



# INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT

*We Protect Hoosiers and Our Environment.*

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**Eric J. Holcomb**  
*Governor*

**Brian C. Rockensuess**  
*Commissioner*

September 17, 2024

Ms. Debra Shore  
Regional Administrator  
U.S. Environmental Protection Agency  
Region 5  
77 West Jackson Boulevard  
Chicago, IL 60604-3950

Re: Technical Clarification for the Huntington,  
Indiana (IN) 2010 Primary 1-Hour Sulfur Dioxide  
(SO<sub>2</sub>) Nonattainment Area (Huntington Township  
in Huntington County)

Dear Ms. Shore:

The Indiana Department of Environmental Management (IDEM) is providing a technical clarification for the Huntington, Indiana (IN) 2010 Primary 1-Hour Sulfur Dioxide (SO<sub>2</sub>) Nonattainment Area (Huntington Township in Huntington County) to demonstrate USMPC Buyer, Inc. d/b/a Isolatek International (Isolatek) is complying with the SO<sub>2</sub> emission limitations and rates set forth in Commissioner's Order Air-2023-02 (the Order).

Commissioner's Order 2023-Air-02 serves as the basis for Indiana's attainment plan and technical support document and request for redesignation and maintenance plan submitted to United States Environmental Protection Agency (U.S. EPA) for review and approval on November 6, 2023 and July 30, 2024, respectively.<sup>1</sup> Enclosed is a copy of an office memorandum from IDEM's Office of Air Quality Compliance Data Section dated August 9, 2024, regarding stack testing conducted by an independent environmental consulting firm for Isolatek on April 16, 2024. The purpose of this stack testing is to demonstrate Isolatek's compliance with the permanent and enforceable SO<sub>2</sub> emission limitations and rates established in the Order. The stack testing report and results demonstrate SO<sub>2</sub> emissions from Isolatek's cupolas (EU#1 and EU#2) and blowchambers (EU#3 and EU#4) are well below the emission limitations and rates established in the Order. IDEM has reviewed this report and concluded that the sampling procedures and results are acceptable to this office.

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<sup>1</sup> On November 6, 2023, permanent and enforceable SO<sub>2</sub> emission limitations and rates were set forth in Commissioner's Order 2023-Air-01 for Isolatek for attainment of the 1-hour SO<sub>2</sub> standards in the area surrounding the facility. On February 12, 2024, Commissioner's Order 2023-Air 01 was amended and replaced by Commissioner's Order 2023-Air-02, which imposes additional compliance terms and conditions in addition to the established emission limits and conditions contained in Commissioner's Order 2023-Air-01.



Visit [on.IN.gov/survey](https://on.IN.gov/survey) or scan the QR code to provide feedback.

*We appreciate your input!*



Ms. Debra Shore

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We remain available to answer any additional questions you may have concerning this matter. If you need additional information, please contact Brian Callahan, Chief, Air Quality Standards and Implementation Section, Office of Air Quality, at (317) 232-8244 or [bcallaha@idem.IN.gov](mailto:bcallaha@idem.IN.gov).

Sincerely,



Matt Stuckey  
Assistant Commissioner  
Office of Air Quality

MS/sad/md/bc/gf/as

Enclosure:

August 9, 2024, Office Memorandum and April 16, 2024, Stack Test Results

cc: Doug Aburano, U.S. EPA Region 5 (no enclosure)  
Sara Arra, U.S. EPA Region 5 (no enclosure)  
Chris Panos, U.S. EPA Region 5 (no enclosure)  
Elizabeth Selbst, U.S. EPA Region 5 (no enclosure)  
Melissa Sheffer, U.S. EPA Region 5 (no enclosure)  
Matt Stuckey, IDEM (no enclosure)  
Scott Deloney, IDEM (no enclosure)  
Brian Callahan, IDEM (no enclosure)  
Mark Derf, IDEM (no enclosure)  
Gale Ferris, IDEM (no enclosure)  
Amy Smith, IDEM (w/ enclosure)  
File Copy

INDIANA DEPARTMENT OF ENVIRONMENTAL MANAGEMENT  
Indianapolis

OFFICE MEMORANDUM

To: Wyman Clark Date: August 9, 2024  
From: Jarrod C. Fisher *XF* Thru: Dave Cline *PA*  
Subject: USMPC Buyer Inc DBA Isolatek International  
Source ID: 069-00021 Permit Number: # T069-44978-00021  
City: Huntington County: Huntington  
Protocol Reviewer: JCF Field Observer: JCF  
Test Company: Environmental Quality Management, Inc.

