

**Results of the April 28 -30, 2020 Mercury Emissions
Tests at the U. S. Steel Corporation - Minntac Step I, II
and III Agglomerator Facilities Located in Mountain
Iron, Minnesota**

| | |
|------------------------|-------|
| Line 3 Waste Gas Stack | SV103 |
| Line 4 Waste Gas Stack | SV118 |
| Line 6 Waste Gas Stack | SV144 |

Agency Interest ID. 2476

Air Emissions Permit No. 13700005-006

Barr Project No. 23691736.20

Prepared for
U. S. Steel Corporation – Minntac
Mountain Iron, Minnesota

June 2020



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Report Certification

Certification of Sampling Procedures:

I certify under penalty of law that the sampling procedures were performed in accordance with the approved test plan and that the data presented in this test report are, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below.



Dan Koschak
Senior Air Quality Technician
Barr Engineering Co.

6-1-2020

Date

Certification of Analytical Procedures:

I certify under penalty of law that the analytical procedures were performed in accordance with the requirements of the test methods and that the data presented for use in the test report were, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below.

1. Element One, Inc. analyzed metals samples. A signed laboratory report is provided in this report.



Dan Koshack
Senior Air Quality Technician
Barr Engineering Co.

6-1-2020

Date

Certification of Test Report by Testing Company:

I certify under penalty of law that this test report and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the test information submitted. Based on my inquiry of the person or persons who performed sampling and analysis relating to the performance test, the information submitted in this test report is, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below.



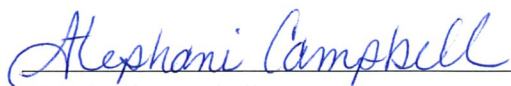
Tom Kuchinski
Stack Testing Services Coordinator
Barr Engineering Co.

May 5, 2020

Date

Certification of Test Report by Owner or Operator of Emission Facility:

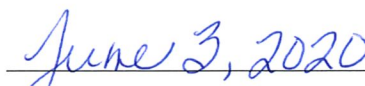
I certify under penalty of law that the information submitted in this test report accurately reflects the operating conditions at the emission facility during this performance test and describes the date and nature of all operational and maintenance activities that were performed on the process and control equipment during the month prior to the performance test. Based on my inquiry of the person or persons who performed the operational and maintenance activities, the information submitted in this test report is, to the best of my knowledge and belief, true, accurate, and complete. All exceptions are listed and explained below.



Stephani Campbell

Environmental Control Engineer

U. S. Steel Corporation – Minntac


Date

Executive Summary

Barr Engineering Co. performed mercury emissions testing at the U. S. Steel Corporation - Minntac Step I, II and III Agglomerator facilities located in Mountain Iron, Minnesota. Testing was performed at three taconite furnace sources April 28-30, 2020 to satisfy the Minnesota Rule 7019.3050 mercury emission inventory testing requirement. The mercury testing was performed on the Step I Line 3 waste gas stack (SV103), Step II Line 4 waste gas stack (SV118) and the Step III Line 6 waste gas stack (SV144). Line 3 is the only active furnace line of Step I. The Line 4 waste gas stack (SV118) is representative of both Step II furnace line stacks (Line 4 and Line 5) and the Line 6 waste gas stack (SV144) is representative of both Step III furnace line stacks (Line 6 and Line 7). Test results are provided in the Executive Summary Table (Table ES-1).

Table ES-1 Executive Summary Table

| Average Test Results | | | |
|---|--------------------------------------|--------------------------------------|--------------------------------------|
| Test Parameter Methods 1-4, 29 | Line 3 Waste Gas Stack (SV103) | Line 4 Waste Gas Stack (SV118) | Line 6 Waste Gas Stack (SV144) |
| Agglomerator Line | Step I | Step II | Step III |
| Air Emissions Permit Group | GP009 | GP010 | GP011 |
| Test Date | 4/28/20 | 4/29/20 | 4/30/20 |
| Total Mercury Concentration, ug/dscm | 2.5 | 3.0 | 3.2 |
| Total Mercury Emission Rate, lb/hr | 0.0021 | 0.0049 | 0.0047 |

1.0 Introduction

Barr Engineering Co. performed mercury emissions testing at the U. S. Steel Corporation - Minntac Step I, II and III Agglomerator facilities located in Mountain Iron, Minnesota. Testing was performed at three taconite furnace sources April 28-30, 2020 to satisfy the Minnesota Rule 7019.3050 mercury emission inventory testing requirements. The mercury testing was performed on the Step I Line 3 waste gas stack (SV103), Step II Line 4 waste gas stack (SV118) and the Step III Line 6 waste gas stack (SV144). Line 3 is the only active furnace line of Step I. The Line 4 waste gas stack (SV118) is representative of both Step II furnace line stacks (Line 4 and Line 5) and the Line 6 waste gas stack (SV144) is representative of both Step III furnace line stacks (Line 6 and Line 7).

A test plan dated February 13, 2020 was submitted to the Minnesota Pollution Control Agency (MPCA). A pretest meeting was held via email between Stephani Campbell of U. S. Steel Corporation-Minntac (Minntac) and Andy Place of the MPCA. The test plan and relevant correspondence are provided in Appendix F. The test plan also lists other particulate matter testing at multiple sources which has been completed and reported separately, or delayed due to idling of Step III operations.

Dan Koschak led the Barr test team. Stephani Campbell, Brad Gerlach and Clark Nurmi of Minntac provided coordination of the test team with facility operations. The performance tests were not witnessed by a representative of the MPCA. A list of project participants is provided in Appendix G.

Each test consisted of three independent 2-hour test runs at the three stacks using EPA Method 29 to determine mercury emissions.

A list of the emissions units tested with target process operating rate ranges and applicable rules are presented in Table 1 below. Production rates during the testing were at or above 90 percent of maximum throughput. The Line 3 furnace was fired with a combination of biomass and natural gas. The Line 4 and 6 furnaces were fired on natural gas.

Table 1-1 Emission Source Information

| Source | Emissions Unit | Control Equipment | Stack Vent | Permit Group | Greenball Feed Rate (LTPH) | Applicable Rule |
|------------------------|-------------------------|-------------------|------------|--------------|----------------------------|-----------------------|
| Line 3 Waste Gas Stack | EU223 EU225 EU226 | CE146 | SV103 | GP009 | 280-350 | Minn. R. 7019.3050 |
| Line 4 Waste Gas Stack | EU259 EU260 EU261 | CE103 | SV118 | GP010 | 500-600 | Minn. R. 7019.3050 |
| Line 6 Waste Gas Stack | EU313 EU314 EU315 | CE126 | SV144 | GP011 | 500-600 | Minn. R. 7019.3050 |

2.0 Results

2.1 Line 3 Waste Gas Stack (SV103)

Results of the Line 3 waste gas stack test (SV103) performed on April 28, 2020 are provided in Table 1. The average emission rate of total mercury is 0.0021 pounds per hour (lb/hr).

2.2 Line 4 Waste Gas Stack (SV118)

Results of the Line 4 waste gas stack (SV118) test performed on April 29, 2020 are provided in Table 2. The average emission rate of total mercury is 0.0049 lb/hr.

2.3 Line 6 Waste Gas Stack (SV144)

Results of the Line 6 waste gas stack (SV144) test performed on April 30, 2020 are provided in Table 3. The average emission rate of total mercury is 0.0047 lb/hr.

No process or test difficulties were noted during the testing.

3.0 Process Description

The Agglomerator grate-kiln system consists of four primary components; the dryer, preheat furnace, kiln, and cooler. Green pellets from the balling drums enter the grate, supported by a slotted grate. The grate is divided into three sections: two for drying and one for preheating the pellets. Hot process gases are passed through the bed of the green pellets on the grate in order to first dry and then preheat them. The grate then transports the pellets into the rotary kiln. In the kiln, the pellets are tumbled and indurated (heat hardened) by heating them to 2450° F. The pellets are discharged into an annular cooler with slotted traveling pallets. Ambient air is passed through the bed of pellets in the cooler to cool the pellets and recover heat. The waste gases from each kiln are controlled by separate wet scrubbers.

Process rate parameters recorded and summarized for each run include green ball feed rate, fired pellet production rate and fuel input. The process operating data during the testing is summarized in Table 4. Detailed process data along with completed MPCA Operating Data Summary for Process Sources forms are located in Appendix E.

4.0 Stack Testing Procedures and Methods

Testing was performed at locations meeting EPA method 1 criteria. Method criteria are listed below in Table 2. Sample port locations and traverse points are provided in Figures 1-6.

Table 4-1 EPA Method 1 Criteria

| Stack Vent Number | Distance to Upstream Disturbances (Diameters) | Distance to Downstream Disturbances (Diameters) | Number of Ports | Number of Points |
|--------------------------|--|--|------------------------|-------------------------|
| SV103 | >2.0 | >0.5 | 4 | 24 |
| SV118 | 4.1 | 2.4 | 4 | 24 |
| SV144 | 2.4 | 1.6 | 4 | 24 |

Volumetric airflow determinations were performed in accordance with EPA Method 2 using an S-type pitot tube. Airflows were determined in conjunction with the EPA Method 29 tests.

Oxygen and carbon dioxide concentrations at the waste gas stacks were determined from integrated stack gas samples collected with each test run and analyzed by modified EPA Method 3A. Results of those analyses are located in Appendix B. Gas calibration certifications are provided in Appendix D.

Stack gas moistures were determined by performing EPA Method 4 in conjunction with the EPA Method 29 tests.

Mercury was determined following EPA Method 29. All glassware used for the testing was prepared as directed by the method. All reagents were prepared at Barr's laboratory except for the acidified potassium permanganate solution which was prepared on-site daily prior to sampling. Sample recovery was performed in Barr Engineering's recovery trailer to minimize potential for sample contamination. Samples were analyzed by Element One, Inc. of Wilmington, North Carolina. A complete laboratory report along with chain of custody is located in Appendix C.

Mercury levels in all reagent blanks were below analytical detection limits. No blank corrections were performed. Sample fractions reported at the analytical detection limit are included in the total mass of the sample.

The test methods referenced above are found in 40 CFR Part 60, Appendix A.

Tables

U.S. Steel Corporation
Minntac
Mountain iron, Minnesota

Barr Engineering Co.
May 28, 2020

TABLE 1

EPA METHOD 29 MERCURY RESULTS

Line 3 Waste Gas Stack (SV103)

| Parameter | Run 1 | Run 2 | Run 3 | Average |
|------------------------------------|-------------|-------------|-------------|---------|
| Test Date | 4/28/2020 | 4/28/2020 | 4/28/2020 | - |
| Test Period | 0758 - 1003 | 1016 - 1221 | 1238 - 1442 | - |
| Test Duration, min | 120 | 120 | 120 | 120 |
| Average Stack Temperature, °F | 121 | 121 | 121 | 121 |
| Average Moisture Content, %V/V | 12.69 | 12.69 | 12.62 | 12.67 |
| Air Flow Rate | | | | |
| acfm | 293,000 | 291,000 | 294,000 | 293,000 |
| scfm | 249,000 | 247,000 | 250,000 | 249,000 |
| dscfm | 217,000 | 216,000 | 218,000 | 217,000 |
| Mercury Concentration, ug/dscm | | | | |
| Filterable | 0.33 | 0.20 | 0.18 | 0.24 |
| Vapor Phase | 2.1 | 2.2 | 2.6 | 2.3 |
| Total | 2.4 | 2.4 | 2.8 | 2.5 |
| Mercury Emission Rate, lb/hr | | | | |
| Filterable | 0.00027 | 0.00016 | 0.00015 | 0.00019 |
| Vapor Phase | 0.0017 | 0.0018 | 0.0021 | 0.0019 |
| Total | 0.0020 | 0.0019 | 0.0023 | 0.0021 |
| Process Data | | | | |
| Green Ball Feed Rate, LTPH | 301 | 300 | 301 | 301 |
| Fired Pellet Production Rate, LTPH | 216 | 215 | 215 | 215 |
| Emission Factors | | | | |
| Total Mercury lb/LT Fired Pellet | 9.1E-06 | 9.0E-06 | 1.1E-05 | 9.5E-06 |

U.S. Steel Corporation
Minntac
Mountain Iron, Minnesota

Barr Engineering Co.
May 28, 2020

TABLE 2

EPA METHOD 29 MERCURY RESULTS

Line 4 Waste Gas Stack (SV118)

| Parameter | Run 1 | Run 2 | Run 3 | Average |
|------------------------------------|-------------|-------------|-------------|----------|
| Test Date | 4/29/2020 | 4/29/2020 | 4/29/2020 | - |
| Test Period | 0756 - 1005 | 1022 - 1226 | 1240 - 1446 | - |
| Test Duration, min | 120 | 120 | 120 | 120 |
| Average Stack Temperature, °F | 121 | 121 | 123 | 122 |
| Average Moisture Content, %V/V | 10.12 | 9.93 | 10.38 | 10.15 |
| Air Flow Rate | | | | |
| acfm | 585,000 | 576,000 | 579,000 | 580,000 |
| scfm | 501,000 | 493,000 | 494,000 | 496,000 |
| dscfm | 450,000 | 444,000 | 443,000 | 446,000 |
| Mercury Concentration, ug/dscm | | | | |
| Filterable | <0.039 | 0.057 | 0.049 | 0.049 |
| Vapor Phase | 2.9 | 2.7 | 3.1 | 2.9 |
| Total | 2.9 | 2.8 | 3.2 | 3.0 |
| Mercury Emission Rate, lb/hr | | | | |
| Filterable | <0.000066 | 0.000095 | 0.000082 | 0.000081 |
| Vapor Phase | 0.0048 | 0.0045 | 0.0052 | 0.0048 |
| Total | 0.0049 | 0.0046 | 0.0053 | 0.0049 |
| Process Data | | | | |
| Green Ball Feed Rate, LTPH | 544 | 544 | 545 | 544 |
| Fired Pellet Production Rate, LTPH | 395 | 397 | 402 | 398 |
| Emission Factors | | | | |
| Total Mercury lb/LT Fired Pellet | 1.2E-05 | 1.2E-05 | 1.3E-05 | 1.2E-05 |

U.S. Steel Corporation
Minntac
Mountain Iron, Minnesota

Barr Engineering Co.
May 28, 2020

TABLE 3

EPA METHOD 29 MERCURY RESULTS

Line 6 Waste Gas Stack (SV144)

| Parameter | Run 1 | Run 2 | Run 3 | Average |
|------------------------------------|-------------|-------------|-------------|----------|
| Test Date | 4/30/2020 | 4/30/2020 | 4/30/2020 | - |
| Test Period | 0744 - 0950 | 1002 - 1209 | 1221 - 1429 | - |
| Test Duration, min | 120 | 120 | 120 | 120 |
| Average Stack Temperature, °F | 111 | 112 | 112 | 112 |
| Average Moisture Content, %V/V | 9.57 | 9.75 | 9.76 | 9.69 |
| Air Flow Rate | | | | |
| acfm | 496,000 | 507,000 | 506,000 | 503,000 |
| scfm | 430,000 | 439,000 | 438,000 | 436,000 |
| dscfm | 389,000 | 396,000 | 395,000 | 393,000 |
| Mercury Concentration, ug/dscm | | | | |
| Filterable | 0.073 | < 0.043 | < 0.043 | 0.053 |
| Vapor Phase | 2.9 | 3.2 | 3.3 | 3.2 |
| Total | 3.0 | 3.3 | 3.4 | 3.2 |
| Mercury Emission Rate, lb/hr | | | | |
| Filterable | 0.00011 | < 0.000063 | < 0.000063 | 0.000078 |
| Vapor Phase | 0.0043 | 0.0048 | 0.0049 | 0.0047 |
| Total | 0.0044 | 0.0048 | 0.0050 | 0.0047 |
| Process Data | | | | |
| Green Ball Feed Rate, LTPH | 519 | 519 | 519 | 519 |
| Fired Pellet Production Rate, LTPH | 392 | 395 | 396 | 394 |
| Emission Factors | | | | |
| Total Mercury lb/LT Fired Pellet | 1.1E-05 | 1.2E-05 | 1.3E-05 | 1.2E-05 |

TABLE 4
SUMMARY OF PROCESS DATA COLLECTED DURING STACK TESTING

Line 3 WG SV103 Test Date: 4/28/20

| Run | Time | | Feed Rates LTPH | | Prod. Rate LTPH | Wood | | | Gas MBTUH | | Total MBTUH |
|---------|-------|------|-----------------|----------|--------------------|---------|-----------|-------|-----------|------|----------------|
| | Start | End | Greenball | To Grate | | lbs/min | MMBTU/ton | MBTUH | Grate | Kiln | |
| 1 | 0758 | 1003 | 301 | 260 | 216 | 50 | 17 | 25 | 49 | 84 | 133 |
| 2 | 1016 | 1221 | 300 | 258 | 215 | 44 | 17 | 22 | 49 | 85 | 134 |
| 3 | 1238 | 1442 | 301 | 259 | 215 | 44 | 17 | 22 | 49 | 83 | 132 |
| Average | | | 301 | 259 | 215 | 46 | 17 | 23 | 49 | 84 | 133 |

