | 0.1 | 0 | 12 | 9.9 | 0 | 77 | 12.0 % $O_2$, 9.90 % CO2 |
| 9:46 | -0.8 | 0.1 | 0 | 12 | 9.9 | 0 | 77 | 12.0 % $O_2$, 9.90 % CO2 |
| 9:47 | **-0.8** | **0.1** | **0** | **12** | **9.9** | **0** | 77 | **12.0 % $O_2$, 9.90 % CO2** |
| 9:48 | -0.8 | 11.8 | 0 | 0.1 | 5.4 | 0 | 77 | $SO_2$ Mid Gas (49.9) |
| 9:49 | -0.7 | 48.8 | 0.1 | 0 | 0.1 | 0 | 77 | $SO_2$ Mid Gas (49.9) |
| 9:50 | -0.5 | 50.5 | 0.2 | 0 | 0.1 | 0 | 77 | $SO_2$ Mid Gas (49.9) |
| 9:51 | -0.3 | 50.6 | 0.2 | 0 | 0.1 | 0 | 77 | $SO_2$ Mid Gas (49.9) |
| 9:52 | **-0.1** | **50.8** | **0.2** | **0** | **0.1** | **0** | 78 | **$SO_2$ Mid Gas (49.9)** |
| 9:53 | 0 | 34.6 | 11 | 0.1 | 0.1 | 0 | 78 | $NO_x$ Mid Gas (50.4) |
| 9:54 | 0 | 17.4 | 49.2 | 0 | 0.1 | 0 | 78 | $NO_x$ Mid Gas (50.4) |
| 9:55 | -0.1 | 17.1 | 49.2 | 0 | 0.1 | -0.2 | 77 | $NO_x$ Mid Gas (50.4) |
| 9:56 | -0.2 | 17 | 48.7 | 0 | 0.1 | -0.7 | 77 | $NO_x$ Mid Gas (50.4) |
| 9:57 | **-0.3** | **17** | **48.8** | **0** | **0.1** | **-0.6** | 77 | **$NO_x$ Mid Gas (50.4)** |
| 9:58 | -0.3 | 9.4 | 46.4 | 11.3 | 0.1 | -0.6 | 77 | Ambient Air |
| 9:59 | -0.2 | 0.8 | 3.1 | 21 | 0.1 | 0.1 | 77 | Ambient Air |
| 10:00 | -0.2 | 0.4 | 0.1 | 20.9 | 0.1 | 0 | 77 | Ambient Air |
| 10:01 | -0.1 | 0.2 | 0.1 | 20.9 | 0.1 | 0 | 77 | Ambient Air |
| 10:02 | 0 | 0.2 | 0.1 | 20.9 | 0.1 | 0 | 77 | Ambient Air |
| 10:03 | 0 | 0.1 | 0.1 | 20.9 | 0.1 | 0 | 77 | Ambient Air |
| 10:04 | **0** | **0.1** | **0.1** | **20.9** | **0.1** | **0** | 77 | **Ambient Air** |
| 10:05 | 0.4 | 0.2 | 2.3 | 6.3 | 2.4 | -0.1 | 77 | Mixed Gas (@5.9 % O2) |
| 10:06 | 11.6 | 0.4 | 16 | 3.6 | 3 | 0 | 77 | Mixed Gas (@5.9 % O2) |
| 10:07 | 11.9 | 0.6 | 24.5 | 5.3 | 4.3 | 0.8 | 77 | Mixed Gas (@5.9 % O2) |
| 10:08 | 6.1 | 0.5 | 39.1 | 8.3 | 6.8 | 0.1 | 77 | Mixed Gas (@5.9 % O2) |
| 10:09 | 6.3 | 0.5 | 37.8 | 8.8 | 7.3 | -0.2 | 77 | Mixed Gas (@5.9 % O2) |
| 10:10 | 15.6 | 0.4 | 36 | 7.5 | 6.3 | 0.3 | 77 | Mixed Gas (@5.9 % O2) |
| 10:11 | 23.1 | 0.5 | 33.6 | 6.2 | 5.1 | -0.5 | 77 | Mixed Gas (@5.9 % O2) |
| 10:12 | 23.9 | 0.6 | 36.7 | 5.9 | 4.9 | -0.4 | 77 | Mixed Gas (@5.9 % O2) |
| 10:13 | 23.8 | 0.6 | 38.3 | 5.9 | 4.9 | -0.2 | 78 | Mixed Gas (@5.9 % O2) |
| 10:14 | **23.7** | **0.6** | **38.2** | **5.9** | **4.9** | **-0.2** | 78 | **Mixed Gas (@5.9 % O2)** |
| 10:15 | 23.9 | 0.8 | 40.7 | 3.7 | 3.2 | -0.7 | 79 | Mixed Gas (@2.1 % O2) |
| 10:16 | 28.9 | 1.5 | 46.6 | 2.5 | 2.1 | 0 | 78 | Mixed Gas (@2.1 % O2) |
| 10:17 | 29.6 | 1.6 | 46.9 | 2.3 | 1.9 | -0.1 | 78 | Mixed Gas (@2.1 % O2) |
| 10:18 | 29.7 | 1.7 | 47.1 | 2.3 | 1.9 | -0.1 | 78 | Mixed Gas (@2.1 % O2) |
| 10:19 | 29.7 | 1.8 | 47.4 | 2.2 | 1.8 | -0.2 | 78 | Mixed Gas (@2.1 % O2) |
| 10:20 | 29.8 | 1.9 | 47.6 | 2.1 | 1.8 | -0.2 | 78 | Mixed Gas (@2.1 % O2) |
| 10:21 | **29.9** | **1.9** | **47.8** | **2.1** | **1.8** | **-0.2** | 78 | **Mixed Gas (@2.1 % O2)** |
| 10:22 | 21 | 1.2 | 35.8 | 16.4 | 0.7 | 0.1 | 78 | Ambient Air |
| 10:23 | 1.2 | 0.1 | 0.4 | 20.9 | 0.1 | 0.2 | 78 | Ambient Air |
| 10:24 | 0.1 | 0.1 | 0.2 | 20.9 | 0.2 | 0.1 | 78 | Ambient Air |
| 10:25 | 0 | 0.1 | 0.1 | 20.8 | 0.2 | 0 | 78 | Ambient Air |
| 10:26 | 0 | 0.1 | 0.1 | 20.9 | 0.1 | 0 | 78 | Ambient Air |
| 10:27 | 0 | 0.1 | 0.1 | 20.9 | 0.1 | 0 | 78 | Ambient Air |
| 10:28 | **0** | **0** | **0.1** | **20.9** | **0.1** | **0** | 78 | **Ambient Air** |