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

**Unit Tested: Two (2) Short Stack #1 and #2 Cupolas - EU#1 and EU#2**

Date of test: April 16, 2024  
Test Purpose: Commissioner's Order  
Type of Fuel: Coke  
Pollution Control Equipment: Baghouse CE#1  
Permitted APCD Parameter Ranges: NA  
APCD Parameters During Testing: BLDS in operation

*#295067*

Pollutants: SO2  
Test methods: 1-4, 6C  
Maximum Operating Rate: 10 TPH  
Average Operating Rate During Test: 8.48 TPH  
SO2 Limit: 160.0 lb/hr  
SO2 Emission Rate: 115.02 lb/hr  
13.79 lb/ton\*

STATUS: **In Compliance** (for SO2 at 84.8% maximum capacity)

**Unit Tested: Two (2) Blowchambers - EU#3 and EU#4**

Date of test: April 16, 2024  
Test Purpose: Commissioner's Order  
Type of Fuel: NA  
Pollution Control Equipment: Screen Houses CE#3 and CE#4  
Permitted APCD Parameter Ranges: NA  
APCD Parameters During Testing: NA

*#295068*

Pollutants: SO2  
Test methods: 1-4, 6C  
Maximum Operating Rate: 10 TPH  
Average Operating Rate During Test: 8.48 TPH  
SO2 Limit: 20.0 lb/hr  
SO2 Emission Rate: 0.60 lb/hr  
0.07 lb/ton\*

STATUS: **In Compliance** (for SO2 at 84.8% maximum capacity)

\*Note: The SO2 lb/ton emission factors are used in equations in Paragraph 6(c) of Commissioner's Order 2023-Air-02 to determine compliance (average hourly SO2 emissions) on a monthly basis.

Cc: Mark Derf-OAQ Programs Branch







|                  |                |
|------------------|----------------|
| SOURCE:          | Isolatek       |
| UNIT TESTED:     | Cupolas        |
| TESTING COMPANY: | EQM            |
| DATE OF TEST:    | April 16, 2024 |
| METHODS:         | 1-4            |

|  |                 |
|--|-----------------|
| Average Stack Temperature, Ts (F)                                | 195.46          |
| Average Stack Gas Velocity, Vs, fps                              | 67.02           |
| Average Stack Gas Flowrate, Qs, acfm                             | 73776.14        |
| Average Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd (dscfm) | 57477.38        |
| Average Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd (dscfh) | 3448642.52      |
| Average % Isokinetic, %I   | #DIV/0! #DIV/0! |
| Average % Isokinetic measured from intermediate values, %I       | #DIV/0! #DIV/0! |
| Average Post Test Cal (2-run)                                    | Pass 1.013      |
| Average Post Test Cal (3-run)                                    | Pass 1.011      |

|                  |                |
|------------------|----------------|
| SOURCE:          | Isolatek       |
| UNIT TESTED:     | Cupolas        |
| TESTING COMPANY: | EQM            |
| METHOD:          | 3A             |
| DATE OF TEST:    | April 16, 2024 |

|               |                |
|---------------|----------------|
| < 20% of Span | 40-60% of Span |
| 0             | 8.68           |
| 4.34          | 13.02          |

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

| Run No. | O2 RM Monitor Span = 21.70 % |                 |               | Drift Assessment |           |
|---------|------------------------------|-----------------|---------------|------------------|-----------|
|         | (Cavg)                       | (Co)i           | (Co)f         | Low Gas          | Low-Drift |
|         | Ave. Measured Raw (%)        | Initial Low Gas | Final Low Gas | Drift (Eq 7E-4)  | Pass/Fail |
| 1       | 18.93                        | 0.04            | 0.05          | 0.05%            | Pass      |
| 2       | 19.00                        | 0.05            | 0.08          | 0.14%            | Pass      |
| 3       | 18.84                        | 0.08            | 0.09          | 0.05%            | Pass      |

  

| Run No. | Drift Assessment |               |                             |
|---------|------------------|---------------|-----------------------------|
|         | (Cm)i            | (Cm)f         | Must be within 3.0%         |
|         | Initial Upscale  | Final Upscale | Upscale Gas Drift (Eq 7E-4) |
| 1       | 21.83            | 21.89         | 0.28% Pass                  |
| 2       | 21.89            | 21.83         | 0.28% Pass                  |
| 3       | 21.83            | 21.85         | 0.09% Pass                  |

| Serial #<br>Tag (Cv) | Analyzer Calibration Error Check (ACE) |                         |                |
|----------------------|--|-------------------------|----------------|
|                      | Linearity Check (Must be within 2.0%)  |                         |                |
|                      | 'Low' Low-Level Gas                    | 'Upscale' Mid-Level Gas | High-Level Gas |
| Monitor (Cdir)       | 0.02                                   | 11.87                   | 21.82          |
| Diff. (Cdir-Cv)      | 0.02                                   | -0.03                   | 0.12           |
| ACE (Eq 7E-1)        | 0.09%                                  | -0.14%                  | 0.55%          |
|                      | Pass                                   | Pass                    | Pass           |