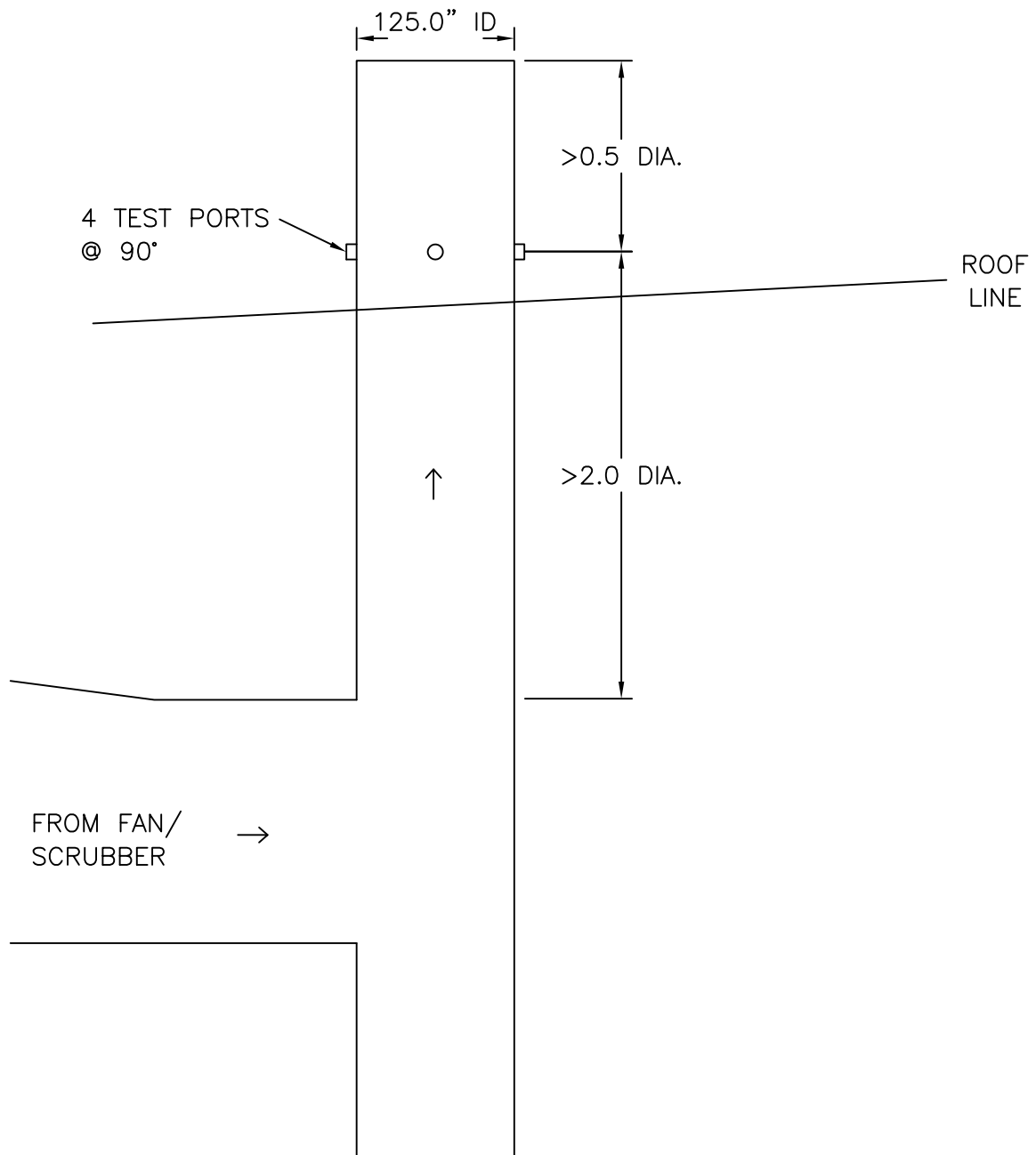
Line 4 WG SV118 Test Date: 4/29/20

| Run | Time | | Feed Rates LTPH | | Prod. Rate LTPH | Wood | | | Gas MBTUH | | Total MBTUH |
|---------|-------|------|-----------------|----------|--------------------|---------|-----------|-------|-----------|------|----------------|
| | Start | End | Greenball | To Grate | | lbs/min | MMBTU/ton | MBTUH | Grate | Kiln | |
| 1 | 0756 | 1005 | 544 | 476 | 395 | 0 | 0 | 0 | 87 | 184 | 271 |
| 2 | 1022 | 1226 | 544 | 478 | 397 | 0 | 0 | 0 | 87 | 180 | 267 |
| 3 | 1240 | 1446 | 545 | 484 | 402 | 0 | 0 | 0 | 86 | 194 | 280 |
| Average | | | 544 | 479 | 398 | 0 | 0 | 0 | 87 | 186 | 273 |

Line 6 WG SV144 Test Date 4/30/20

| Run | Time | | Feed Rates LTPH | | Prod. Rate LTPH | Wood | | | Gas MBTUH | | Total MBTUH |
|---------|-------|------|-----------------|----------|--------------------|---------|-----------|-------|-----------|------|----------------|
| | Start | End | Greenball | To Grate | | lbs/min | MMBTU/ton | MBTUH | Grate | Kiln | |
| 1 | 0744 | 0950 | 519 | 450 | 392 | 0 | 0 | 0 | 87 | 170 | 257 |
| 2 | 1002 | 1209 | 519 | 454 | 395 | 0 | 0 | 0 | 87 | 175 | 262 |
| 3 | 1221 | 1429 | 519 | 455 | 396 | 0 | 0 | 0 | 87 | 169 | 256 |
| Average | | | 519 | 453 | 394 | 0 | 0 | 0 | 87 | 171 | 258 |

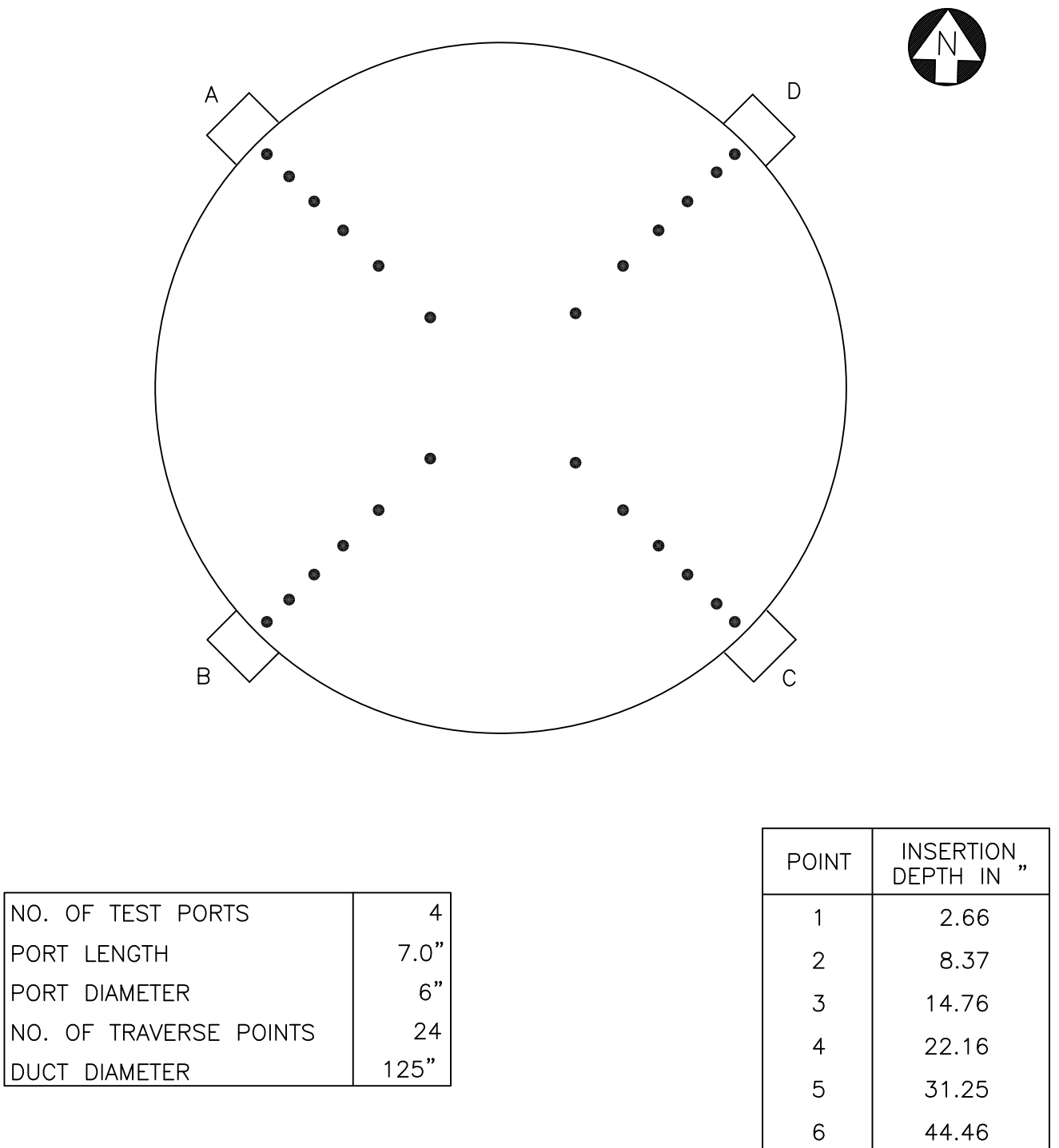
Figures



TEST PORT LOCATIONS
 US STEEL MINNESOTA ORE OPERATIONS
 MOUNTAIN IRON, MINNESOTA
 STEP 1 AGGLOMERATOR LINE 3 WASTE GAS STACK (SV103)

NOT TO SCALE

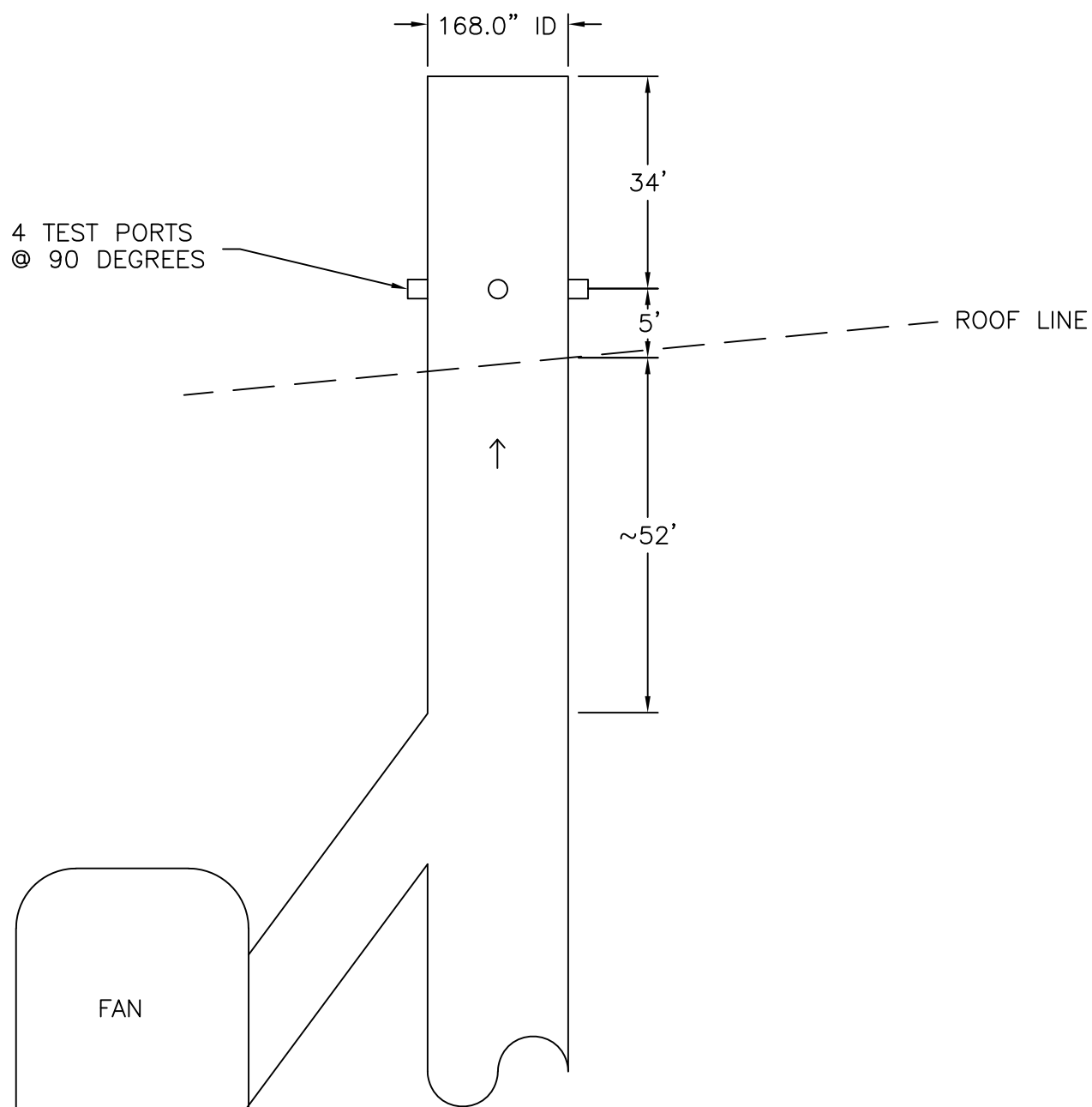
FIGURE 1



TRAVERSE POINT LOCATIONS
 US STEEL MINNESOTA ORE OPERATIONS
 MOUNTAIN IRON, MINNESOTA
 STEP 1 AGGLOMERATOR LINE 3 WASTE GAS STACK (SV103)

NOT TO SCALE

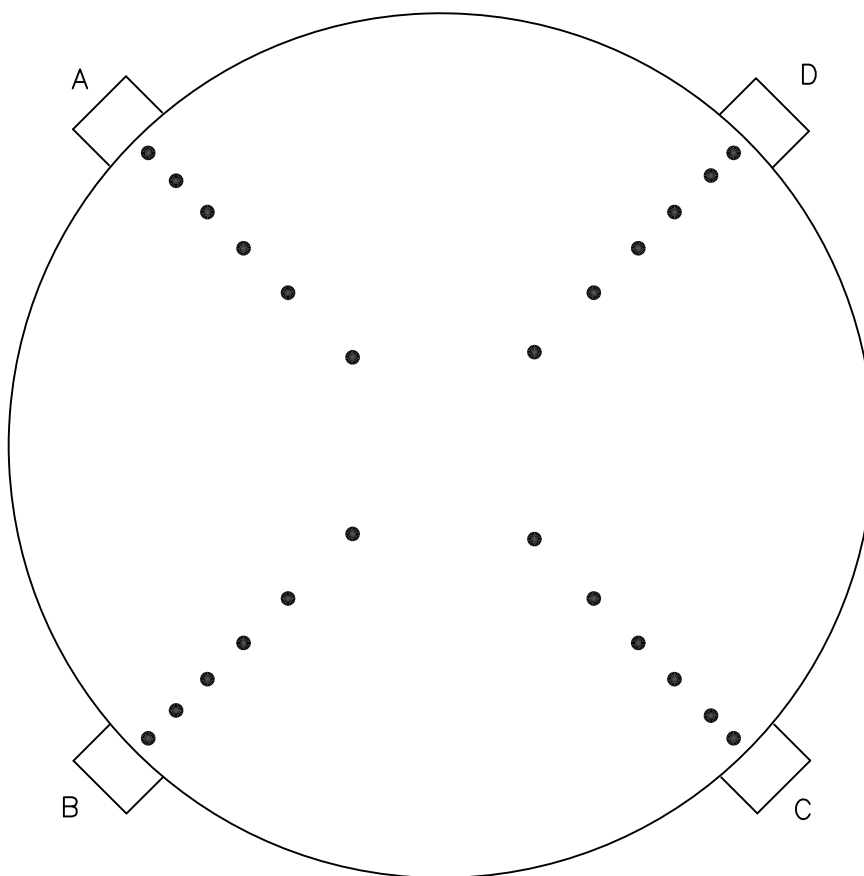
FIGURE 2



TEST PORT LOCATIONS
 US STEEL MINNESOTA ORE OPERATIONS
 MOUNTAIN IRON, MINNESOTA
 STEP II AGGLOMERATOR LINE 4 WASTE GAS STACK (SV118)