CHESTER ENGINEERS MOBILE AIR QUALITY LABORATORY
CEMS Interference Test Results
Test Performed on January 12, 2007 by Dan Nadzam

| API Gas Filter Correlation CO Analyzer Model 300 S/N 905 | | |
|---|---|---|
| Calibration Span (C.S.) (ppmv, dry) = 90.5 | | |
| Test Gas Type | Concentration (ppm or %) | Analyzer Response (ppm) |
| N2 | 100% | 0 |
| O2/CO2/N2 | 12%/9.90%/balance | -0.8 |
| SO2/N2 | 49.9ppm/balance | -0.1 |
| NO/N2 | 50.4ppm/balance | -0.3 |
| Ambient Air | 20.9%O2/79.1%N2 | 0 |
| | Sum of absolute Response | 1.2 |
| | Sum as a percent of Calibration Span | 1.3% |
| | Meets criteria of <= 2.5% of C.S. | YES |

| API Fluorescent SO2 Analyzer Model 100AH S/N 064 | | |
|---|---|---|
| Calibration Span (C.S.) (ppmv, dry) = 99.5 | | |
| Test Gas Type | Concentration (ppm or %) | Analyzer Response (ppm) |
| N2 | 100% | 0.1 |
| O2/CO2/N2 | 12%/9.90%/balance | 0.1 |
| CO/N2 | 60.5ppm/balance | 0.1 |
| CO/NOx/O2/CO2/N2 | 20.9ppm/47.8ppm/2.1%/1.8%/balance | 1.9 |
| Ambient Air | 20.9%O2/79.1%N2 | 0.1 |
| | Sum of absolute Response | 2.3 |
| | Sum as a percent of Calibration Span | 2.3% |
| | Meets criteria of <= 2.5% of C.S. | YES |

| API Chemiluminescent NOx Analyzer Model 200AH S/N 258 | | |
|---|---|---|
| Calibration Span (C.S.) (ppmv, dry) = 87.0 | | |
| Test Gas Type | Concentration (ppm or %) | Analyzer Response (ppm) |
| N2 | 100% | 0.1 |
| O2/CO2/N2 | 12%/9.90%/balance | 0 |
| SO2/N2 | 49.9ppm/balance | 0.2 |
| CO/N2 | 60.5ppm/balance | 0 |
| Ambient Air | 20.9%O2/79.1%N2 | 0.1 |
| | Sum of absolute Response | 0.4 |
| | Sum as a percent of Calibration Span | 0.5% |
| | Meets criteria of <= 2.5% of C.S. | YES |

| California Analytical Instruments O2 Analyzer Model 100-P S/N 4J06002 | | |
|---|---|---|
| Calibration Span (C.S.) (%, dry) = 21.9 | | |
| Test Gas Type | Concentration (ppm or %) | Analyzer Response (%) |
| N2 | 100% | 0 |
| NO/N2 | 50.4ppm/balance | 0 |
| SO2/N2 | 49.9ppm/balance | 0 |
| CO/N2 | 60.5ppm/balance | 0 |
| | Sum of absolute Response | 0 |
| | Sum as a percent of Calibration Span | 0.0% |
| | Meets criteria of <= 2.5% of C.S. | YES |

| California Analytical Instruments CO2 Analyzer Model 100 S/N 5J06007 | | |
|---|---|---|
| Calibration Span (C.S.) (%, dry) = 17.7 | | |
| Test Gas Type | Concentration (ppm or %) | Analyzer Response (%) |
| N2 | 100% | 0 |
| NO/N2 | 50.4ppm/balance | 0.1 |
| SO2/N2 | 49.9ppm/balance | 0.1 |
| CO/N2 | 60.5ppm/balance | 0 |
| Ambient Air | 20.9%O2/79.1%N2 | 0.1 |
| | Sum of absolute Response | 0.3 |
| | Sum as a percent of Calibration Span | 1.7% |
| | Meets criteria of <= 2.5% of C.S. | YES |