| Run No. | System Bias (SB) Low-Level Gas (Must be within 5.0%) |                         |                      |                    |
|---------|--|-------------------------|----------------------|--------------------|
|         | Low Linearity Gas (Cdir)                             | Final Low Gas Bias (Cs) | Low Gas SB (Eq 7E-2) | Low-Bias Pass/Fail |
|         | Initial  | 0.02                    | 0.04                 | 0.09%              |
| 1       | 0.02   | 0.05                    | 0.14%                | Pass               |
| 2       | 0.02   | 0.08                    | 0.28%                | Pass               |
| 3       | 0.02   | 0.09                    | 0.32%                | Pass               |

| Run No. | (Cma)                     | Percent Moisture (%) | (Cgas)                  | Corrected Dry Basis (%) | Corrected |
|---------|---------------------------|----------------------|-------------------------|-------------------------|-----------|
|         | Upscale Calibration Gas % |                      | Corrected Wet Basis (%) |                         |           |
|         | 1                         |                      | 21.70                   |                         | #DIV/0!   |
| 2       | 21.70                     | #DIV/0!              | 18.86                   | #DIV/0!                 |           |
| 3       | 21.70                     | #DIV/0!              | 18.71                   | #DIV/0!                 |           |

| Run No. | System Bias (SB) Upscale Gas (Must be within 5.0%) |                             |                          |                        |
|---------|--|-----------------------------|--------------------------|------------------------|
|         | Upscale Linearity Gas (Cdir)                       | Final Upscale Gas Bias (Cs) | Upscale Gas SB (Eq 7E-2) | Upscale-Bias Pass/Fail |
|         | Initial  | 11.87                       | 21.83                    | 45.90%                 |
| 1       | 11.87  | 21.89                       | 46.18%                   | Fail                   |
| 2       | 11.87  | 21.83                       | 45.90%                   | Fail                   |
| 3       | 11.87  | 21.85                       | 45.99%                   | Fail                   |

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Appendix A-4  
Method 7E

$$C_{gas} = (C_{avg} - C_o) * C_{ma} / (C_m - C_o) \text{ Eq. 7E-5}$$

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



|                  |                |
|------------------|----------------|
| SOURCE:          | Isolatek       |
| UNIT TESTED:     | Cupolas        |
| TESTING COMPANY: | EQM            |
| METHOD:          | 3A             |
| DATE OF TEST:    | April 16, 2024 |

|          |           |
|----------|-----------|
| < 20% of | 40-60% of |
| Span     | Span      |
| 0        | 7.04      |
| 3.52     | 10.56     |

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

| Run No. | CO2 RM Monitor Span = 17.60 % |                  |                | Drift Assessment |                        |
|---------|-------------------------------|------------------|----------------|------------------|------------------------|
|         | (Cavg)<br>Ave. Measured       | (Co)i<br>Initial | (Co)f<br>Final | Low Gas<br>Drift | Low-Drift<br>Pass/Fail |
|         | Raw (%)                       | Low Gas          | Low Gas        | (Eq 7E-4)        |                        |
| 1       | 1.85                          | 0.05             | 0.02           | 0.17%            | Pass                   |
| 2       | 1.77                          | 0.02             | 0.09           | 0.40%            | Pass                   |
| 3       | 1.91                          | 0.09             | 0.02           | 0.40%            | Pass                   |

  

| Run No. | Drift Assessment |                |                      | Must be within 3.0%   |  |
|---------|------------------|----------------|----------------------|-----------------------|--|
|         | (Cm)i<br>Initial | (Cm)f<br>Final | Upscale Gas<br>Drift | Up-Drift<br>Pass/Fail |  |
|         | Upscale          | Upscale        | (Eq 7E-4)            |                       |  |
| 1       | 17.69            | 17.75          | 0.34%                | Pass                  |  |
| 2       | 17.75            | 17.83          | 0.45%                | Pass                  |  |
| 3       | 17.83            | 17.84          | 0.06%                | Pass                  |  |

| Serial #<br>Tag (Cv)<br>Monitor (Cdir)<br>Diff. (Cdir-Cv)<br>ACE (Eq 7E-1) | Analyzer Calibration Error Check (ACE)<br>Linearity Check (Must be within 2.0%) |                               |                   |
|--|---|-------------------------------|-------------------|
|  | 'Low'<br>Low-Level<br>Gas   | 'Upscale'<br>Mid-Level<br>Gas | High-Level<br>Gas |
|  |   | 0.00                          | 10.10             |
|  | 0.00  | 10.11                         | 17.64             |
|  | 0.00  | 0.01                          | 0.04              |
|  | 0.00%   | 0.06%                         | 0.23%             |
|  | Pass  | Pass                          | Pass              |

| Run No. | System Bias (SB) Low-Level Gas (Must be within 5.0%) |                               |                            |                       |
|---------|--|-------------------------------|----------------------------|-----------------------|
|         | Low<br>Linearity<br>Gas (Cdir)                       | Final Low<br>Gas<br>Bias (Cs) | Low Gas<br>SB<br>(Eq 7E-2) | Low-Bias<br>Pass/Fail |
|         | Initial  | 0.00                          | 0.05                       | 0.28%                 |
| 1       | 0.00   | 0.02                          | 0.11%                      | Pass                  |
| 2       | 0.00   | 0.09                          | 0.51%                      | Pass                  |
| 3       | 0.00   | 0.02                          | 0.11%                      | Pass                  |