NOT TO SCALE

FIGURE 3



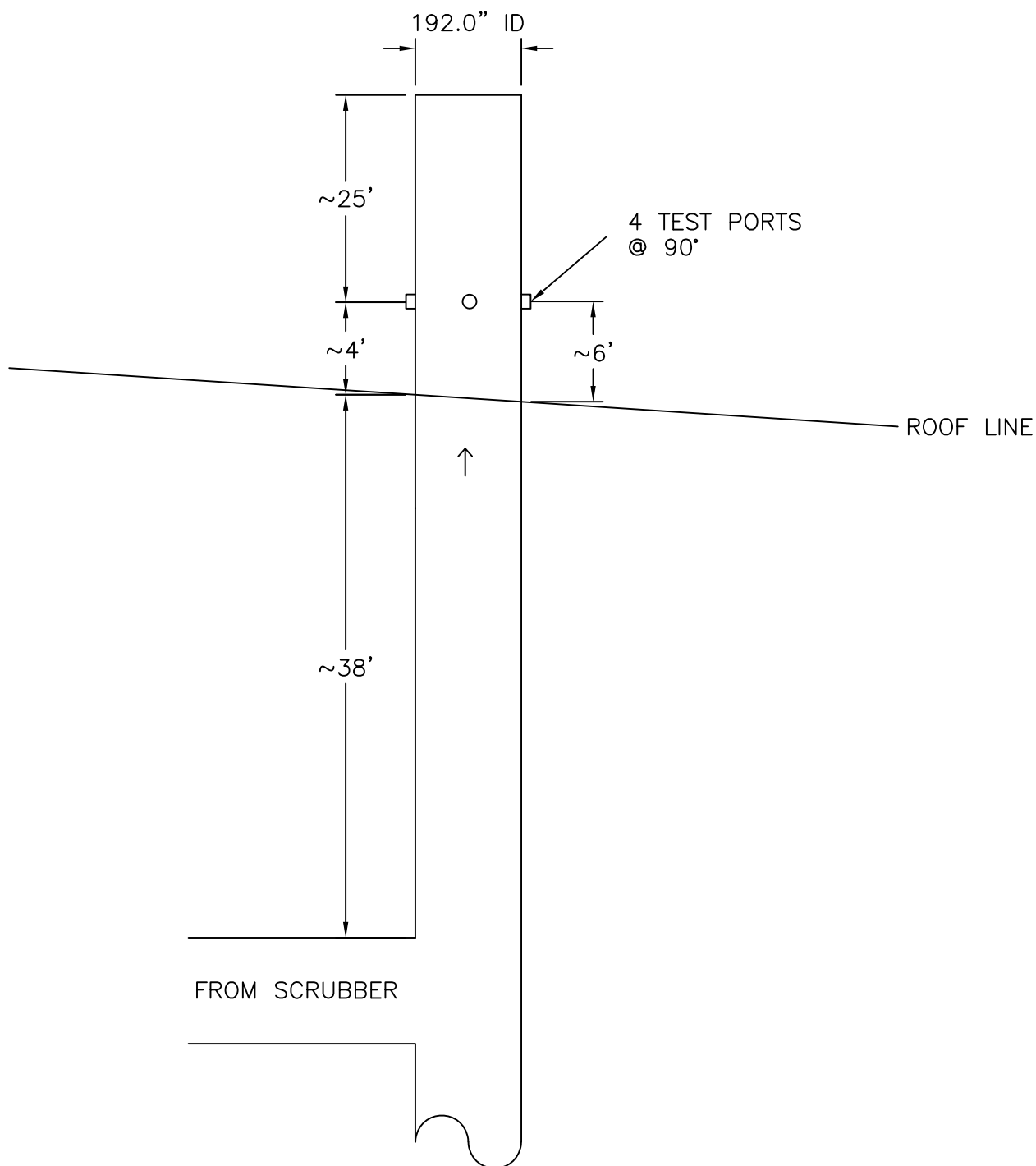
| | |
|------------------------|--------|
| NO. OF TEST PORTS | 4 |
| PORT LENGTH | 23.0" |
| PORT DIAMETER | 6.0" |
| NO. OF TRAVERSE POINTS | 24 |
| DUCT DIAMETER | 168.0" |

| POINT | INSERTION DEPTH IN " |
|-------|-------------------------|
| 1 | 3.58 |
| 2 | 11.25 |
| 3 | 19.84 |
| 4 | 29.78 |
| 5 | 42.00 |
| 6 | 59.75 |

TRAVERSE POINT LOCATIONS
 US STEEL MINNESOTA ORE OPERATIONS
 MOUNTAIN IRON, MINNESOTA
 STEP II AGGLOMERATOR LINE 4 WASTE GAS STACK (SV118)

NOT TO SCALE

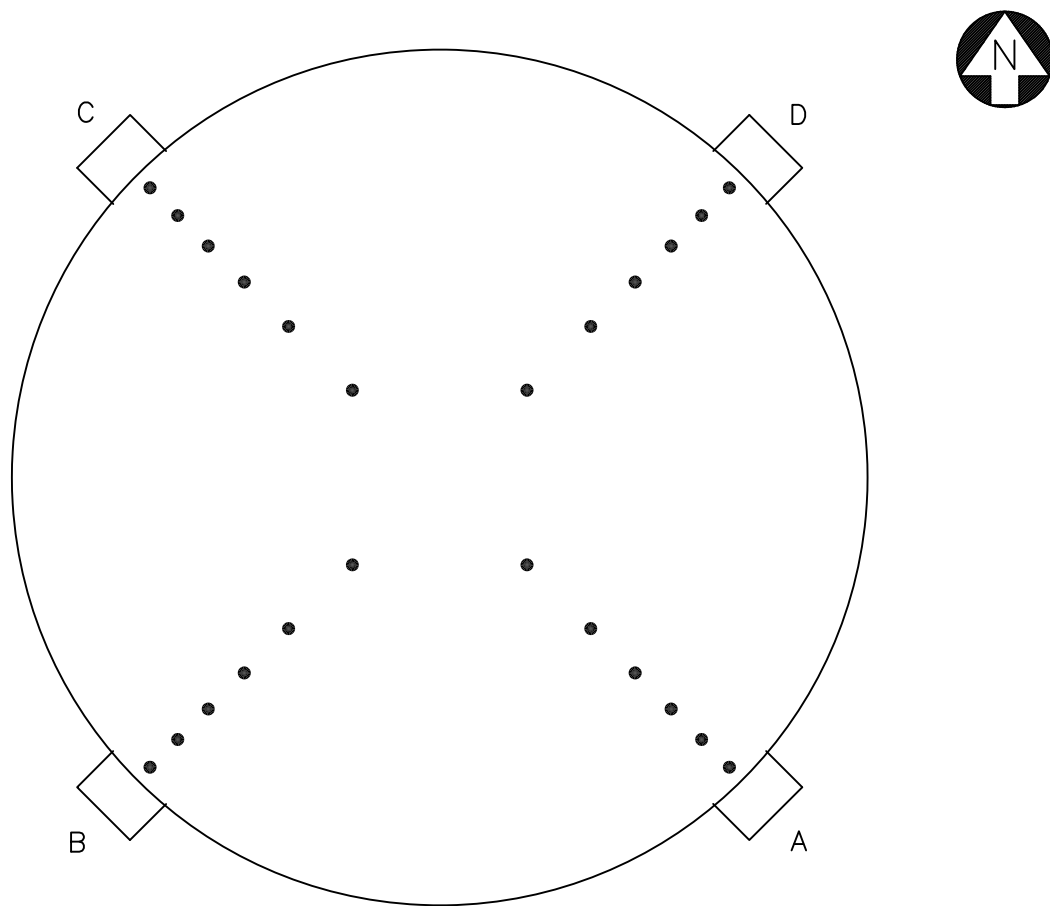
FIGURE 4



TEST PORT LOCATIONS
 US STEEL MINNESOTA ORE OPERATIONS
 MOUNTAIN IRON, MINNESOTA
 STEP III AGGLOMERATOR LINE 6 WASTE GAS STACK (SV144)

NOT TO SCALE

FIGURE 5



| | |
|------------------------|--------|
| NO. OF TEST PORTS | 4 |
| PORT LENGTH | 15.0" |
| PORT DIAMETER | 6.0" |
| NO. OF TRAVERSE POINTS | 24 |
| DUCT DIAMETER | 192.0" |

| POINT | INSERTION DEPTH IN " |
|-------|-------------------------|
| 1 | 4.09 |
| 2 | 12.86 |
| 3 | 22.68 |
| 4 | 34.03 |
| 5 | 48.00 |
| 6 | 68.29 |

TRAVERSE POINT LOCATIONS
 US STEEL MINNESOTA ORE OPERATIONS
 MOUNTAIN IRON, MINNESOTA
 STEP III AGGLOMERATOR LINE 6 WASTE GAS STACK (SV144)

NOT TO SCALE

FIGURE 6

Appendices

Appendix A

Report Calculations and Nomenclature

Determination of Volumetric Air Flow Rate, Gas Composition, Moisture Content, Meter Volume and Isokinetic Sampling
EPA Methods 2, 3, 4 and Isokinetics by Method
Line 3 Waste Gas Stack (SV103)

| Input Data | Symbol | Units | Run 1 | Run 2 | Run 3 |
|--|-----------------------|----------------------|-------------------|-------------------|-------------------|
| Test Date | - | - | 4/28/2020 | 4/28/2020 | 4/28/2020 |
| Test Period | - | - | 0758 - 1003 | 1016 - 1221 | 1238 - 1442 |
| Number of Sample Ports | - | - | 4 | 4 | 4 |
| Number of Traverse Points | - | - | 24 | 24 | 24 |
| Duct Dimensions (diameter or Length x Width) | D, L X W | inches | 125.00 | 125.00 | 125.00 |
| Barometric Pressure | Pbar | in. Hg | 28.00 | 28.00 | 28.00 |
| Stack Static Pressure | Pg | in. H ₂ O | -0.45 | -0.45 | -0.45 |
| Average Stack Temperature | Tsf | degrees F | 121 | 121 | 121 |
| Actual Dry Gas Meter Volume | Vm | cubic feet | 82.53 | 82.98 | 84.16 |
| Dry Gas Meter Calibration Factor | Y | - | 0.9805 | 0.9805 | 0.9805 |
| Average Orifice Meter Pressure Drop | DH | in H ₂ O | 1.66 | 1.65 | 1.69 |
| Average Meter Temperature | Tmf | degrees F | 47 | 56 | 58 |
| Pitot Tube Coefficient | Cp | - | 0.84 | 0.84 | 0.84 |
| Average Square Root of Velocity Head | (DP) ^{0.5} | - | 0.921 | 0.916 | 0.925 |
| Mass of Water Vapor Condensed in Impingers | Vwc | g | 232 | 236 | 235 |
| Mass of Water Vapor Collected in Desiccant | Vwsg | g | 22 | 20 | 23 |
| Orsat Results, Dry Basis | | | | | |
| Oxygen | %O ₂ | %v/v | 17.3 | 17.7 | 17.2 |
| Carbon Dioxide | %CO ₂ | %v/v | 2.8 | 2.6 | 3.0 |
| Nitrogen + Carbon Monoxide | %N ₂ + %CO | %v/v | 79.9 | 79.7 | 79.8 |
| Nozzle Diameter | Dn | inches | 0.218 | 0.218 | 0.218 |
| Run Time | theta | minutes | 120 | 120 | 120 |
| Calculated Data | Symbol | Units | Run 1 | Run 2 | Run 3 |
| Average Absolute Stack Temperature Tsr = Tsf + 460 | Tsr | degrees R | 581 | 581 | 581 |
| Stack Pressure Ps = Pbar + Pg / 13.6 | Ps | in. Hg | 27.97 | 27.97 | 27.97 |
| Duct Area A = $\pi D^2 / (4 \times 144)$ or A = L x W / 144 | A | Sq. ft | 85.221 | 85.221 | 85.221 |
| Meter Volume at Standard Conditions Vmstd = $17.64 \times Vm \times Y \times ((Pbar + (DH / 13.6)) / (Tmf + 460))$ | Vmstd-ft3 | cubic feet | 79.11 | 78.16 | 78.98 |
| Meter Volume at Standard Conditions Vmstd-m3 = Vmstd-ft3 x 0.02832 | Vmstd-m3 | cubic meter | 2.24 | 2.21 | 2.24 |
| Average Moisture Content of Stack Gas MC = $((0.04175 \times Vwc + 0.04715 \times Vwsg) / ((0.04715 \times Vwc + 0.04715 \times Vwsg) + (Vmstd))) \times 100$ | MC | % Vol | 12.69 see note | 12.69 see note | 12.62 see note |
| Molecular Weight of Stack Gas, dry Md = $(0.44 \times \%CO_2) + (0.32 \times \%O_2) + (0.28 \times (\%N_2 + \%CO))$ | Md | lb/lbmol | 29.14 | 29.12 | 29.17 |
| Molecular Weight of Stack Gas, wet Ms = $Md \times (1 - (MC/100)) + 18 \times (MC/100)$ | Ms | lb/lbmol | 27.73 | 27.71 | 27.76 |
| Average Stack Gas Velocity Vs = $85.49 \times Cp \times (dP)^{0.5} \times ((Tsr / (Ps \times Ms))^{0.5})$ | Vs | ft/sec | 57.29 | 56.98 | 57.49 |
| Actual Volumetric Air Flow Rate Qa = $60 \times Vs \times A$ | Qa | acfm | 292,943 | 291,366 | 293,986 |
| Volumetric Air Flow Rate at Standard Conditions Qs = $Qa \times (528 / (Ts + 460)) \times (Ps / 29.92)$ | Qs | scfm | 248,753 | 247,414 | 249,728 |
| Dry Volumetric Air Flow Rate at Standard Conditions Qd = $Qa \times (1 - (MC / 100)) \times (528 / Tsr) \times (Ps / 29.92)$ | Qd | dscfm | 217,180 | 216,011 | 218,213 |
| Nozzle Cross-Sectional Area An = $(3.14 \times Dn^2) / (4 \times 144)$ | An | sq. ft | 0.000259 | 0.000259 | 0.000259 |
| Isokinetic Variation I = $(0.0945 \times Tsr \times Vmstd) / (Ps \times Vs \times An \times theta \times (1 - (MC / 100)))$ | I | % | 99.9 | 99.2 | 99.2 |

Note: Moisture Content limited to moisture at saturation

EPA Method 29 Mercury Calculation Summary
Determination of Mercury Emissions
EPA Method 29

Line 3 Waste Gas Stack (SV103)

| Input Data | Symbol | Units | Run 1 | Run 2 | Run 3 |
|--|-----------|-------------|-------------|-------------|-------------|
| Test Date | - | - | 4/28/2020 | 4/28/2020 | 4/28/2020 |
| Test Period | - | - | 0758 - 1003 | 1016 - 1221 | 1238 - 1442 |
| Run Time | theta | min | 120 | 120 | 120 |
| Meter Volume at Standard Conditions Vmstd | Vmstd-ft3 | cubic feet | 79.11 | 78.16 | 78.98 |
| Meter Volume at Standard Conditions Vmstd | Vmstd-m3 | cubic meter | 2.24 | 2.21 | 2.24 |
| Dry Volumetric Air Flow Rate at Standard Conditions (M2,M4, ISO Calcs) | Qd | DSCFM | 217,180 | 216,011 | 218,213 |
| Laboratory Results | | | | | |
| Mercury Loading, ug | | | | | |
| Filterable | Hg-ug | FH-ug | 0.749 | 0.439 | 0.406 |
| Back Half | Hg-ug | BH-ug | 4.68 | 4.85 | 5.79 |
| Calculated Data | | | | | |
| Filterable Mercury Concentration, ug/dscm | | | | | |
| ug/dscm = FHx ug / Vmstd-m3 | | | | | |
| Filterable | Hg | ug/dscm | 0.334 | 0.198 | 0.182 |
| Back Half Mercury Concentration, ug/dscm | | | | | |
| ug/dscm = BH Tot-ug / Vmstd-m3 | | | | | |
| Filterable | Hg | ug/dscm | 2.09 | 2.19 | 2.59 |
| Total Mercury Concentration, ug/dscm | | | | | |
| Total ug/dscm = (FH Tot-ug + BH Tot-ug) / Vmstd m3 x 0.001 | | | | | |
| Filterable | Hg | ug/dscm | 2.42 | 2.39 | 2.77 |
| Front Half Mercury Emission Rate, lb/hr | | | | | |
| Metal-E = tot ug x 2.2046e-9/vstd ft3 x Qd x 60 | | | | | |
| Filterable | Hg | lb/hr | 0.000272 | 0.000160 | 0.000148 |
| Back Half Mercury Emission Rate, lb/hr | | | | | |
| Metal-E = tot ug x 2.2046e-9/vstd ft3 x Qd x 60 | | | | | |
| Filterable | Hg | lb/hr | 0.00170 | 0.00177 | 0.00212 |
| Total Mercury Emission Rate, lb/hr | | | | | |
| Metal-E = Front half lb/hr + Back Half lb/hr | | | | | |
| Filterable | Hg | lb/hr | 0.00197 | 0.00193 | 0.00227 |

Determination of Volumetric Air Flow Rate, Gas Composition, Moisture Content, Meter Volume and Isokinetic Sampling
EPA Methods 2, 3, 4 and Isokinetics by Method
Line 4 Waste Gas Stack (SV118)

| Input Data | Symbol | Units | Run 1 | Run 2 | Run 3 |
|---|-----------------------|----------------------|-------------|-------------|-------------|
| Test Date | - | - | 4/29/2020 | 4/29/2020 | 4/29/2020 |
| Test Period | - | - | 0756 - 1005 | 1022 - 1226 | 1240 - 1446 |
| Number of Sample Ports | - | - | 4 | 4 | 4 |
| Number of Traverse Points | - | - | 24 | 24 | 24 |
| Duct Dimensions (diameter or Length x Width) | D, L X W | inches | 168.00 | 168.00 | 168.00 |
| Barometric Pressure | Pbar | in. Hg | 28.20 | 28.20 | 28.20 |
| Stack Static Pressure | Pg | in. H ₂ O | -0.42 | -0.42 | -0.42 |
| Average Stack Temperature | Tsf | degrees F | 121 | 121 | 123 |
| Actual Dry Gas Meter Volume | Vm | cubic feet | 93.82 | 94.84 | 97.33 |
| Dry Gas Meter Calibration Factor | Y | - | 0.9805 | 0.9805 | 0.9805 |
| Average Orifice Meter Pressure Drop | DH | in H ₂ O | 2.14 | 2.15 | 2.22 |
| Average Meter Temperature | Tmf | degrees F | 53 | 65 | 75 |
| Pitot Tube Coefficient | Cp | - | 0.84 | 0.84 | 0.84 |
| Average Square Root of Velocity Head | (DP) ^{0.5} | - | 1.028 | 1.012 | 1.016 |
| Mass of Water Vapor Condensed in Impingers | Vwc | g | 187 | 178 | 191 |
| Mass of Water Vapor Collected in Desiccant | Vwsg | g | 27 | 30 | 28 |
| Orsat Results, Dry Basis | | | | | |
| Oxygen | %O ₂ | %v/v | 17.7 | 17.8 | 17.6 |
| Carbon Dioxide | %CO ₂ | %v/v | 2.6 | 2.5 | 2.9 |
| Nitrogen + Carbon Monoxide | %N ₂ + %CO | %v/v | 79.7 | 79.7 | 79.5 |
| Nozzle Diameter | Dn | inches | 0.218 | 0.218 | 0.218 |
| Run Time | theta | minutes | 120 | 120 | 120 |
| Calculated Data | Symbol | Units | Run 1 | Run 2 | Run 3 |
| Average Absolute Stack Temperature Tsr = Tsf + 460 | Tsr | degrees R | 581 | 581 | 583 |
| Stack Pressure Ps = Pbar + Pg / 13.6 | Ps | in. Hg | 28.17 | 28.17 | 28.17 |
| Duct Area A = $\pi D^2 / (4 \times 144)$ or A = L x W / 144 | A | Sq. ft | 153.938 | 153.938 | 153.938 |
| Meter Volume at Standard Conditions Vmstd = 17.64 x Vm x Y x ((Pbar + (DH / 13.6)) / (Tmf + 460)) | Vmstd-ft3 | cubic feet | 89.71 | 88.69 | 89.26 |
| Meter Volume at Standard Conditions Vmstd-m3 = Vmstd-ft3 x 0.02832 | Vmstd-m3 | cubic meter | 2.54 | 2.51 | 2.53 |
| Average Moisture Content of Stack Gas MC = ((0.04175 x Vwc + 0.04715 x Vwsg) / ((0.04715 x Vwc + 0.04715 x Vwsg) + (Vmstd))) x 100 | MC | % Vol | 10.12 | 9.93 | 10.38 |
| Molecular Weight of Stack Gas, dry Md = (0.44 x %CO ₂) + (0.32 x %O ₂) + (0.28 x (%N ₂ + %CO)) | Md | lb/lbmol | 29.12 | 29.11 | 29.17 |
| Molecular Weight of Stack Gas, wet Ms = Md x (1 - (MC/100)) + 18 x (MC/100) | Ms | lb/lbmol | 28.00 | 28.01 | 28.01 |
| Average Stack Gas Velocity Vs = 85.49 x Cp x (dP) ^{0.5} x ((Tsr/(Ps x Ms)) ^{0.5}) | Vs | ft/sec | 63.33 | 62.40 | 62.69 |
| Actual Volumetric Air Flow Rate Qa = 60 x Vs x A | Qa | acfm | 584,929 | 576,339 | 579,059 |
| Volumetric Air Flow Rate at Standard Conditions Qs = Qa x (528 / (Ts + 460)) x (Ps / 29.92) | Qs | scfm | 500,608 | 493,008 | 494,060 |
| Dry Volumetric Air Flow Rate at Standard Conditions Qd = Qa x (1 - (MC / 100)) x (528 / Tsr) x (Ps / 29.92) | Qd | dscfm | 449,929 | 444,047 | 442,769 |
| Nozzle Cross-Sectional Area An = (3.14 x Dn ²) / (4 x 144) | An | sq. ft | 0.000259 | 0.000259 | 0.000259 |
| Isokinetic Variation I = (0.0945 x Tsr x Vmstd) / (Ps x Vs x An x theta x (1 - (MC / 100))) | I | % | 98.8 | 98.9 | 99.8 |

EPA Method 29 Mercury Calculation Summary
Determination of Mercury Emissions
EPA Method 29

Line 4 Waste Gas Stack (SV118)

| Input Data | Symbol | Units | Run 1 | Run 2 | Run 3 |
|--|-----------|-------------|-------------|-------------|-------------|
| Test Date | - | - | 4/29/2020 | 4/29/2020 | 4/29/2020 |
| Test Period | - | - | 0756 - 1005 | 1022 - 1226 | 1240 - 1446 |
| Run Time | theta | min | 120 | 120 | 120 |
| Meter Volume at Standard Conditions Vmstd | Vmstd-ft3 | cubic feet | 89.71 | 88.69 | 89.26 |
| Meter Volume at Standard Conditions Vmstd | Vmstd-m3 | cubic meter | 2.54 | 2.51 | 2.53 |
| Conditions (M2,M4, ISO Calcs) | Qd | DSCFM | 449,929 | 444,047 | 442,769 |
| Laboratory Results | | | | | |
| Mercury Loading, ug | | | | | |
| Filterable | Hg-ug | FH-ug | < 0.1 | 0.144 | 0.125 |
| Back Half | Hg-ug | BH-ug | 7.27 | 6.86 | 7.89 |
| Calculated Data | | | | | |
| Filterable Mercury Concentration, ug/dscm | | | | | |
| ug/dscm = FHx ug / Vmstd-m3 | | | | | |
| Filterable | Hg | ug/dscm | < 0.039 | 0.057 | 0.049 |
| Back Half Mercury Concentration, ug/dscm | | | | | |
| ug/dscm = BH Tot-ug / Vmstd-m3 | | | | | |
| Filterable | Hg | ug/dscm | 2.86 | 2.73 | 3.12 |
| Total Mercury Concentration, ug/dscm | | | | | |
| Total ug/dscm = (FH Tot-ug + BH Tot-ug) / Vmstd m3 x 0.001 | | | | | |
| Filterable | Hg | ug/dscm | 2.90 | 2.79 | 3.17 |
| Front Half Mercury Emission Rate, lb/hr | | | | | |
| Metal-E = tot ug x 2.2046e-9/vstd ft3 x Qd x 60 | | | | | |
| Filterable | Hg | lb/hr | < 0.000066 | 0.000095 | 0.000082 |
| Back Half Mercury Emission Rate, lb/hr | | | | | |
| Metal-E = tot ug x 2.2046e-9/vstd ft3 x Qd x 60 | | | | | |
| Filterable | Hg | lb/hr | 0.0048 | 0.0045 | 0.0052 |
| Total Mercury Emission Rate, lb/hr | | | | | |
| Metal-E = Front half lb/hr + Back Half lb/hr | | | | | |
| Filterable | Hg | lb/hr | 0.0049 | 0.0046 | 0.0053 |

Determination of Volumetric Air Flow Rate, Gas Composition, Moisture Content, Meter Volume and Isokinetic Sampling
EPA Methods 2, 3, 4 and Isokinetics by Method
Line 6 Waste Gas Stack (SV144)

| Input Data | Symbol | Units | Run 1 | Run 2 | Run 3 |
|---|-----------------------|----------------------|-------------|-------------|-------------|
| Test Date | - | - | 4/30/2020 | 4/30/2020 | 4/30/2020 |
| Test Period | - | - | 0744 - 0950 | 1002 - 1209 | 1221 - 1429 |
| Number of Sample Ports | - | - | 4 | 4 | 4 |
| Number of Traverse Points | - | - | 24 | 24 | 24 |
| Duct Dimensions (diameter or Length x Width) | D, L X W | inches | 192.00 | 192.00 | 192.00 |
| Barometric Pressure | Pbar | in. Hg | 28.10 | 28.10 | 28.10 |
| Stack Static Pressure | Pg | in. H ₂ O | -0.31 | -0.31 | -0.31 |
| Average Stack Temperature | Tsf | degrees F | 111 | 112 | 112 |
| Actual Dry Gas Meter Volume | Vm | cubic feet | 87.74 | 90.34 | 90.44 |
| Dry Gas Meter Calibration Factor | Y | - | 0.9805 | 0.9805 | 0.9805 |
| Average Orifice Meter Pressure Drop | DH | in H ₂ O | 1.82 | 1.90 | 1.89 |
| Average Meter Temperature | Tmf | degrees F | 65 | 73 | 74 |
| Pitot Tube Coefficient | Cp | - | 0.84 | 0.84 | 0.84 |
| Average Square Root of Velocity Head | (DP) ^{0.5} | - | 0.673 | 0.686 | 0.685 |
| Mass of Water Vapor Condensed in Impingers | Vwc | g | 183 | 197 | 198 |
| Mass of Water Vapor Collected in Desiccant | Vwsg | g | 27 | 25 | 23 |
| Orsat Results, Dry Basis | | | | | |
| Oxygen | %O ₂ | %v/v | 17.5 | 17.4 | 17.2 |
| Carbon Dioxide | %CO ₂ | %v/v | 2.8 | 2.9 | 3.0 |
| Nitrogen + Carbon Monoxide | %N ₂ + %CO | %v/v | 79.7 | 79.7 | 79.8 |
| Nozzle Diameter | Dn | inches | 0.254 | 0.254 | 0.254 |
| Run Time | theta | minutes | 120 | 120 | 120 |
| | | | | | |
| Calculated Data | Symbol | Units | Run 1 | Run 2 | Run 3 |
| Average Absolute Stack Temperature Tsr = Tsf + 460 | Tsr | degrees R | 571 | 572 | 572 |
| Stack Pressure Ps = Pbar + Pg / 13.6 | Ps | in. Hg | 28.08 | 28.08 | 28.08 |
| Duct Area A = PI x D ² / (4 x 144) or A = L x W / 144 | A | Sq. ft | 201.062 | 201.062 | 201.062 |
| Meter Volume at Standard Conditions Vmstd = 17.64 x Vm x Y x ((Pbar + (DH / 13.6)) / (Tmf + 460)) | Vmstd-ft3 | cubic feet | 81.55 | 82.77 | 82.70 |
| Meter Volume at Standard Conditions Vmstd-m3 = Vmstd-ft3 x 0.02832 | Vmstd-m3 | cubic meter | 2.31 | 2.34 | 2.34 |
| Average Moisture Content of Stack Gas MC = ((0.04175 x Vwc + 0.04715 x Vwsg) / ((0.04715 x Vwc + 0.04715 x Vwsg) + (Vmstd))) x 100 | MC | % Vol | 9.57 | 9.75 | 9.76 |
| | | | see note | see note | see note |
| Molecular Weight of Stack Gas, dry Md = (0.44 x %CO ₂) + (0.32 x %O ₂) + (0.28 x (%N ₂ + %CO)) | Md | lb/lbmol | 29.15 | 29.16 | 29.17 |
| Molecular Weight of Stack Gas, wet Ms = Md x (1-(MC/100))+18 x (MC/100) | Ms | lb/lbmol | 28.08 | 28.07 | 28.08 |
| Average Stack Gas Velocity Vs = 85.49 x Cp x (dP) ^{0.5} x ((Tsr/(Ps x Ms)) ^{0.5}) | Vs | ft/sec | 41.13 | 41.99 | 41.92 |
| Actual Volumetric Air Flow Rate Qa = 60 x Vs x A | Qa | acfm | 496,186 | 506,613 | 505,719 |
| Volumetric Air Flow Rate at Standard Conditions Qs = Qa x (528 / (Ts + 460)) x (Ps / 29.92) | Qs | scfm | 430,310 | 438,872 | 438,066 |
| Dry Volumetric Air Flow Rate at Standard Conditions Qd = Qa x (1 - (MC / 100)) x (528 / Tsr) x (Ps / 29.92) | Qd | dscfm | 389,120 | 396,103 | 395,324 |
| Nozzle Cross-Sectional Area An = (3.14 x Dn ²) / (4 x 144) | An | sq. ft | 0.000352 | 0.000352 | 0.000352 |
| Isokinetic Variation I = (0.0945 x Tsr x Vmstd) / (Ps x Vs x An x theta x (1 - (MC / 100))) | I | % | 99.9 | 99.6 | 99.7 |

Note: Moisture Content limited to moisture at saturation

EPA Method 29 Mercury Calculation Summary
Determination of Mercury Emissions
EPA Method 29

Line 6 Waste Gas Stack (SV144)

| Input Data | Symbol | Units | Run 1 | Run 2 | Run 3 |
|--|-----------|-------------|-------------|-------------|-------------|
| Test Date | - | - | 4/30/2020 | 4/30/2020 | 4/30/2020 |
| Test Period | - | - | 0744 - 0950 | 1002 - 1209 | 1221 - 1429 |
| Run Time | theta | min | 120 | 120 | 120 |
| Meter Volume at Standard Conditions Vmstd | Vmstd-ft3 | cubic feet | 81.55 | 82.77 | 82.70 |
| Meter Volume at Standard Conditions Vmstd | Vmstd-m3 | cubic meter | 2.31 | 2.34 | 2.34 |
| Conditions (M2,M4, ISO Calcs) | Qd | DSCFM | 389,120 | 396,103 | 395,324 |
| Mercury Loading, ug | | | | | |
| Filterable | Hg-ug | FH-ug | 0.169 | < 0.1 | < 0.1 |
| Back Half | Hg-ug | BH-ug | 6.78 | 7.54 | 7.80 |
| Calculated Data | Symbol | Units | Run 1 | Run 2 | Run 3 |
| Filterable Mercury Concentration, ug/dscm | | | | | |
| ug/dscm = FHx ug / Vmstd-m3 | | | | | |
| Filterable | Hg | ug/dscm | 0.073 | < 0.043 | < 0.043 |
| Back Half Mercury Concentration, ug/dscm | | | | | |
| ug/dscm = BH Tot-ug / Vmstd-m3 | | | | | |
| Filterable | Hg | ug/dscm | 2.94 | 3.22 | 3.33 |
| Total Mercury Concentration, ug/dscm | | | | | |
| Total ug/dscm = (FH Tot-ug + BH Tot-ug) / Vmstd m3 x 0.001 | | | | | |
| Filterable | Hg | ug/dscm | 3.01 | 3.26 | 3.37 |
| Front Half Mercury Emission Rate, lb/hr | | | | | |
| Metal-E = tot ug x 2.2046e-9/vstd ft3 x Qd x 60 | | | | | |
| Filterable | Hg | lb/hr | 0.00011 | < 0.000063 | < 0.000063 |
| Back Half Mercury Emission Rate, lb/hr | | | | | |
| Metal-E = tot ug x 2.2046e-9/vstd ft3 x Qd x 60 | | | | | |
| Filterable | Hg | lb/hr | 0.0043 | 0.0048 | 0.0049 |
| Total Mercury Emission Rate, lb/hr | | | | | |
| Metal-E = Front half lb/hr + Back Half lb/hr | | | | | |
| Filterable | Hg | lb/hr | 0.0044 | 0.0048 | 0.0050 |

Appendix B

Field Data Sheets



EPA METHOD 2 FIELD DATA SHEET

Project Minn Inc
Sample Location L3 WUS JUIO3
Date 4-28-2020
Operators 0521msn/tak
Duct Dimensions 125 inches
Port Length 7 inches
Pitot Tube No. 4-3 Cp 0.8X
Manometer ID C-14 Bar. ID 0A-16
Digital Therm ID C-14 T.C. ID 4-3

| | Run 1 | Run 2 | Run 3 | Run 4 |
|-----------------------------------|--------------|-------|-------|-------|
| Bar Press (In Hg) | <u>28.20</u> | | | |
| Stat. Press (In H ₂ O) | <u>-0.15</u> | | | |
| Temp - Dry Bulb °F | | | | |
| Temp - Wet Bulb °F | | | | |
| Moist Content - % | | | | |
| O ₂ % | | | | |
| Time of Meas. | | | | |

Pitot Leak Check Positive: OK Negative: OK

| Traverse Point Information | | | Cyclonic Flow ∠° | Velocity Head - Inches H ₂ O | | | | Stack Temperature - °F | | | |
|----------------------------|--------------|-------|------------------------|---|-------|-------|-------|------------------------|-------|-------|-------|
| Point Number | Inches From: | | | Run 1 | Run 2 | Run 3 | Run 4 | Run 1 | Run 2 | Run 3 | Run 4 |
| | Wall | Port | | ΔP | ΔP | ΔP | ΔP | Temp. | Temp. | Temp. | Temp. |
| A-1 | 2.66 | 9.66 | | | | | | | | | |
| 2 | 8.37 | 15.37 | | | | | | | | | |
| 3 | 14.76 | 21.76 | | | | | | | | | |
| 4 | 22.16 | 29.16 | | | | | | | | | |
| 5 | 31.25 | 38.25 | | | | | | | | | |
| 6 | 44.41 | 51.41 | | | | | | | | | |
| B-1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| C-1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| D-1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |



Schematic of Duct Cross-Section

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---------------------|-------|-------|-------|-------|
| Stack Pres. - In Hg | | | | |
| Duct Area - Sq Ft. | | | | |
| Mole Weight - Md | | | | |
| Mole Weight - Ms | | | | |
| Avg. Temp. - °F | | | | |
| Average √ΔP | | | | |
| Gas Vel - Ft/Sec | | | | |
| ACFM | | | | |
| SCFM | | | | |
| DSCFM | | | | |