  

| Run No. | System Bias (SB) Upscale Gas (Must be within 5.0%) |                                   |                                |                           |
|---------|--|-----------------------------------|--------------------------------|---------------------------|
|         | Upscale<br>Linearity<br>Gas (Cdir)                 | Final Upscale<br>Gas<br>Bias (Cs) | Upscale Gas<br>SB<br>(Eq 7E-2) | Upscale-Bias<br>Pass/Fail |
|         | Initial  | 10.11                             | 17.69                          | 43.07%                    |
| 1       | 10.11  | 17.75                             | 43.41%                         | Fail                      |
| 2       | 10.11  | 17.83                             | 43.86%                         | Fail                      |
| 3       | 10.11  | 17.84                             | 43.92%                         | Fail                      |

| Run No. | (Cma)<br>Upscale<br>Calibration Gas<br>% | Percent<br>Moisture<br>(%) | (Cgas)<br>Corrected<br>Dry Basis<br>(%) | Corrected<br>Wet Basis<br>(%) |
|---------|--|----------------------------|---|-------------------------------|
|         | 1  | 17.60                      | #DIV/0!                                 | 1.81                          |
| 2       | 17.60                                    | #DIV/0!                    | 1.70                                    | #DIV/0!                       |
| 3       | 17.60                                    | #DIV/0!                    | 1.84                                    | #DIV/0!                       |

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Appendix A-4  
Method 7E

$$C_{gas} = (C_{avg} - C_o) * C_{ma} / (C_m - C_o) \text{ Eq. 7E-5}$$

where: C<sub>gas</sub> = Average effluent gas concentration adjusted for bias, %  
C<sub>avg</sub> = Average unadjusted gas concentration indicated data recorder for the test run, %  
C<sub>o</sub> = Average of initial and final system cal. bias check responses from the low-level calibration gas, %  
C<sub>m</sub> = Average of initial and final system cal. bias check responses for the upscale calibration gas, %  
C<sub>ma</sub> = Actual concentration of the upscale calibration gas, %

|                  |                |
|------------------|----------------|
| SOURCE:          | Isolatek       |
| UNIT TESTED:     | Cupolas        |
| TESTING COMPANY: | EQM            |
| METHOD:          | 6C             |
| DATE OF TEST:    | April 16, 2024 |

|          |           |
|----------|-----------|
| < 20% of | 40-60% of |
| Span     | Span      |
| 0        | 178.8     |
| 89.4     | 268.2     |

**SO2 Reference Method Analyzer  
Sampling System Bias Check and Measured Value Correction**

| Run No. | SO2 RM Monitor Span = 447.00 PPM |                  |                | Drift Assessment<br>Must be within 3.0% |           |
|---------|----------------------------------|------------------|----------------|---|-----------|
|         | (Cavg)<br>Ave. Measured          | (Co)i<br>Initial | (Co)f<br>Final | Low Gas                                 | Low-Drift |
|         | Raw (ppm)                        | Low Gas          | Low Gas        | (Eq 7E-4)                               | Pass/Fail |
| 1       | 208.62                           | 3.50             | 7.20           | 0.83%                                   | Pass      |
| 2       | 201.16                           | 7.20             | 7.90           | 0.16%                                   | Pass      |
| 3       | 208.40                           | 7.90             | 8.10           | 0.04%                                   | Pass      |

| Run No. | Drift Assessment<br>Must be within 3.0% |                |             | Upscale Gas<br>Drift<br>(Eq 7E-4) | Up-Drift<br>Pass/Fail |
|---------|---|----------------|-------------|-----------------------------------|-----------------------|
|         | (Cm)i<br>Initial                        | (Cm)f<br>Final | Upscale Gas |                                   |                       |
|         | Upscale                                 | Upscale        | Drift       |                                   |                       |
| 1       | 452.60                                  | 453.90         | 0.29%       | Pass                              |                       |
| 2       | 453.90                                  | 445.10         | 1.97%       | Pass                              |                       |
| 3       | 445.10                                  | 450.10         | 1.12%       | Pass                              |                       |

| Run No. | (Cma)<br>Upscale | Percent<br>Moisture<br>(%) | (Cgas)<br>Corrected | Corrected<br>Wet Basis<br>(ppm) |
|---------|------------------|----------------------------|---------------------|---------------------------------|
|         | Calibration Gas  |                            | Dry Basis           |                                 |
|         | ppm              |                            | (ppm)               |                                 |
| 1       | 447.00           | 1.36%                      | 202.86              | 200.10                          |
| 2       | 447.00           | 1.41%                      | 195.82              | 193.06                          |
| 3       | 447.00           | 1.47%                      | 203.78              | 200.78                          |