EPA METHOD 29
FIELD DATA SHEET

Project Minutec Meter ID C-14 Probe ID Y-3 Bar. Pres 28.0 in Hg
Smpl Loc 23 WWS SUR Meter Y 0.9805 Pitot No. Y-3 Stat. Pres -0.45 in H₂O
Test No. 1 Run 1 Orifice H@ 2.029Y Pitot Cp 0.8Y Probe Lgth 4 ft
Date 4-28-20 Operators DDK/MSJ/TWK Liner Type: ☒ Glass ☐ S.S. ☐ Other — Imp TC 09450

| Sample Train Leak Rate (cfm) | | |
|------------------------------|---------------|---------------------|
| Pretest | <u>0.5</u> | at <u>1.0</u> in Hg |
| Posttest | <u>0.5</u> | at <u>1.6</u> in Hg |
| Pitot (3 in.) | Pos. <u>A</u> | Neg. <u>B</u> |

| Sample Point | Sample Time Δt | Meter Volume Vm, ft ³ | Velocity ΔP , in H ₂ O | Orifice ΔH , in H ₂ O | Sample Vacuum, in Hg | Stack Temp. Ts, °F | Sample Train Temperatures, °F | | | | | Oxygen Content, % |
|-----------------------|------------------------|----------------------------------|---|--|----------------------|----------------------|-------------------------------|--------|-----------------|-------------|---------------------|-------------------|
| | | | | | | | Probe | Filter | Impinger Outlet | Meter Inlet | Meter Outlet | |
| A-6 | 0758 | 415.19 | | | | | | | | | | |
| 5 | 5 | 418.51 | 0.85 | 1.64 | 9 | 120 | 254 | 755 | 48 | 45 | 45 | 17.2 |
| 9 | 10 | 422.18 | 0.93 | 1.87 | 10 | 121 | 250 | 257 | 49 | 45 | 45 | |
| 3 | 15 | 425.67 | 0.92 | 1.89 | 11 | 121 | 250 | 251 | 49 | 45 | 45 | |
| 2 | 20 | 429.51 | 1.15 | 2.12 | 12 | 121 | 251 | 252 | 50 | 45 | 45 | |
| 1 | 25 | 433.12 | 0.94 | 1.81 | 10 | 121 | 251 | 254 | 51 | 45 | 45 | |
| B-6 | 30 | 436.88 | 0.85 | 1.64 | 9 | 121 | 250 | 251 | 52 | 45 | 45 | |
| 5 | 35 | 439.80 | 0.63 | 1.22 | 7 | 121 | 250 | 251 | 56 | 46 | 46 | |
| 9 | 40 | 442.76 | 0.61 | 1.18 | 7 | 120 | 250 | 249 | 57 | 46 | 46 | |
| 3 | 45 | 445.76 | 0.65 | 1.26 | 7.5 | 121 | 250 | 251 | 57 | 46 | 46 | |
| 2 | 50 | 448.77 | 0.69 | 1.33 | 7.5 | 122 | 250 | 251 | 57 | 46 | 46 | |
| 1 | 55 | 451.86 | 0.70 | 1.35 | 7.5 | 121 | 250 | 251 | 58 | 47 | 47 | |
| C-6 | 60 | 454.93 | 0.70 | 1.36 | 7.5 | 121 | 250 | 251 | 59 | 47 | 47 | |
| 5 | 65 | 457.90 | 0.71 | 1.38 | 8.0 | 121 | 251 | 252 | 58 | 47 | 47 | |
| 9 | 70 | 461.21 | 0.80 | 1.54 | 9.0 | 123 | 250 | 252 | 60 | 48 | 48 | |
| 3 | 75 | 464.55 | 0.82 | 1.59 | 10.0 | 122 | 251 | 254 | 61 | 48 | 48 | |
| 2 | 80 | 468.11 | 0.87 | 1.64 | 11.0 | 121 | 250 | 257 | 63 | 48 | 48 | |
| 1 | 85 | 471.72 | 0.88 | 1.71 | 12 | 122 | 250 | 259 | 64 | 49 | 49 | |
| D-6 | 90 | 475.31 | 0.85 | 1.65 | 11.5 | 122 | 250 | 251 | 62 | 49 | 49 | |
| 5 | 95 | 478.85 | 0.86 | 1.67 | 11.0 | 121 | 250 | 251 | 57 | 49 | 49 | |
| 9 | 100 | 482.23 | 0.89 | 1.73 | 11.5 | 121 | 250 | 251 | 55 | 50 | 50 | |
| 3 | 105 | 486.05 | 1.00 | 1.95 | 12.0 | 122 | 250 | 251 | 52 | 50 | 50 | |
| 2 | 110 | 490.00 | 1.10 | 2.14 | 13.0 | 122 | 250 | 251 | 52 | 50 | 50 | |
| 1 | 115 | 493.90 | 1.10 | 2.14 | 13.0 | 121 | 250 | 251 | 52 | 50 | 50 | |
| | 120 | 497.72 | 0.98 | 1.91 | 13 | 120 | 250 | 251 | 53 | 51 | 51 | |
| $\bar{\theta} = 1003$ | | $V_m = 482.53$ | $\bar{\Delta P} = 0.85$ | $\bar{\Delta H} = 1.66$ | | $\bar{T}_s = 121.21$ | | | | | $\bar{T}_m = 47.42$ | |

| Initialization Values | | | Test Run Times | | ORSAT System | | | Sample Train Components | | | Nozzle Calibration | |
|-----------------------|----------------|------------------|----------------|----------|--------------|---------|----------------------|-------------------------|------------|-----------|--------------------|-------|
| Meter Temp | Oxygen Content | Moisture Content | Start Time | End Time | Bag No. | Bag Vol | cc/min * at 15 in Hg | Filter No. | Nozzle No. | Nozzle Dn | Tech. | Date |
| Run 1 | 45 | 17.2 | 12 | 0858 | 1003 | 1 | 25 | 0.218 | 9-218 | 0.218 | JMK | 4-28 |
| Run 2 | | | | | | | | | | | | |
| | | | | | | | | | | | Avg. in. | 0.218 |

Moisture Recovery Data: AND/H₂O AND/H₂O Empty Runway Runway

| Impinger | 1 | 2 | 3 | 4 | 5 | 6 | Desiccant | Total |
|----------------|-------|-------|-------|-------|-------|---|-----------|-------|
| Final wt., g | 906.4 | 804.4 | 662.5 | 757.2 | 765.0 | | 1003.8 | |
| Initial wt., g | 751.9 | 743.8 | 651.9 | 752.7 | 764.7 | | 982 | |
| Difference | 155.9 | 60.6 | 10.6 | 4.5 | 0.3 | | 21.8 | 253.7 |

| Air Flows | |
|-----------|---------|
| ACFM | DSCFM |
| 292,961 | 217,194 |



EPA METHOD 29
FIELD DATA SHEET

Project Minter Meter ID C-14 Probe ID 4-3 Bar. Pres 28.00 in Hg
Smpl Loc 23 WWS Meter Y 0.9805 Pitot No. 4-3 Stat. Pres -0.05 in H₂O
Test No. 1 Run 2 Orifice H@ 2.0294 Pitot Cp 0.84 Probe Lgth 4 ft
Date 4-28-2 Operators OSTR/MJN/TAK Liner Type: ☒ Glass ☐ S.S. ☐ Other - Imp TC 89450

| Sample Train Leak Rate (cfm) | | |
|------------------------------|-----------------------------|-------|
| Pretest | <u>0.0</u> at <u>10</u> | in Hg |
| Posttest | <u>0.0</u> at <u>8</u> | in Hg |
| Pitot (3 in.) | Pos. <u>5</u> Neg. <u>4</u> | |

| Sample Point | Sample Time Δt | Meter Volume Vm, ft ³ | Velocity ΔP , in H ₂ O | Orifice ΔH , in H ₂ O | Sample Vacuum, in Hg | Stack Temp. Ts, °F | Sample Train Temperatures, °F | | | | | Oxygen Content, % |
|--------------|------------------------|----------------------------------|---|--|----------------------|--------------------|-------------------------------|--------|-----------------|---------------|--------------|-------------------|
| | | | | | | | Probe | Filter | Impinger Outlet | Meter Inlet | Meter Outlet | |
| A-6 | 5 | 501.62 | 0.83 | 1.60 | 3.0 | 121 | 251 | 252 | 46 | 51 | 51 | |
| 5 | 10 | 505.21 | 0.92 | 1.37 | 3.0 | 121 | 250 | 253 | 46 | 51 | 51 | |
| 4 | 15 | 509.82 | 0.99 | 1.90 | 3.5 | 122 | 250 | 251 | 45 | 52 | 52 | |
| 3 | 20 | 513.22 | 1.10 | 2.12 | 3.5 | 122 | 250 | 250 | 46 | 52 | 52 | |
| 2 | 25 | 517.08 | 1.15 | 2.22 | 3.5 | 121 | 250 | 250 | 48 | 52 | 52 | |
| 1 | 30 | 520.94 | 1.00 | 1.93 | 3.5 | 121 | 251 | 251 | 51 | 53 | 53 | |
| B-6 | 35 | 524.17 | 0.77 | 1.44 | 3.0 | 121 | 250 | 250 | 53 | 54 | 54 | |
| 5 | 40 | 527.35 | 0.78 | 1.51 | 3.0 | 121 | 249 | 250 | 53 | 55 | 55 | |
| 4 | 45 | 530.72 | 0.77 | 1.50 | 2.5 | 121 | 250 | 251 | 52 | 55 | 55 | |
| 3 | 50 | 534.26 | 0.89 | 1.73 | 3.0 | 121 | 249 | 249 | 53 | 56 | 56 | |
| 2 | 55 | 537.91 | 0.84 | 1.63 | 3.0 | 121 | 250 | 251 | 54 | 56 | 56 | |
| 1 | 60 | 541.08 | 0.83 | 1.61 | 3.0 | 122 | 250 | 251 | 55 | 57 | 57 | |
| C-6 | 65 | 544.28 | 0.67 | 1.31 | 2.5 | 121 | 250 | 251 | 55 | 57 | 57 | |
| 5 | 70 | 547.17 | 0.61 | 1.19 | 2.5 | 121 | 250 | 251 | 55 | 58 | 58 | |
| 4 | 75 | 550.35 | 0.59 | 1.15 | 2.0 | 121 | 251 | 251 | 54 | 58 | 58 | |
| 3 | 80 | 552.94 | 0.62 | 1.21 | 2.5 | 121 | 250 | 251 | 56 | 59 | 59 | |
| 2 | 85 | 556.00 | 0.65 | 1.27 | 2.5 | 121 | 250 | 251 | 59 | 59 | 59 | |
| 1 | 90 | 558.96 | 0.67 | 1.31 | 2.5 | 122 | 250 | 251 | 59 | 59 | 59 | |
| D-6 | 95 | 562.51 | 0.87 | 1.70 | 3.5 | 122 | 251 | 250 | 61 | 60 | 60 | |
| 5 | 100 | 566.37 | 0.94 | 1.92 | 4.0 | 121 | 250 | 251 | 63 | 60 | 60 | |
| 4 | 105 | 570.04 | 0.95 | 1.87 | 4.0 | 120 | 250 | 251 | 64 | 60 | 60 | |
| 3 | 110 | 573.66 | 0.98 | 1.92 | 4.0 | 121 | 250 | 251 | 65 | 60 | 60 | |
| 2 | 115 | 577.14 | 0.96 | 1.88 | 4.0 | 122 | 249 | 251 | 61 | 60 | 60 | |
| 1 | 120 | 581.04 | 0.90 | 1.77 | 3.5 | 121 | 251 | 250 | 58 | 59 | 59 | |
| $\bar{t} =$ | | $V_m = 2.98$ | $\Delta H = 0.85$ | $\Delta H = 1.65$ | | $T_s = 121$ | | | | $T_m = 56.38$ | | |

| Initialization Values | | | Test Run Times | | ORSAT System | | | Sample Train Components | | | Nozzle Calibration | |
|-----------------------|----------------|------------------|----------------|----------|--------------|---------|----------------------|-------------------------|------------|-----------|--------------------|------|
| Meter Temp | Oxygen Content | Moisture Content | Start Time | End Time | Bag No. | Bag Vol | cc/min * at 15 in Hg | Filter No. | Nozzle No. | Nozzle Dn | Tech. | Date |
| Run 1 | 15 | 17.2 | 1016 | 1221 | 2 | 25 | 20.0 | 42012 | 6-218 | 0.218 | 1 | |
| Run 2 | | | | | | | | | | | 2 | |
| | | | | | | | | | | | 3 | |
| | | | | | | | | | | | Avg. in. | |

Moisture Recovery Data:

| Impinger | 2 | 3 | 4 | 5 | 6 | Desiccant | Total |
|----------------|-------|-------|-------|-------|-------|-----------|-------|
| Final wt., g | 846.8 | 847.5 | 662.2 | 775.9 | 762.0 | X | 970.8 |
| Initial wt., g | 780.9 | 759.1 | 652.2 | 768.7 | 759.3 | X | 950.9 |
| Difference | 127.1 | 88.4 | 10.0 | 7.2 | 2.7 | X | 259.4 |

| Air Flows | |
|-----------|---------|
| ACFM | DSCFM |
| 291.311 | 215.970 |



EPA METHOD 29
FIELD DATA SHEET

Project Mining Meter ID C-14 Probe ID Y-3 Bar. Pres 28.00 in Hg
Smpl Loc L3 WRS 5U103 Meter Y 0.9805 Pitot No. Y-3 Stat. Pres 10.45 in H₂O
Test No. 1 Run 3 Orifice H@ 2.0294 Pitot Cp 0.84 Probe Lgth 4 ft
Date 4-28-20 Operators OSK/MSN/TAK Liner Type: ☒ Glass ☐ S.S. ☐ Other — Imp TC 60940

| Sample Train Leak Rate (cfm) | | |
|------------------------------|---------------|--------------------|
| Pretest | <u>0.0</u> | at <u>10</u> in Hg |
| Posttest | <u>0.0</u> | at <u>7</u> in Hg |
| Pitot (3 in.) | Pos. <u>X</u> | Neg. <u>Y</u> |

| Sample Point | Sample Time Δt | Meter Volume V_m , ft ³ | Velocity ΔP , in H ₂ O | Orifice ΔH , in H ₂ O | Sample Vacuum, in Hg | Stack Temp. T_s , °F | Sample Train Temperatures, °F | | | | | Oxygen Content, % |
|------------------|------------------------|--------------------------------------|---|--|----------------------|------------------------|-------------------------------|--------|-----------------|-------------|--------------|-------------------|
| | | | | | | | Probe | Filter | Impinger Outlet | Meter Inlet | Meter Outlet | |
| A-6 | 1238 | 581.31 | | | | | | | | | | |
| 5 | 5 | 584.82 | 0.84 | 1.64 | 3.0 | 121 | 248 | 250 | 51 | 57 | 57 | |
| Y | 10 | 588.46 | 0.98 | 1.98 | 3.5 | 121 | 250 | 252 | 49 | 57 | 57 | |
| 3 | 15 | 592.44 | 1.10 | 2.19 | 3.5 | 122 | 250 | 250 | 48 | 57 | 57 | |
| 2 | 20 | 596.42 | 1.10 | 2.19 | 3.5 | 121 | 250 | 251 | 51 | 57 | 57 | |
| 1 | 25 | 600.20 | 0.97 | 1.89 | 3.5 | 121 | 251 | 254 | 53 | 57 | 57 | |
| B-6 | 30 | 603.73 | 0.89 | 1.74 | 3.0 | 120 | 250 | 251 | 54 | 57 | 57 | |
| 5 | 35 | 606.64 | 0.62 | 1.21 | 2.5 | 121 | 249 | 252 | 55 | 57 | 57 | |
| Y | 40 | 609.62 | 0.59 | 1.15 | 2.5 | 121 | 251 | 252 | 54 | 57 | 57 | |
| 3 | 45 | 612.41 | 0.61 | 1.19 | 2.5 | 121 | 250 | 251 | 53 | 58 | 58 | |
| 2 | 50 | 615.34 | 0.63 | 1.23 | 2.5 | 121 | 250 | 251 | 54 | 58 | 58 | |
| 1 | 55 | 618.47 | 0.66 | 1.29 | 2.5 | 121 | 250 | 251 | 54 | 58 | 58 | |
| C-6 | 60 | 621.55 | 0.65 | 1.27 | 2.5 | 121 | 251 | 250 | 54 | 58 | 58 | |
| 5 | 65 | 624.66 | 0.69 | 1.35 | 2.5 | 121 | 250 | 251 | 54 | 58 | 58 | |
| Y | 70 | 627.84 | 0.74 | 1.44 | 3.0 | 122 | 250 | 251 | 53 | 58 | 58 | |
| 3 | 75 | 631.24 | 0.79 | 1.54 | 3.0 | 122 | 249 | 250 | 53 | 58 | 58 | |
| 2 | 80 | 634.73 | 0.86 | 1.68 | 3.5 | 121 | 250 | 251 | 55 | 59 | 59 | |
| 1 | 85 | 638.18 | 0.86 | 1.68 | 3.5 | 121 | 254 | 257 | 56 | 59 | 59 | |
| D-6 | 90 | 641.72 | 0.83 | 1.62 | 3.5 | 121 | 250 | 251 | 57 | 59 | 59 | |
| 5 | 95 | 645.32 | 0.89 | 1.74 | 3.5 | 121 | 251 | 254 | 58 | 60 | 60 | |
| Y | 100 | 649.16 | 1.00 | 1.96 | 4.0 | 121 | 250 | 251 | 60 | 60 | 60 | |
| 3 | 105 | 653.15 | 1.05 | 2.06 | 4.5 | 120 | 249 | 249 | 61 | 60 | 60 | |
| 2 | 110 | 657.24 | 1.15 | 2.26 | 4.5 | 121 | 250 | 249 | 63 | 60 | 60 | |
| 1 | 115 | 661.52 | 1.20 | 2.38 | 5.0 | 121 | 251 | 250 | 65 | 60 | 60 | |
| | 120 | 665.47 | 1.10 | 2.16 | 4.5 | 120 | 250 | 251 | 65 | 61 | 61 | |
| $\bar{\theta} =$ | | $V_m =$ | $\Delta H =$ | $\Delta H =$ | | $T_s =$ | | | | | $T_m =$ | |
| | | 84.16 | 0.87 | 1.67 | | 121 | | | | | 58.8 | |

| Initialization Values | | | Test Run Times | | ORSAT System | | | Sample Train Components | | | Nozzle Calibration | |
|-----------------------|----------------|------------------|----------------|----------|--------------|---------|----------------------|-------------------------|------------|-----------|--------------------|------|
| Meter Temp | Oxygen Content | Moisture Content | Start Time | End Time | Bag No. | Bag Vol | cc/min * at 15 in Hg | Filter No. | Nozzle No. | Nozzle Dn | Tech. | Date |
| Run 1 | 58 | 12.7 | 1238 | 1442 | 3 | 25 | 0.0 | Quartz | 6-218 | 0.218 | 1 | |
| Run 2 | | | | | | | | | | | 2 | |
| | | | | | | | | | | | 3 | |
| | | | | | | | | | | | Avg. in. | |

Moisture Recovery Data: H₂O₃/H₂O₂ H₂O₃/H₂O₂ Empty kmvny kmvny X

| Impinger | 1 | 2 | 3 | 4 | 5 | 6 | Desiccant | Total |
|----------------|-------|-------|-------|-------|-------|---|-----------|-------|
| Final wt., g | 410.0 | 808.5 | 659.6 | 760.7 | 769.6 | X | 975.5 | |
| Initial wt., g | 754.9 | 746.8 | 654.4 | 756.6 | 768.6 | X | 953.0 | |
| Difference | 772.7 | 661.7 | 5.2 | 4.1 | 1.0 | X | 22.5 | 266.6 |

103.1 at RMP 5-27-20

* 257.6

| Air Flows | |
|-----------|---------|
| ACFM | DSCFM |
| 294.149 | 219.304 |



EPA Method 29 - Field Data Sheet - Run 1

| | | | | | | | | | | |
|-----------------|------------------------------|-------------|--------|----------------|-------|-------------|----------|---------|-------------------------------|--------------------|
| Project | U.S. Steel Corporation | Meter ID | C-14 | Probe ID | 4-3 | Bar.Press. | 28.00 | in. Hg | Sample Train Leak | Rate, cfm: |
| Sample Location | Line 3 Waste Gas Stack SV103 | Meter Y | 0.9805 | Pitot Tube No. | 4-3 | Stat Press. | -0.5 | in. H2O | Pretest | 0.000 at 10 in. Hg |
| Date | 04/28/20 | Orifice dH@ | 2.0294 | Pitot Cp | 0.84 | CPM TC | NA | | Posttest | 0.000 at 16 in. Hg |
| Test | 1 | Run # | 1 | Liner Type: | Glass | IMP Out TC | TIO-8948 | | Pretest Pitot leak Check Pos | PASS @ >3" w.c |
| Operators | DJK /MJN | | | | | | | | Posttest Pitot leak Check Neg | PASS @ >3" w.c |

| Sample Point | Sample Time DT | Actual Meter Vol Vm, ft3 | Velocity Head DP, in. H2O | Orifice DH in. H2O | Ideal Point Volume Vm, ft3 | Ideal Meter Vol Vm, ft3 | Sample Train Vacuum in. Hg | Stack Temp Ts, °F | Sample Train Temperatures, °F | | | | | Moisture Content, % |
|--------------|----------------|--------------------------|---------------------------|--------------------|----------------------------|-------------------------|----------------------------|-------------------|-------------------------------|-------|-----------------|-------------|--------------|---------------------|
| | | | | | | | | | Filter | Probe | Impinger Outlet | Meter Inlet | Meter Outlet | |
| Start Time | 0758 | 415.19 | | | | | | | | | | | | |
| 1 | 5.0 | 418.51 | 0.850 | 1.64 | 3.46 | 418.65 | * | 120 | * | * | * | 45 | 45 | 12.0 |
| 2 | 10.0 | 422.18 | 0.970 | 1.87 | 3.69 | 422.33 | * | 121 | * | * | * | 45 | 45 | 12.0 |
| 3 | 15.0 | 425.67 | 0.980 | 1.89 | 3.71 | 426.04 | * | 121 | * | * | * | 45 | 45 | 12.0 |
| 4 | 20.0 | 429.51 | 1.100 | 2.12 | 3.92 | 429.96 | * | 121 | * | * | * | 45 | 45 | 12.0 |
| 5 | 25.0 | 433.22 | 0.940 | 1.81 | 3.63 | 433.59 | * | 121 | * | * | * | 45 | 45 | 12.0 |
| 6 | 30.0 | 436.88 | 0.850 | 1.64 | 3.45 | 437.05 | * | 121 | * | * | * | 46 | 46 | 12.0 |
| 7 | 35.0 | 439.80 | 0.630 | 1.22 | 2.98 | 440.03 | * | 121 | * | * | * | 46 | 46 | 12.0 |
| 8 | 40.0 | 442.76 | 0.610 | 1.18 | 2.94 | 442.96 | * | 120 | * | * | * | 46 | 46 | 12.0 |
| 9 | 45.0 | 445.76 | 0.650 | 1.26 | 3.03 | 445.99 | * | 121 | * | * | * | 46 | 46 | 12.0 |
| 10 | 50.0 | 448.77 | 0.690 | 1.33 | 3.12 | 449.11 | * | 122 | * | * | * | 46 | 46 | 12.0 |
| 11 | 55.0 | 451.86 | 0.700 | 1.35 | 3.14 | 452.25 | * | 121 | * | * | * | 47 | 47 | 12.0 |
| 12 | 60.0 | 454.93 | 0.700 | 1.36 | 3.15 | 455.40 | * | 121 | * | * | * | 47 | 47 | 12.0 |
| 13 | 65.0 | 457.90 | 0.710 | 1.38 | 3.17 | 458.57 | * | 121 | * | * | * | 47 | 47 | 12.0 |
| 14 | 70.0 | 461.21 | 0.800 | 1.54 | 3.36 | 461.93 | * | 123 | * | * | * | 48 | 48 | 12.0 |
| 15 | 75.0 | 464.55 | 0.820 | 1.59 | 3.41 | 465.34 | * | 122 | * | * | * | 48 | 48 | 12.0 |
| 16 | 80.0 | 468.11 | 0.870 | 1.69 | 3.51 | 468.85 | * | 121 | * | * | * | 48 | 48 | 12.0 |
| 17 | 85.0 | 471.72 | 0.880 | 1.71 | 3.53 | 472.39 | * | 122 | * | * | * | 49 | 49 | 12.0 |
| 18 | 90.0 | 475.31 | 0.850 | 1.65 | 3.48 | 475.86 | * | 122 | * | * | * | 49 | 49 | 12.0 |
| 19 | 95.0 | 478.85 | 0.860 | 1.67 | 3.50 | 479.36 | * | 121 | * | * | * | 49 | 49 | 12.0 |
| 20 | 100.0 | 482.23 | 0.890 | 1.73 | 3.56 | 482.92 | * | 121 | * | * | * | 50 | 50 | 12.0 |
| 21 | 105.0 | 486.05 | 1.000 | 1.95 | 3.78 | 486.70 | * | 122 | * | * | * | 50 | 50 | 12.0 |
| 22 | 110.0 | 490.00 | 1.100 | 2.14 | 3.96 | 490.66 | * | 122 | * | * | * | 50 | 50 | 12.0 |
| 23 | 115.0 | 493.90 | 1.100 | 2.14 | 3.96 | 494.62 | * | 121 | * | * | * | 50 | 50 | 12.0 |
| 24 | 120.0 | 497.72 | 0.980 | 1.91 | 3.75 | 498.37 | * | 120 | * | * | * | 51 | 51 | 12.0 |
| End Time | 1003 | | | | | | | | | | | | | |
| Run Time | 120 | | Avg DH= | 1.66 | | | Avg Ts= | 121.21 | | | | Avg Tm= | 47.42 | |

Integrated Gas Sampling Data :

Bag No. 1
Bag Vol. 25 liters
Leak Rate 0 cc/min

Filter No. Quartz
Nozzle No. G-218
Nozzle Dn. 0.218

MOISTURE RECOVERY DATA :

Impinger
Final wt., g
Initial wt., g
Difference

| 1 | 2 | 3 | 4 | 5 | Desiccant | Total | | |
|-------|-------|-------|-------|-------|-----------|-------|--|--|
| 906.8 | 804.4 | 662.5 | 757.2 | 765.0 | 1003.8 | | | |
| 750.9 | 743.8 | 651.9 | 752.7 | 764.7 | 982.0 | | | |
| 155.9 | 60.6 | 10.6 | 4.5 | 0.3 | 21.8 | 253.7 | | |

* Data Recorded on Field Data Sheet



EPA Method 29 - Field Data Sheet - Run 2

| | | | | | | | | | | |
|-----------------|------------------------------|-------------|--------|----------------|-------|-------------|----------|---------|-------------------------------|--------------------|
| Project | U.S. Steel Corporation | Meter ID | C-14 | Probe ID | 4-3 | Bar.Press. | 28.00 | in. Hg | Sample Train Leak | Rate, cfm: |
| Sample Location | Line 3 Waste Gas Stack SV103 | Meter Y | 0.9805 | Pitot Tube No. | 4-3 | Stat Press. | -0.5 | in. H2O | Pretest | 0.000 at 10 in. Hg |
| Date | 04/28/20 | Orifice dH@ | 2.0294 | Pitot Cp | 0.84 | CPM TC | NA | | Posttest | 0.000 at 8 in. Hg |
| Test | 1 | Run # | 2 | Liner Type: | Glass | IMP Out TC | TIO-8948 | | Pretest Pitot leak Check Pos | PASS @ >3" w.c |
| Operators | DJK /MJN | | | | | | | | Posttest Pitot leak Check Neg | PASS @ >3" w.c |

| Sample Point | Sample Time DT | Actual Meter Vol Vm, ft3 | Velocity Head DP, in. H2O | Orifice DH in. H2O | Ideal Point Volume Vm, ft3 | Ideal Meter Vol Vm, ft3 | Sample Train Vacuum in. Hg | Stack Temp Ts, °F | Sample Train Temperatures, °F | | | | | Moisture Content, % |
|--------------|----------------|--------------------------|---------------------------|--------------------|----------------------------|-------------------------|----------------------------|-------------------|-------------------------------|-------|-----------------|-------------|--------------|---------------------|
| | | | | | | | | | Filter | Probe | Impinger Outlet | Meter Inlet | Meter Outlet | |
| Start Time | 1016 | 498.06 | | | | | | | | | | | | |
| 1 | 5.0 | 501.62 | 0.830 | 1.60 | 3.43 | 501.49 | * | 121 | * | * | * | 51 | 51 | 12.7 |
| 2 | 10.0 | 505.21 | 0.920 | 1.77 | 3.61 | 505.10 | * | 121 | * | * | * | 51 | 51 | 12.7 |
| 3 | 15.0 | 509.02 | 0.990 | 1.90 | 3.74 | 508.84 | * | 122 | * | * | * | 52 | 52 | 12.7 |
| 4 | 20.0 | 513.02 | 1.100 | 2.12 | 3.95 | 512.79 | * | 122 | * | * | * | 52 | 52 | 12.7 |
| 5 | 25.0 | 517.08 | 1.150 | 2.22 | 4.04 | 516.83 | * | 121 | * | * | * | 52 | 52 | 12.7 |
| 6 | 30.0 | 520.94 | 1.000 | 1.93 | 3.77 | 520.60 | * | 121 | * | * | * | 53 | 53 | 12.7 |
| 7 | 35.0 | 524.17 | 0.770 | 1.49 | 3.32 | 523.92 | * | 121 | * | * | * | 54 | 54 | 12.7 |
| 8 | 40.0 | 527.35 | 0.780 | 1.51 | 3.35 | 527.27 | * | 121 | * | * | * | 55 | 55 | 12.7 |
| 9 | 45.0 | 530.72 | 0.770 | 1.50 | 3.33 | 530.60 | * | 121 | * | * | * | 55 | 55 | 12.7 |
| 10 | 50.0 | 534.26 | 0.890 | 1.73 | 3.58 | 534.18 | * | 121 | * | * | * | 56 | 56 | 12.7 |
| 11 | 55.0 | 537.71 | 0.840 | 1.63 | 3.48 | 537.66 | * | 121 | * | * | * | 56 | 56 | 12.7 |
| 12 | 60.0 | 541.08 | 0.830 | 1.61 | 3.46 | 541.12 | * | 122 | * | * | * | 57 | 57 | 12.7 |
| 13 | 65.0 | 544.28 | 0.670 | 1.31 | 3.12 | 544.24 | * | 121 | * | * | * | 57 | 57 | 12.7 |
| 14 | 70.0 | 547.17 | 0.610 | 1.19 | 2.98 | 547.22 | * | 121 | * | * | * | 58 | 58 | 12.7 |
| 15 | 75.0 | 550.05 | 0.590 | 1.15 | 2.94 | 550.16 | * | 121 | * | * | * | 58 | 58 | 12.7 |
| 16 | 80.0 | 552.94 | 0.620 | 1.21 | 3.01 | 553.17 | * | 121 | * | * | * | 59 | 59 | 12.7 |
| 17 | 85.0 | 556.00 | 0.650 | 1.27 | 3.09 | 556.25 | * | 121 | * | * | * | 59 | 59 | 12.7 |
| 18 | 90.0 | 558.96 | 0.670 | 1.31 | 3.13 | 559.38 | * | 122 | * | * | * | 59 | 59 | 12.7 |
| 19 | 95.0 | 562.51 | 0.870 | 1.70 | 3.56 | 562.95 | * | 122 | * | * | * | 60 | 60 | 12.7 |
| 20 | 100.0 | 566.37 | 0.980 | 1.92 | 3.79 | 566.74 | * | 121 | * | * | * | 60 | 60 | 12.7 |
| 21 | 105.0 | 570.04 | 0.950 | 1.87 | 3.74 | 570.47 | * | 120 | * | * | * | 60 | 60 | 12.7 |
| 22 | 110.0 | 573.66 | 0.980 | 1.92 | 3.79 | 574.27 | * | 121 | * | * | * | 60 | 60 | 12.7 |
| 23 | 115.0 | 577.44 | 0.960 | 1.88 | 3.75 | 578.01 | * | 122 | * | * | * | 60 | 60 | 12.7 |
| 24 | 120.0 | 581.04 | 0.900 | 1.77 | 3.63 | 581.65 | * | 121 | * | * | * | 59 | 59 | 12.7 |
| End Time | 1221 | | | | | | | | | | | | | |
| Run Time | 120 | | Avg DH= | 1.65 | | | Avg Ts= | 121.21 | | | | Avg Tm= | 56.38 | |

Integrated Gas Sampling Data :

Bag No. 2
Bag Vol. 25 liters
Leak Rate 0 cc/min

Filter No. Quartz
Nozzle No. G-218
Nozzle Dn. 0.218

MOISTURE RECOVERY DATA :

Impinger
Final wt., g
Initial wt., g
Difference

| 1 | 2 | 3 | 4 | 5 | Desiccant | Total | | |
|-------|-------|-------|-------|-------|-----------|-------|--|--|
| 883.7 | 847.5 | 662.2 | 775.9 | 762.0 | 970.8 | | | |
| 756.3 | 759.1 | 652.2 | 768.7 | 759.3 | 950.9 | | | |
| 127.4 | 88.4 | 10.0 | 7.2 | 2.7 | 19.9 | 255.6 | | |

* Data Recorded on Field Data Sheet



EPA Method 29 - Field Data Sheet - Run 3

| | | | | | | | | | | | | |
|-----------------|------------------------------|-------|-------------|--------|----------------|-------|-------------|----------|---------|-------------------------------|-------|--------------|
| Project | U.S. Steel Corporation | | Meter ID | C-14 | Probe ID | 4-3 | Bar.Press. | 28.00 | in. Hg | Sample Train Leak Rate, cfm: | | |
| Sample Location | Line 3 Waste Gas Stack SV103 | | Meter Y | 0.9805 | Pitot Tube No. | 4-3 | Stat Press. | -0.5 | in. H2O | Pretest | 0.000 | at 10 in. Hg |
| Date | 04/28/20 | | Orifice dH@ | 2.0294 | Pitot Cp | 0.84 | CPM TC | NA | | Posttest | 0.000 | at 7 in. Hg |
| Test | 1 | Run # | 3 | | Liner Type: | Glass | IMP Out TC | TIO-8948 | | Pretest Pitot leak Check Pos | PASS | @ >3" w.c |
| Operators | DJK /MJN | | | | | | | | | Posttest Pitot leak Check Neg | PASS | @ >3" w.c |

| Sample Point | Sample Time DT | Actual Meter Vol Vm, ft3 | Velocity Head DP, in. H2O | Orifice DH in. H2O | Ideal Point Volume Vm, ft3 | Ideal Meter Vol Vm, ft3 | Sample Train Vacuum in. Hg | Stack Temp Ts, °F | Sample Train Temperatures, °F | | | | | Moisture Content, % |
|--------------|----------------|--------------------------|---------------------------|--------------------|----------------------------|-------------------------|----------------------------|-------------------|-------------------------------|-------|-----------------|-------------|--------------|---------------------|
| | | | | | | | | | Filter | Probe | Impinger Outlet | Meter Inlet | Meter Outlet | |
| Start Time | 1238 | 581.31 | | | | | | | | | | | | |
| 1 | 5.0 | 584.80 | 0.840 | 1.64 | 3.50 | 584.81 | * | 121 | * | * | * | 57 | 57 | 12.7 |
| 2 | 10.0 | 588.46 | 0.980 | 1.91 | 3.77 | 588.58 | * | 121 | * | * | * | 57 | 57 | 12.7 |
| 3 | 15.0 | 592.44 | 1.100 | 2.14 | 3.99 | 592.57 | * | 122 | * | * | * | 57 | 57 | 12.7 |
| 4 | 20.0 | 596.42 | 1.100 | 2.14 | 3.99 | 596.56 | * | 121 | * | * | * | 57 | 57 | 12.7 |
| 5 | 25.0 | 600.20 | 0.970 | 1.89 | 3.75 | 600.31 | * | 121 | * | * | * | 57 | 57 | 12.7 |
| 6 | 30.0 | 603.73 | 0.890 | 1.74 | 3.60 | 603.91 | * | 120 | * | * | * | 57 | 57 | 12.7 |
| 7 | 35.0 | 606.68 | 0.620 | 1.21 | 3.00 | 606.91 | * | 121 | * | * | * | 57 | 57 | 12.7 |
| 8 | 40.0 | 609.62 | 0.590 | 1.15 | 2.93 | 609.84 | * | 121 | * | * | * | 57 | 57 | 12.7 |
| 9 | 45.0 | 612.41 | 0.610 | 1.19 | 2.98 | 612.82 | * | 121 | * | * | * | 58 | 58 | 12.7 |
| 10 | 50.0 | 615.34 | 0.630 | 1.23 | 3.03 | 615.85 | * | 121 | * | * | * | 58 | 58 | 12.7 |
| 11 | 55.0 | 618.47 | 0.660 | 1.29 | 3.10 | 618.96 | * | 121 | * | * | * | 58 | 58 | 12.7 |
| 12 | 60.0 | 621.55 | 0.650 | 1.27 | 3.08 | 622.04 | * | 121 | * | * | * | 58 | 58 | 12.7 |
| 13 | 65.0 | 624.66 | 0.690 | 1.35 | 3.17 | 625.21 | * | 121 | * | * | * | 58 | 58 | 12.7 |
| 14 | 70.0 | 627.84 | 0.740 | 1.44 | 3.28 | 628.49 | * | 122 | * | * | * | 58 | 58 | 12.7 |
| 15 | 75.0 | 631.24 | 0.790 | 1.54 | 3.39 | 631.89 | * | 122 | * | * | * | 58 | 58 | 12.7 |
| 16 | 80.0 | 634.73 | 0.860 | 1.68 | 3.54 | 635.43 | * | 121 | * | * | * | 59 | 59 | 12.7 |
| 17 | 85.0 | 638.18 | 0.860 | 1.68 | 3.55 | 638.97 | * | 121 | * | * | * | 59 | 59 | 12.7 |
| 18 | 90.0 | 641.72 | 0.830 | 1.62 | 3.49 | 642.46 | * | 121 | * | * | * | 59 | 59 | 12.7 |
| 19 | 95.0 | 645.32 | 0.890 | 1.74 | 3.61 | 646.07 | * | 121 | * | * | * | 60 | 60 | 12.7 |
| 20 | 100.0 | 649.16 | 1.000 | 1.96 | 3.83 | 649.90 | * | 121 | * | * | * | 60 | 60 | 12.7 |
| 21 | 105.0 | 653.15 | 1.050 | 2.06 | 3.93 | 653.82 | * | 120 | * | * | * | 60 | 60 | 12.7 |
| 22 | 110.0 | 657.24 | 1.150 | 2.26 | 4.10 | 657.93 | * | 121 | * | * | * | 60 | 60 | 12.7 |
| 23 | 115.0 | 661.52 | 1.200 | 2.35 | 4.19 | 662.12 | * | 121 | * | * | * | 60 | 60 | 12.7 |
| 24 | 120.0 | 665.47 | 1.100 | 2.16 | 4.02 | 666.13 | * | 120 | * | * | * | 61 | 61 | 12.7 |
| End Time | 1442 | | | | | | | | | | | | | |
| Run Time | 120 | | Avg DH= | 1.69 | | | Avg Ts= | 121.00 | | | | Avg Tm= | 58.33 | |