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Appendix A-4  
Method 7E

$$C_{gas} = (C_{avg} - C_o) * C_{ma} / (C_m - C_o) \text{ Eq. 7E-5}$$

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

| Serial #<br>Tag (Cv) | Analyzer Calibration Error Check (ACE)<br>Linearity Check (Must be within 2.0%) |                  |                   |
|----------------------|---|------------------|-------------------|
|                      | 'Low'   | 'Upscale'        |                   |
|                      | Low-Level<br>Gas  | Mid-Level<br>Gas | High-Level<br>Gas |
| Monitor (Cdir)       | 3.00  | 191.00           | 447.00            |
| Diff. (Cdir-Cv)      | 3.00  | 1.00             | 2.90              |
| ACE (Eq 7E-1)        | 0.67%   | 0.22%            | 0.65%             |
|                      | Pass  | Pass             | Pass              |

| Run No. | System Bias (SB) Low-Level Gas (Must be within 5.0%) |                  |               |           |
|---------|--|------------------|---------------|-----------|
|         | Low<br>Linearity                                     | Final Low<br>Gas | Low Gas<br>SB | Low-Bias  |
|         | Gas (Cdir)   | Bias (Cs)        | (Eq 7E-2)     | Pass/Fail |
| Initial | 3.00   | 3.50             | 0.11%         | Pass      |
| 1       | 3.00   | 7.20             | 0.94%         | Pass      |
| 2       | 3.00   | 7.90             | 1.10%         | Pass      |
| 3       | 3.00   | 8.10             | 1.14%         | Pass      |

| Run No. | System Bias (SB) Upscale Gas (Must be within 5.0%) |                      |                   |              |
|---------|--|----------------------|-------------------|--------------|
|         | Upscale<br>Linearity                               | Final Upscale<br>Gas | Upscale Gas<br>SB | Upscale-Bias |
|         | Gas (Cdir)   | Bias (Cs)            | (Eq 7E-2)         | Pass/Fail    |
| Initial | 449.90   | 452.60               | 0.60%             | Pass         |
| 1       | 449.90   | 453.90               | 0.89%             | Pass         |
| 2       | 449.90   | 445.10               | -1.07%            | Pass         |
| 3       | 449.90   | 450.10               | 0.04%             | Pass         |

| Run #   | Flowrate<br>dscfh | SO2<br>ppmdv | SO2<br>lb/dscf | SO2<br>lb/hr | Production<br>TPH |
|---------|-------------------|--------------|----------------|--------------|-------------------|
| 1       | 3597256.11        | 202.86       | 0.000034       | 121.24       | 9.87              |
| 2       | 3526663.08        | 195.82       | 0.000033       | 114.73       | 7.04              |
| 3       | 3222008.37        | 203.78       | 0.000034       | 109.08       | 8.53              |
| Average | 3448642.52        | 200.82       | 0.000033       | 115.02       | 8.48              |

| SO2<br>lb/ton |
|---------------|
| 12.28         |
| 16.30         |
| 12.79         |
| 13.79         |







|                  |                         |
|------------------|-------------------------|
| SOURCE:          | Isolatek                |
| UNIT TESTED:     | Blowchamber/Screenhouse |
| TESTING COMPANY: | EQM                     |
| DATE OF TEST:    | April 16, 2024          |
| METHODS:         | 1-4                     |

|  |         |            |
|--|---------|------------|
| Average Stack Temperature, Ts (F)                                |         | 148.71     |
| Average Stack Gas Velocity, Vs, fps                              |         | 50.18      |
| Average Stack Gas Flowrate, Qs, acfm                             |         | 133010.52  |
| Average Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd (dscfm) |         | 112582.25  |
| Average Stack Gas Flowrate @ STD. COND., Dry Basis, Qstd (dscfh) |         | 6754934.77 |
| Average % Isokinetic, %I   | #DIV/0! | #DIV/0!    |
| Average % Isokinetic measured from intermediate values, %I       | #DIV/0! | #DIV/0!    |
| Average Post Test Cal (2-run)                                    | Pass    | 1.017      |
| Average Post Test Cal (3-run)                                    | Pass    | 1.013      |

|                  |                         |
|------------------|-------------------------|
| SOURCE:          | Isolatek                |
| UNIT TESTED:     | Blowchamber/Screenhouse |
| TESTING COMPANY: | EQM                     |
| METHOD:          | 3A                      |
| DATE OF TEST:    | January 12, 2023        |

|               |                |
|---------------|----------------|
| < 20% of Span | 40-60% of Span |
| 0             | 8.68           |
| 4.34          | 13.02          |