Integrated Gas Sampling Data :

| | |
|-----------|-----------|
| Bag No. | 3 |
| Bag Vol. | 25 liters |
| Leak Rate | 0 cc/min |

| | |
|------------|--------|
| Filter No. | Quartz |
| Nozzle No. | G-218 |
| Nozzle Dn. | 0.218 |

MOISTURE RECOVERY DATA :

| |
|----------------|
| Impinger |
| Final wt., g |
| Initial wt., g |
| Difference |

| 1 | 2 | 3 | 4 | 5 | Desiccant | Total | | |
|-------|-------|-------|-------|-------|-----------|-------|--|--|
| 918.0 | 808.5 | 659.6 | 760.7 | 769.6 | 975.5 | | | |
| 754.9 | 746.8 | 654.4 | 756.6 | 768.6 | 953.0 | | | |
| 163.1 | 61.7 | 5.2 | 4.1 | 1.0 | 22.5 | 257.6 | | |

* Data Recorded on Field Data Sheet



EPA METHOD 3A -- Instrument Analysis Data Sheet

Project USS Minutac
Sample Location(s): L3 WGS SV103
Test No: 1
Date: 4/28/20
Operators: DAIC

Analyzer Make / Model / Serial No. Serumex 1440
Analyzer O₂ Range (span), %: 0-22.5
Analyzer CO₂ Range (span), %: 0-9.5

| | Cylinder Serial No. | O ₂ Cert. Conc. | CO ₂ Cert. Conc. |
|--|------------------------|----------------------------|-----------------------------|
| | | | |
| Zero Gas | <u>EB0099389</u> | <u>0</u> | <u>0</u> |
| O ₂ /CO ₂ Mid-range | <u>EB0099404</u> | <u>9.5</u> | <u>9.5</u> |
| O ₂ /CO ₂ High-range | <u>EB0098388</u> | <u>22.5</u> | <u>4.9</u> |

PRETEST ANALYZER CALIBRATION DATA

| | O ₂ | | CO ₂ | |
|-------------|-------------------------|--|-------------------------|--|
| | Cylinder Value, % | Analyzer Calibration Response, % | Cylinder Value, % | Analyzer Calibration Response, % |
| Zero Gas | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> |
| Mid-range: | <u>9.5</u> | <u>9.5</u> | <u>4.9</u> | <u>5.0</u> |
| High-range: | <u>22.5</u> | <u>22.5</u> | <u>9.5</u> | <u>9.5</u> |

Time of Calibration _____ to _____

INTEGRATED BAG ANALYSIS

Location/Test No. L3 WGS SV103

Run No.

Time Sampled

Time Analyzed

O₂, %

CO₂, %

| 1 | 2 | 3 |
|-------------|-------------|-------------|
| <u>1555</u> | <u>1557</u> | <u>1600</u> |
| <u>17.3</u> | <u>17.7</u> | <u>17.2</u> |
| <u>2.8</u> | <u>2.6</u> | <u>3.0</u> |

POSTTEST ANALYZER CALIBRATION DATA

| | O ₂ | | CO ₂ | |
|-------------|-------------------------|--|-------------------------|--|
| | Cylinder Value, % | Analyzer Calibration Response, % | Cylinder Value, % | Analyzer Calibration Response, % |
| Zero Gas | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> |
| Mid-range: | <u>9.5</u> | <u>9.5</u> | <u>4.9</u> | <u>5.0</u> |
| High-range: | <u>22.5</u> | <u>22.5</u> | <u>9.5</u> | <u>9.5</u> |



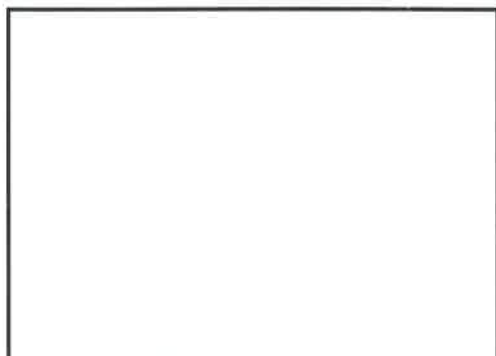
EPA METHOD 2 FIELD DATA SHEET

Project Miniton
Sample Location LY WBS SULLY
Date 4-29-2020
Operators ATK/ASW/TAK
Duct Dimensions 16.8 inches
Port Length 23 inches
Pitot Tube No. 7-6 Cp 0.84
Manometer ID C-14 Bar. ID BA-
Digital Therm ID C-14 T.C. ID 7-6

| | Run 1 | Run 2 | Run 3 | Run 4 |
|-----------------------------------|--------------|-------|-------|-------|
| Bar Press (In Hg) | <u>28.20</u> | | | |
| Stat. Press (In H ₂ O) | <u>-0.42</u> | | | |
| Temp - Dry Bulb °F | | | | |
| Temp - Wet Bulb °F | | | | |
| Moist Content - % | | | | |
| O ₂ % | | | | |
| Time of Meas. | | | | |

Pitot Leak Check Positive: OK Negative: OK

| Traverse Point Information | | | Cyclonic Flow ∠° | Velocity Head - Inches H ₂ O | | | | Stack Temperature - °F | | | |
|----------------------------|--------------|-------|------------------------|---|-------|-------|-------|------------------------|-------|-------|-------|
| Point Number | Inches From: | | | Run 1 | Run 2 | Run 3 | Run 4 | Run 1 | Run 2 | Run 3 | Run 4 |
| | Wall | Port | | ΔP | ΔP | ΔP | ΔP | Temp. | Temp. | Temp. | Temp. |
| A-1 | 3.58 | 26.58 | | | | | | | | | |
| 2 | 11.25 | 34.25 | | | | | | | | | |
| 3 | 19.84 | 42.84 | | | | | | | | | |
| 4 | 29.78 | 52.78 | | | | | | | | | |
| 5 | 42.00 | 65.00 | | | | | | | | | |
| 6 | 59.75 | 82.75 | | | | | | | | | |
| B-1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| C-1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| D-1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |



Schematic of Duct Cross-Section

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---------------------|-------|-------|-------|-------|
| Stack Pres. - In Hg | | | | |
| Duct Area - Sq Ft. | | | | |
| Mole Weight - Md | | | | |
| Mole Weight - Ms | | | | |
| Avg. Temp. - °F | | | | |
| Average √ΔP | | | | |
| Gas Vel - Ft/Sec | | | | |
| ACFM | | | | |
| SCFM | | | | |
| DSCFM | | | | |



EPA METHOD 29
FIELD DATA SHEET

Project min fac Meter ID C-14 Probe ID 7-6 Bar. Pres 28.20 in Hg
Smpl Loc CH WWS Meter Y 0.9805 Pitot No. 7-6 Stat. Pres 10.42 in H₂O
Test No. 2 Run 1 Orifice H@ 2.0294 Pitot Cp 0.87 Probe Lgth 7 ft
Date 4-29-20 Operators 054/mjw/ta Liner Type: ☒ Glass ☐ S.S. ☐ Other - Imp TC 09440

| Sample Train Leak Rate (cfm) | | |
|------------------------------|--------------|--------------------|
| Pretest | <u>0.0</u> | at <u>10</u> in Hg |
| Posttest | <u>0.0</u> | at <u>9</u> in Hg |
| Pitot (3 in.) | Pos <u>2</u> | Neg. <u>2</u> |

| Sample Point | Sample Time Δt | Meter Volume Vm, ft ³ | Velocity ΔP , in H ₂ O | Orifice ΔH , in H ₂ O | Sample Vacuum, in Hg | Stack Temp. Ts, °F | Sample Train Temperatures, °F | | | | | Oxygen Content, % |
|--------------|------------------------|----------------------------------|---|--|----------------------|--------------------|-------------------------------|--------|-----------------|-------------|--------------|-------------------|
| | | | | | | | Probe | Filter | Impinger Outlet | Meter Inlet | Meter Outlet | |
| A-6 | 0756 | 665.77 | | | | | | | | | | |
| 5 | 5 | 669.35 | 0.90 | 1.75 | 3.0 | 120 | 250 | 250 | 56 | 48 | 48 | |
| 5 | 10 | 672.83 | 0.92 | 1.82 | 3.0 | 120 | 250 | 250 | 58 | 48 | 48 | |
| 4 | 15 | 676.47 | 0.89 | 1.76 | 3.0 | 120 | 250 | 251 | 59 | 48 | 48 | |
| 3 | 20 | 680.08 | 0.90 | 1.78 | 3.0 | 121 | 250 | 248 | 60 | 48 | 48 | |
| 2 | 25 | 683.76 | 0.91 | 1.80 | 3.0 | 120 | 250 | 251 | 61 | 49 | 49 | |
| 1 | 30 | 687.08 | 0.87 | 1.61 | 2.5 | 120 | 250 | 249 | 62 | 49 | 49 | |
| B-6 | 35 | 690.34 | 0.79 | 1.57 | 2.5 | 121 | 250 | 251 | 59 | 50 | 50 | |
| 5 | 40 | 693.37 | 0.82 | 1.63 | 2.5 | 122 | 249 | 249 | 55 | 50 | 50 | |
| 4 | 45 | 697.14 | 0.84 | 1.66 | 2.5 | 122 | 251 | 249 | 52 | 51 | 51 | |
| 3 | 50 | 700.67 | 0.82 | 1.63 | 2.5 | 121 | 249 | 249 | 52 | 51 | 51 | |
| 2 | 55 | 704.08 | 0.83 | 1.65 | 2.5 | 121 | 252 | 252 | 52 | 52 | 52 | |
| 1 | 60 | 707.28 | 0.90 | 1.40 | 2.0 | 121 | 249 | 248 | 53 | 52 | 52 | |
| C-6 | 65 | 711.12 | 1.00 | 2.00 | 3.5 | 118 | 247 | 250 | 52 | 53 | 53 | |
| 5 | 70 | 715.17 | 1.20 | 2.39 | 4.0 | 122 | 252 | 251 | 52 | 54 | 54 | |
| 4 | 75 | 719.61 | 1.35 | 2.70 | 4.5 | 122 | 250 | 251 | 54 | 55 | 55 | |
| 3 | 80 | 724.18 | 1.31 | 2.70 | 4.5 | 122 | 249 | 250 | 55 | 55 | 55 | |
| 2 | 85 | 728.44 | 1.30 | 2.60 | 4.5 | 122 | 251 | 250 | 55 | 56 | 56 | |
| 1 | 90 | 732.62 | 1.15 | 2.31 | 4.0 | 121 | 250 | 252 | 57 | 56 | 56 | |
| C-6 | 95 | 736.02 | 1.35 | 2.31 | 4.5 | 121 | 250 | 251 | 60 | 57 | 57 | |
| 5 | 100 | 741.42 | 1.35 | 2.72 | 4.5 | 120 | 248 | 250 | 61 | 57 | 57 | |
| 4 | 105 | 745.96 | 1.40 | 2.82 | 5.0 | 121 | 250 | 252 | 64 | 58 | 58 | |
| 3 | 110 | 750.60 | 1.45 | 2.93 | 5.0 | 120 | 250 | 251 | 64 | 58 | 58 | |
| 2 | 115 | 755.17 | 1.35 | 2.72 | 4.5 | 121 | 244 | 251 | 63 | 58 | 58 | |
| 1 | 120 | 759.59 | 1.30 | 2.62 | 4.5 | 121 | 249 | 251 | 62 | 58 | 58 | |
| Ø= | | Vm=73.82 | 1.07 | ΔH=2.14 | | Ts=120.87 | | | | | Tm=52.96 | |

| Initialization Values | | | Test Run Times | | ORSAT System | | | Sample Train Components | | | Nozzle Calibration | |
|-----------------------|----------------|------------------|----------------|----------|--------------|---------|----------------------|-------------------------|------------|-----------|--------------------|------|
| Meter Temp | Oxygen Content | Moisture Content | Start Time | End Time | Bag No. | Bag Vol | cc/min * at 15 in Hg | Filter No. | Nozzle No. | Nozzle Dn | Tech. | Date |
| 48 | 17.2 | 11 | 0756 | 1005 | 1 | 25 | 0.0 | Quartz | G-218 | 0.218 | 1 | |
| Run 2= | | | | | | | | | | | 2 | |
| | | | | | | | | | | | 3 | |
| | | | | | | | | | | | Avg. in. | |

Moisture Recovery Data:

| Impinger | 1 | 2 | 3 | 4 | 5 | 6 | Desiccant | Total |
|----------------|-------|-------|-------|-------|-------|---|-----------|-------|
| Final wt., g | 835.5 | 807.3 | 650.8 | 772.7 | 750.5 | | 984.7 | |
| Initial wt., g | 722.1 | 743.4 | 645.6 | 769.2 | 757.1 | | 957.8 | |
| Difference | 113.4 | 63.9 | 5.2 | 3.5 | 1.4 | | 26.9 | 214.3 |

| Air Flows | |
|-----------|---------|
| ACFM | DSCFM |
| 584,799 | 449,905 |

See L3 WGS Test



EPA METHOD 29
FIELD DATA SHEET

Project minh-tu Meter ID C-14 Probe ID 7-6 Bar. Pres 28.20 in Hg
Smpl Loc 24 WWS Meter Y 0.9805 Pitot No. 7-6 Stat. Pres 28.42 in H₂O
Test No. 2 Run 2 Orifice H@ 2.0294 Pitot Cp 0.88 Probe Lgth 7 ft
Date 7-29-20 Operators DMH/MSC/TH Liner Type: ☒ Glass ☐ S.S. ☐ Other - Imp TC 0946

| Sample Train Leak Rate (cfm) | | |
|------------------------------|---|-------------------|
| Pretest | <u>0.0</u> | at <u>1</u> in Hg |
| Posttest | <u>0.0</u> | at <u>8</u> in Hg |
| Pitot (3 in.) | Pos. <input checked="" type="checkbox"/> Neg. <input checked="" type="checkbox"/> | |