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

| Run No. | O2 RM Monitor Span = 21.70 % |                  |                | Drift Assessment<br>Must be within 3.0% |                        |
|---------|------------------------------|------------------|----------------|---|------------------------|
|         | (Cavg)<br>Ave. Measured      | (Co)i<br>Initial | (Co)f<br>Final | Low Gas<br>Drift                        | Low-Drift<br>Pass/Fail |
|         | Raw (%)                      | Low Gas          | Low Gas        | (Eq 7E-4)                               |                        |
| 1       | 20.89                        | -0.05            | 0.07           | 0.55%                                   | Pass                   |
| 2       | 20.97                        | 0.07             | 0.00           | 0.32%                                   | Pass                   |
| 3       | 20.96                        | 0.00             | 0.01           | 0.05%                                   | Pass                   |

  

| Run No. | Drift Assessment<br>Must be within 3.0% |                |                      |
|---------|---|----------------|----------------------|
|         | (Cm)i<br>Initial                        | (Cm)f<br>Final | Upscale Gas<br>Drift |
|         | Upscale                                 | Upscale        | (Eq 7E-4)            |
| 1       | 11.98                                   | 11.70          | 1.29% Pass           |
| 2       | 11.70                                   | 11.68          | 0.09% Pass           |
| 3       | 11.68                                   | 11.69          | 0.05% Pass           |

| Serial #<br>Tag (Cv)<br>Monitor (Cdir)<br>Diff. (Cdir-Cv)<br>ACE (Eq 7E-1) | Analyzer Calibration Error Check (ACE)<br>Linearity Check (Must be within 2.0%) |                            |                |
|--|---|----------------------------|----------------|
|  | 'Low'<br>Low-Level Gas  | 'Upscale'<br>Mid-Level Gas | High-Level Gas |
|  |   | 0.00                       | 11.90          |
|  | 0.00  | 11.93                      | 21.70          |
|  | 0.00  | 0.03                       | 0.00           |
|  | 0.00%   | 0.14%                      | 0.00%          |
|  | Pass  | Pass                       | Pass           |

| Run No. | System Bias (SB) Low-Level Gas (Must be within 5.0%) |                         |                      |                    |
|---------|--|-------------------------|----------------------|--------------------|
|         | Low Linearity Gas (Cdir)                             | Final Low Gas Bias (Cs) | Low Gas SB (Eq 7E-2) | Low-Bias Pass/Fail |
|         | Initial  | 0.00                    | -0.05                | -0.23%             |
| 1       | 0.00   | 0.07                    | 0.32%                | Pass               |
| 2       | 0.00   | 0.00                    | 0.00%                | Pass               |
| 3       | 0.00   | 0.01                    | 0.05%                | Pass               |

  

| Run No. | System Bias (SB) Upscale Gas (Must be within 5.0%) |                             |                          |                        |
|---------|--|-----------------------------|--------------------------|------------------------|
|         | Upscale Linearity Gas (Cdir)                       | Final Upscale Gas Bias (Cs) | Upscale Gas SB (Eq 7E-2) | Upscale-Bias Pass/Fail |
|         | Initial  | 11.93                       | 11.98                    | 0.23%                  |
| 1       | 11.93  | 11.70                       | -1.06%                   | Pass                   |
| 2       | 11.93  | 11.68                       | -1.15%                   | Pass                   |
| 3       | 11.93  | 11.69                       | -1.11%                   | Pass                   |

| Run No. | (Cma)<br>Upscale Calibration Gas % | Percent Moisture (%) | (Cgas)<br>Corrected Dry Basis (%) | Corrected Wet Basis (%) |
|---------|------------------------------------|----------------------|-----------------------------------|-------------------------|
|         | 1                                  | 11.90                | #DIV/0!                           | 21.01                   |
| 2       | 11.90                              | #DIV/0!              | 21.37                             | #DIV/0!                 |
| 3       | 11.90                              | #DIV/0!              | 21.35                             | #DIV/0!                 |

40 CFR 60  
Appendix A-4  
Method 7E

$$C_{gas} = (C_{avg} - C_o) * C_{ma} / (C_m - C_o) \text{ Eq. 7E-5}$$

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

|                         |                         |
|-------------------------|-------------------------|
| <b>SOURCE:</b>          | Isolatek                |
| <b>UNIT TESTED:</b>     | Blowchamber/Screenhouse |
| <b>TESTING COMPANY:</b> | EQM                     |
| <b>METHOD:</b>          | 3A                      |
| <b>DATE OF TEST:</b>    | January 12, 2023        |

|          |           |
|----------|-----------|
| < 20% of | 40-60% of |
| Span     | Span      |
| 0        | 7.04      |
| 3.52     | 10.56     |

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

| Run No. | CO2 RM Monitor Span = 17.60 %      |                             |                           | Drift Assessment<br>Must be within 3.0% |                        |
|---------|------------------------------------|-----------------------------|---------------------------|---|------------------------|
|         | (Cavg)<br>Ave. Measured<br>Raw (%) | (Co)i<br>Initial<br>Low Gas | (Co)f<br>Final<br>Low Gas | Low Gas<br>Drift<br>(Eq 7E-4)           | Low-Drift<br>Pass/Fail |
| 1       | 0.06                               | 0.06                        | 0.01                      | 0.28%                                   | Pass                   |
| 2       | 0.06                               | 0.01                        | 0.03                      | 0.11%                                   | Pass                   |
| 3       | 0.09                               | 0.03                        | 0.02                      | 0.06%                                   | Pass                   |

  

| Run No. | Drift Assessment<br>Must be within 3.0% |                           | Upscale Gas<br>Drift<br>(Eq 7E-4) | Up-Drift<br>Pass/Fail |
|---------|---|---------------------------|-----------------------------------|-----------------------|
|         | (Cm)i<br>Initial<br>Upscale             | (Cm)f<br>Final<br>Upscale |                                   |                       |
| 1       | 10.08                                   | 10.07                     | 0.06%                             | Pass                  |
| 2       | 10.07                                   | 10.29                     | 1.25%                             | Pass                  |
| 3       | 10.29                                   | 10.34                     | 0.28%                             | Pass                  |

| Serial #<br>Tag (Cv)<br>Monitor (Cdir)<br>Diff. (Cdir-Cv)<br>ACE (Eq 7E-1) | Analyzer Calibration Error Check (ACE)<br>Linearity Check (Must be within 2.0%) |                               |                   |
|--|---|-------------------------------|-------------------|
|  | 'Low'<br>Low-Level<br>Gas   | 'Upscale'<br>Mid-Level<br>Gas | High-Level<br>Gas |
|  |   | 0.00                          | 10.10             |
|  | 0.00  | 10.06                         | 17.60             |
|  | 0.00  | -0.04                         | 0.00              |
|  | 0.00%   | -0.23%                        | 0.00%             |
|  | Pass  | Pass                          | Pass              |

| Run No. | (Cma)<br>Upscale<br>Calibration Gas<br>% | Percent<br>Moisture<br>(%) | (Cgas)<br>Corrected<br>Dry Basis<br>(%) | Corrected<br>Wet Basis<br>(%) |
|---------|--|----------------------------|---|-------------------------------|
|         | 1  | 10.10                      | #DIV/0!                                 | 0.02                          |
| 2       | 10.10                                    | #DIV/0!                    | 0.04                                    | #DIV/0!                       |
| 3       | 10.10                                    | #DIV/0!                    | 0.06                                    | #DIV/0!                       |

| Run No. | System Bias (SB) Low-Level Gas (Must be within 5.0%) |                               |                            |                       |
|---------|--|-------------------------------|----------------------------|-----------------------|
|         | Low<br>Linearity<br>Gas (Cdir)                       | Final Low<br>Gas<br>Bias (Cs) | Low Gas<br>SB<br>(Eq 7E-2) | Low-Bias<br>Pass/Fail |
| Initial | 0.00   | 0.06                          | 0.34%                      | Pass                  |
| 1       | 0.00   | 0.01                          | 0.06%                      | Pass                  |
| 2       | 0.00   | 0.03                          | 0.17%                      | Pass                  |
| 3       | 0.00   | 0.02                          | 0.11%                      | Pass                  |

  

| Run No. | System Bias (SB) Upscale Gas (Must be within 5.0%) |                                   |                                |                           |
|---------|--|-----------------------------------|--------------------------------|---------------------------|
|         | Upscale<br>Linearity<br>Gas (Cdir)                 | Final Upscale<br>Gas<br>Bias (Cs) | Upscale Gas<br>SB<br>(Eq 7E-2) | Upscale-Bias<br>Pass/Fail |
| Initial | 10.06  | 10.08                             | 0.11%                          | Pass                      |
| 1       | 10.06  | 10.07                             | 0.06%                          | Pass                      |
| 2       | 10.06  | 10.29                             | 1.31%                          | Pass                      |
| 3       | 10.06  | 10.34                             | 1.59%                          | Pass                      |

40 CFR 60  
Appendix A-4  
Method 7E

$$C_{gas} = (C_{avg} - C_o) * C_{ma} / (C_m - C_o) \text{ Eq. 7E-5}$$

where:

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



|                  |                         |
|------------------|-------------------------|
| SOURCE:          | Isolatek                |
| UNIT TESTED:     | Blowchamber/Screenhouse |
| TESTING COMPANY: | EQM                     |
| METHOD:          | 6C                      |
| DATE OF TEST:    | January 12, 2023        |

< 20% of Span 40-60% of Span  
0 178.8  
89.4 268.2

SO2 Reference Method Analyzer  
Sampling System Bias Check and Measured Value Correction

| Run No. | SO2 RM Monitor Span = 447.00 PPM     |                             |                           | Drift Assessment<br>Must be within 3.0% |                        |
|---------|--------------------------------------|-----------------------------|---------------------------|---|------------------------|
|         | (Cavg)<br>Ave. Measured<br>Raw (ppm) | (Co)i<br>Initial<br>Low Gas | (Co)f<br>Final<br>Low Gas | Low Gas<br>Drift<br>(Eq 7E-4)           | Low-Drift<br>Pass/Fail |
|         | 1                                    | 1.95                        | 1.80                      | 1.20                                    | 0.13%                  |
| 2       | 0.71                                 | 1.20                        | 0.03                      | 0.26%                                   | Pass                   |
| 3       | 1.13                                 | 0.03                        | 0.04                      | 0.00%                                   | Pass                   |

| Run No. | Drift Assessment<br>Must be within 3.0% |                           |                                   |                       |
|---------|---|---------------------------|-----------------------------------|-----------------------|
|         | (Cm)i<br>Initial<br>Upscale             | (Cm)f<br>Final<br>Upscale | Upscale Gas<br>Drift<br>(Eq 7E-4) | Up-Drift<br>Pass/Fail |
|         | 1                                       | 185.00                    | 185.40                            | 0.09%                 |
| 2       | 185.40                                  | 189.40                    | 0.89%                             | Pass                  |
| 3       | 189.40                                  | 189.20                    | 0.04%                             | Pass                  |

| Run No. | (Cma)<br>Upscale<br>Calibration Gas<br>ppm | Percent<br>Moisture<br>(%) | (Cgas)<br>Corrected<br>Dry Basis<br>(ppm) | Corrected<br>Wet Basis<br>(ppm) |      |
|---------|--|----------------------------|---|---------------------------------|------|
|         | 1  | 191.00                     | 0.94%                                     | 0.47                            | 0.46 |
|         | 2  | 191.00                     | 0.87%                                     | 0.10                            | 0.10 |
| 3       | 191.00                                     | 0.91%                      | 1.11                                      | 1.10                            |      |

40 CFR 60  
Appendix A-4  
Method 7E

$$C_{gas} = (C_{avg} - C_o) * C_{ma} / (C_m - C_o) \text{ Eq. 7E-5}$$

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

| Serial #<br>Tag (Cv) | Analyzer Calibration Error Check (ACE)<br>Linearity Check (Must be within 2.0%) |                               |                   |
|----------------------|---|-------------------------------|-------------------|
|                      | 'Low'<br>Low-Level<br>Gas   | 'Upscale'<br>Mid-Level<br>Gas | High-Level<br>Gas |
|                      | 0.00  | 191.00                        | 447.00            |
| 0.00                 | 187.30  | 447.00                        |                   |
| 0.00                 | -3.70   | 0.00                          |                   |
| 0.00%                | -0.83%  | 0.00%                         |                   |
| Pass                 | Pass  | Pass                          |                   |

| Run No. | System Bias (SB) Low-Level Gas (Must be within 5.0%) |                               |                            |                       |
|---------|--|-------------------------------|----------------------------|-----------------------|
|         | Low<br>Linearity<br>Gas (Cdir)                       | Final Low<br>Gas<br>Bias (Cs) | Low Gas<br>SB<br>(Eq 7E-2) | Low-Bias<br>Pass/Fail |
|         | Initial  | 0.00                          | 1.80                       | 0.40%                 |
| 1       | 0.00   | 1.20                          | 0.27%                      | Pass                  |
| 2       | 0.00   | 0.03                          | 0.01%                      | Pass                  |
| 3       | 0.00   | 0.04                          | 0.01%                      | Pass                  |

  

| Run No. | System Bias (SB) Upscale Gas (Must be within 5.0%) |                                   |                                |                           |
|---------|--|-----------------------------------|--------------------------------|---------------------------|
|         | Upscale<br>Linearity<br>Gas (Cdir)                 | Final Upscale<br>Gas<br>Bias (Cs) | Upscale Gas<br>SB<br>(Eq 7E-2) | Upscale-Bias<br>Pass/Fail |
|         | Initial  | 187.30                            | 185.00                         | -0.51%                    |
| 1       | 187.30   | 185.40                            | -0.43%                         | Pass                      |
| 2       | 187.30   | 189.40                            | 0.47%                          | Pass                      |
| 3       | 187.30   | 189.20                            | 0.43%                          | Pass                      |

| Run #   | Flowrate   | SO2   | SO2      | SO2   | Production |
|---------|------------|-------|----------|-------|------------|
|         | dscfh      | ppmdv | lb/dscf  | lb/hr | TPH        |
| 1       | 8411563.34 | 0.47  | 0.000000 | 0.65  | 9.87       |
| 2       | 6075118.52 | 0.10  | 0.000000 | 0.10  | 7.04       |
| 3       | 5778122.46 | 1.11  | 0.000000 | 1.06  | 8.53       |
| Average | 6754934.77 | 0.56  | 0.000000 | 0.60  | 8.48       |

| SO2    |
|--------|
| lb/ton |
| 0.07   |
| 0.01   |
| 0.12   |
| 0.07   |