| Sample Point | Sample Time Δt | Meter Volume Vm, ft ³ | Velocity ΔP , in H ₂ O | Orifice ΔH , in H ₂ O | Sample Vacuum, in Hg | Stack Temp. Ts, °F | Sample Train Temperatures, °F | | | | | Oxygen Content, % |
|--------------|------------------------|----------------------------------|---|--|----------------------|-----------------------|-------------------------------|--------|-----------------|----------------------|--------------|-------------------|
| | | | | | | | Probe | Filter | Impinger Outlet | Meter Inlet | Meter Outlet | |
| A-6 | 5 | 263.74 | 1.25 | 2.16 | 3.5 | 121 | 241 | 252 | 56 | 59 | 59 | |
| 5 | 10 | 268.17 | 1.30 | 2.67 | 4.0 | 121 | 245 | 250 | 58 | 58 | 58 | |
| 4 | 15 | 272.10 | 1.35 | 2.73 | 4.0 | 121 | 251 | 251 | 57 | 58 | 58 | |
| 3 | 20 | 276.68 | 1.40 | 2.88 | 4.5 | 119 | 250 | 252 | 60 | 59 | 59 | |
| 2 | 25 | 281.68 | 1.35 | 2.78 | 4.0 | 119 | 250 | 252 | 61 | 59 | 59 | |
| 1 | 30 | 285.95 | 1.20 | 2.47 | 4.0 | 119 | 251 | 254 | 61 | 60 | 60 | |
| B-6 | 35 | 289.89 | 1.99 | 2.04 | 3.5 | 119 | 250 | 247 | 59 | 60 | 60 | |
| 5 | 40 | 294.08 | 1.20 | 2.46 | 4.0 | 123 | 251 | 246 | 56 | 61 | 61 | |
| 4 | 45 | 298.56 | 1.35 | 2.77 | 4.5 | 123 | 251 | 252 | 57 | 61 | 61 | |
| 3 | 50 | 303.28 | 1.45 | 2.98 | 4.5 | 122 | 250 | 251 | 59 | 62 | 62 | |
| 2 | 55 | 307.77 | 1.30 | 2.68 | 4.5 | 122 | 249 | 246 | 59 | 63 | 63 | |
| 1 | 60 | 312.16 | 1.25 | 2.59 | 4.5 | 121 | 241 | 253 | 62 | 64 | 64 | |
| C-6 | 65 | 316.31 | 0.81 | 1.68 | 3.5 | 121 | 220 | 254 | 62 | 65 | 65 | |
| 5 | 70 | 319.22 | 0.83 | 1.72 | 3.5 | 121 | 249 | 249 | 63 | 66 | 66 | |
| 4 | 75 | 322.91 | 0.80 | 1.83 | 4.0 | 122 | 247 | 249 | 64 | 66 | 66 | |
| 3 | 80 | 326.84 | 0.84 | 1.75 | 4.0 | 122 | 247 | 245 | 64 | 66 | 67 | |
| 2 | 85 | 329.91 | 0.73 | 1.52 | 3.5 | 121 | 244 | 251 | 64 | 68 | 68 | |
| 1 | 90 | 333.77 | 0.87 | 1.19 | 2.5 | 122 | 242 | 250 | 63 | 69 | 69 | |
| D-6 | 95 | 336.44 | 0.82 | 1.72 | 3.5 | 121 | 254 | 259 | 66 | 69 | 69 | |
| 5 | 100 | 340.19 | 0.86 | 1.81 | 3.5 | 122 | 252 | 251 | 64 | 70 | 70 | |
| 4 | 105 | 343.67 | 0.87 | 1.82 | 3.5 | 121 | 250 | 251 | 63 | 70 | 70 | |
| 3 | 110 | 347.31 | 0.86 | 1.84 | 3.5 | 121 | 250 | 251 | 61 | 71 | 71 | |
| 2 | 115 | 350.97 | 0.87 | 1.83 | 3.5 | 121 | 251 | 249 | 61 | 71 | 71 | |
| 1 | 120 | 354.67 | 0.87 | 1.77 | 3.5 | 121 | 250 | 251 | 62 | 72 | 72 | |
| $\bar{Q} =$ | | Vm = <u>94.84</u> | <u>1.04</u> | $\Delta H =$ <u>2.15</u> | | $T_s =$ <u>121.17</u> | | | | $T_m =$ <u>64.50</u> | | |

| Initialization Values | | | Test Run Times | | ORSAT System | | | Sample Train Components | | | Nozzle Calibration | |
|-----------------------|----------------|------------------|----------------|--------------|--------------|-----------|----------------------|-------------------------|--------------|--------------|--------------------|------|
| Meter Temp | Oxygen Content | Moisture Content | Start Time | End Time | Bag No. | Bag Vol | cc/min * at 15 in Hg | Filter No. | Nozzle No. | Nozzle Dn | Tech. | Date |
| Run 1 | <u>59</u> | <u>12.2</u> | <u>10.22</u> | <u>12.26</u> | <u>2</u> | <u>25</u> | <u>2.0</u> | <u>Q-1</u> | <u>0.218</u> | <u>0.218</u> | 1 | |
| Run 2 | | | | | | | | | | | 2 | |
| | | | | | | | | | | | 3 | |
| | | | | | | | | | | | Avg. in. | |

Moisture Recovery Data:

| Impinger | 1 | 2 | 3 | 4 | 5 | 6 | Desiccant | Total |
|----------------|--------------|--------------|--------------|--------------|--------------|---|--------------|--------------|
| Final wt., g | <u>849.8</u> | <u>812.4</u> | <u>662.3</u> | <u>754.5</u> | <u>766.4</u> | | <u>974.1</u> | |
| Initial wt., g | <u>743.8</u> | <u>751.9</u> | <u>656.5</u> | <u>749.5</u> | <u>766.2</u> | | <u>974.1</u> | |
| Difference | <u>106</u> | <u>60.5</u> | <u>5.8</u> | <u>5.0</u> | <u>0.2</u> | | <u>29.9</u> | <u>207.4</u> |

| Air Flows | |
|---------------|----------------|
| ACFM | DSCFM |
| <u>526.10</u> | <u>443.935</u> |

See run 1



EPA METHOD 29
FIELD DATA SHEET

Project Minn Lk Meter ID C-14 Probe ID 7-6 Bar. Pres 28.20 in Hg
Smpl Loc LY WLS Meter Y 0.9805 Pitot No. 7-6 Stat. Pres -0.42 in H₂O
Test No. 2 Run 3 Orifice H@ 2.0294 Pitot Cp 0.81 Probe Lgth 7 ft
Date 4-24-20 Operators JK/MSN/TAK Liner Type: ☒ Glass ☐ S.S. ☐ Other - Imp TC 8946

| Sample Train Leak Rate (cfm) | | |
|------------------------------|--|-------------------------------|
| Pretest | <u>0.0</u> | at <u>10</u> in Hg |
| Posttest | <u>0.0</u> | at <u>8</u> in Hg |
| Pitot (3 in.) | Pos. <input checked="" type="checkbox"/> | Neg. <input type="checkbox"/> |

| Sample Point | Sample Time Δt | Meter Volume Vm, ft ³ | Velocity ΔP , in H ₂ O | Orifice ΔH , in H ₂ O | Sample Vacuum, in Hg | Stack Temp. Ts, °F | Sample Train Temperatures, °F | | | | | Oxygen Content, % |
|------------------|------------------------|----------------------------------|---|--|----------------------|--------------------|-------------------------------|--------|-----------------|-------------|--------------|-------------------|
| | | | | | | | Probe | Filter | Impinger Outlet | Meter Inlet | Meter Outlet | |
| A-6 | 1240 | 854.91 | | | | | | | | | | |
| | 5 | 858.58 | 0.85 | 1.86 | 3.0 | 122 | 245 | 245 | 65 | 73 | 73 | |
| | 10 | 862.27 | 0.85 | 1.85 | 3.0 | 122 | 249 | 252 | 64 | 73 | 73 | |
| | 15 | 865.81 | 0.89 | 1.88 | 3.0 | 122 | 250 | 251 | 64 | 73 | 73 | |
| | 20 | 869.55 | 0.92 | 1.89 | 3.0 | 122 | 253 | 251 | 65 | 74 | 74 | |
| B-6 | 25 | 873.23 | 0.85 | 1.85 | 3.0 | 122 | 251 | 250 | 64 | 74 | 74 | |
| | 30 | 876.91 | 0.84 | 1.78 | 3.0 | 122 | 251 | 252 | 64 | 74 | 74 | |
| | 35 | 880.36 | 0.76 | 1.60 | 3.0 | 124 | 252 | 251 | 63 | 74 | 74 | |
| | 40 | 883.97 | 0.81 | 1.71 | 3.0 | 124 | 249 | 248 | 60 | 75 | 75 | |
| | 45 | 887.71 | 0.85 | 1.80 | 3.0 | 124 | 247 | 250 | 58 | 75 | 75 | |
| C-6 | 50 | 891.17 | 0.79 | 1.67 | 3.0 | 124 | 244 | 250 | 57 | 75 | 75 | |
| | 55 | 894.48 | 0.71 | 1.80 | 2.5 | 124 | 250 | 251 | 57 | 75 | 75 | |
| | 60 | 897.68 | 0.60 | 1.27 | 2.5 | 124 | 247 | 249 | 58 | 75 | 75 | |
| | 65 | 901.90 | 1.05 | 2.23 | 2.5 | 122 | 241 | 244 | 58 | 76 | 76 | |
| | 70 | 906.11 | 1.30 | 2.76 | 4.5 | 123 | 258 | 249 | 60 | 76 | 76 | |
| D-6 | 75 | 910.65 | 1.30 | 2.76 | 4.5 | 123 | 247 | 247 | 61 | 76 | 76 | |
| | 80 | 915.30 | 1.35 | 2.86 | 4.5 | 123 | 247 | 246 | 63 | 76 | 76 | |
| | 85 | 919.98 | 1.40 | 2.97 | 5.0 | 123 | 251 | 258 | 65 | 76 | 76 | |
| | 90 | 924.71 | 1.30 | 2.76 | 5.0 | 122 | 241 | 242 | 65 | 76 | 76 | |
| | 95 | 928.94 | 1.10 | 2.34 | 4.5 | 122 | 254 | 250 | 66 | 76 | 76 | |
| E-6 | 100 | 933.52 | 1.30 | 2.77 | 5.0 | 121 | 250 | 251 | 63 | 75 | 75 | |
| | 105 | 938.28 | 1.40 | 2.97 | 5.0 | 122 | 250 | 252 | 62 | 76 | 76 | |
| | 110 | 943.04 | 1.35 | 2.87 | 5.0 | 122 | 250 | 251 | 62 | 75 | 75 | |
| | 115 | 947.81 | 1.35 | 2.86 | 5.0 | 122 | 249 | 251 | 62 | 75 | 75 | |
| | 120 | 952.24 | 1.20 | 2.58 | 5.0 | 122 | 247 | 251 | 62 | 75 | 75 | |
| $\bar{\Delta t}$ | | V_m | ΔH | ΔH | | T_s | | | | T_m | | |
| | | 923.3 | 1.05 | 2.22 | | 122.63 | | | | 74.92 | | |

| Initialization Values | | | Test Run Times | | ORSAT System | | | Sample Train Components | | | Nozzle Calibration | |
|-----------------------|----------------|------------------|----------------|----------|--------------|---------|----------------------|-------------------------|------------|-----------|--------------------|------|
| Meter Temp | Oxygen Content | Moisture Content | Start Time | End Time | Bag No. | Bag Vol | cc/min * at 15 in Hg | Filter No. | Nozzle No. | Nozzle Dn | Tech. | Date |
| 73 | 17.2 | 9.92 | 1240 | 1446 | 3 | 25 | 0.0 | Qartz | 6 KASS | 0.218 | | |
| Avg. in. | | | | | | | | | | | | |

Moisture Recovery Data:

| Impinger | 1 | 2 | 3 | 4 | 5 | 6 | Desiccant | Total |
|----------------|-------|-------|-------|-------|-------|---|-----------|-------|
| Final wt., g | 864.3 | 787.7 | 653.5 | 778.7 | 762.0 | | 1011.9 | |
| Initial wt., g | 717.4 | 752.3 | 648.4 | 775.1 | 761.7 | | 983.9 | |
| Difference | 146.9 | 35.4 | 51 | 3.5 | 0.3 | | 28 | 219.3 |

| Air Flows | |
|-----------|---------|
| ACFM | DSCFM |
| 579,338 | 443,059 |

* RMP S-27-20



EPA Method 29 - Field Data Sheet - Run 1

| | | | | | | | | | | |
|-----------------|------------------------------|-------------|--------|----------------|-------|-------------|----------|---------|-------------------------------|--------------------|
| Project | U.S. Steel Corporation | Meter ID | C-14 | Probe ID | "7-6 | Bar.Press. | 28.20 | in. Hg | Sample Train Leak | Rate, cfm: |
| Sample Location | Line 4 Waste Gas Stack SV118 | Meter Y | 0.9805 | Pitot Tube No. | "7-6 | Stat Press. | -0.4 | in. H2O | Pretest | 0.000 at 10 in. Hg |
| Date | 04/29/20 | Orifice dH@ | 2.0294 | Pitot Cp | 0.84 | CPM TC | NA | | Posttest | 0.000 at 9 in. Hg |
| Test | 2 | Run # | 1 | Liner Type: | Glass | IMP Out TC | TIO-8948 | | Pretest Pitot leak Check Pos | PASS @ >3" w.c |
| Operators | DJK /MJN | | | | | | | | Posttest Pitot leak Check Neg | PASS @ >3" w.c |

| Sample Point | Sample Time DT | Actual Meter Vol Vm, ft3 | Velocity Head DP, in. H2O | Orifice DH in. H2O | Ideal Point Volume Vm, ft3 | Ideal Meter Vol Vm, ft3 | Sample Train Vacuum in. Hg | Stack Temp Ts, °F | Sample Train Temperatures, °F | | | | | Moisture Content, % |
|--------------|----------------|--------------------------|---------------------------|--------------------|----------------------------|-------------------------|----------------------------|-------------------|-------------------------------|-------|-----------------|-------------|--------------|---------------------|
| | | | | | | | | | Filter | Probe | Impinger Outlet | Meter Inlet | Meter Outlet | |
| Start Time | 0756 | 665.77 | | | | | | | | | | | | |
| 1 | 5.0 | 669.35 | 0.900 | 1.78 | 3.60 | 669.37 | * | 120 | * | * | * | 48 | 48 | 11.0 |
| 2 | 10.0 | 672.83 | 0.920 | 1.82 | 3.64 | 673.00 | * | 120 | * | * | * | 48 | 48 | 11.0 |
| 3 | 15.0 | 676.47 | 0.890 | 1.76 | 3.58 | 676.58 | * | 120 | * | * | * | 48 | 48 | 11.0 |
| 4 | 20.0 | 680.08 | 0.900 | 1.78 | 3.59 | 680.18 | * | 121 | * | * | * | 48 | 48 | 11.0 |
| 5 | 25.0 | 683.76 | 0.910 | 1.80 | 3.62 | 683.79 | * | 120 | * | * | * | 49 | 49 | 11.0 |
| 6 | 30.0 | 687.08 | 0.810 | 1.61 | 3.42 | 687.21 | * | 120 | * | * | * | 49 | 49 | 11.0 |
| 7 | 35.0 | 690.34 | 0.790 | 1.57 | 3.38 | 690.59 | * | 121 | * | * | * | 50 | 50 | 11.0 |
| 8 | 40.0 | 693.77 | 0.820 | 1.63 | 3.44 | 694.03 | * | 122 | * | * | * | 50 | 50 | 11.0 |
| 9 | 45.0 | 697.14 | 0.840 | 1.66 | 3.48 | 697.52 | * | 122 | * | * | * | 51 | 51 | 11.0 |
| 10 | 50.0 | 700.67 | 0.820 | 1.63 | 3.45 | 700.97 | * | 121 | * | * | * | 51 | 51 | 11.0 |
| 11 | 55.0 | 704.08 | 0.830 | 1.65 | 3.47 | 704.44 | * | 121 | * | * | * | 52 | 52 | 11.0 |
| 12 | 60.0 | 707.28 | 0.700 | 1.40 | 3.20 | 707.64 | * | 121 | * | * | * | 52 | 52 | 11.0 |
| 13 | 65.0 | 711.12 | 1.000 | 2.00 | 3.83 | 711.46 | * | 118 | * | * | * | 53 | 53 | 11.0 |
| 14 | 70.0 | 715.17 | 1.200 | 2.39 | 4.18 | 715.64 | * | 122 | * | * | * | 54 | 54 | 11.0 |
| 15 | 75.0 | 719.61 | 1.350 | 2.70 | 4.44 | 720.08 | * | 122 | * | * | * | 55 | 55 | 11.0 |
| 16 | 80.0 | 724.18 | 1.350 | 2.70 | 4.45 | 724.53 | * | 122 | * | * | * | 55 | 55 | 11.0 |
| 17 | 85.0 | 728.44 | 1.300 | 2.60 | 4.37 | 728.90 | * | 122 | * | * | * | 56 | 56 | 11.0 |
| 18 | 90.0 | 732.62 | 1.150 | 2.31 | 4.12 | 733.02 | * | 121 | * | * | * | 56 | 56 | 11.0 |
| 19 | 95.0 | 737.02 | 1.350 | 2.71 | 4.46 | 737.48 | * | 121 | * | * | * | 57 | 57 | 11.0 |
| 20 | 100.0 | 741.42 | 1.350 | 2.72 | 4.47 | 741.95 | * | 120 | * | * | * | 57 | 57 | 11.0 |
| 21 | 105.0 | 745.96 | 1.400 | 2.82 | 4.55 | 746.50 | * | 121 | * | * | * | 58 | 58 | 11.0 |
| 22 | 110.0 | 750.61 | 1.450 | 2.93 | 4.64 | 751.14 | * | 120 | * | * | * | 58 | 58 | 11.0 |
| 23 | 115.0 | 755.17 | 1.350 | 2.72 | 4.48 | 755.62 | * | 121 | * | * | * | 58 | 58 | 11.0 |
| 24 | 120.0 | 759.59 | 1.300 | 2.62 | 4.39 | 760.02 | * | 121 | * | * | * | 58 | 58 | 11.0 |
| End Time | 1005 | | | | | | | | | | | | | |
| Run Time | 120 | | Avg DH= | 2.14 | | | Avg Ts= | 120.83 | | | | Avg Tm= | 52.96 | |

Integrated Gas Sampling Data :

| | |
|-----------|-----------|
| Bag No. | 1 |
| Bag Vol. | 25 liters |
| Leak Rate | 0 cc/min |

| | |
|------------|--------|
| Filter No. | Quartz |
| Nozzle No. | G-218 |
| Nozzle Dn. | 0.218 |

MOISTURE RECOVERY DATA :

| |
|----------------|
| Impinger |
| Final wt., g |
| Initial wt., g |
| Difference |

| 1 | 2 | 3 | 4 | 5 | Desiccant | Total | | |
|-------|-------|-------|-------|-------|-----------|-------|--|--|
| 835.5 | 807.3 | 650.8 | 772.7 | 758.5 | 984.7 | | | |
| 722.1 | 743.4 | 645.6 | 769.2 | 757.1 | 957.8 | | | |
| 113.4 | 63.9 | 5.2 | 3.5 | 1.4 | 26.9 | 214.3 | | |

* Data Recorded on Field Data Sheet



EPA Method 29 - Field Data Sheet - Run 2

| | | | | | | | | | | |
|-----------------|------------------------------|-------------|--------|----------------|-------|-------------|----------|---------|-------------------------------|--------------------|
| Project | U.S. Steel Corporation | Meter ID | C-14 | Probe ID | "7-6 | Bar.Press. | 28.20 | in. Hg | Sample Train Leak | Rate, cfm: |
| Sample Location | Line 4 Waste Gas Stack SV118 | Meter Y | 0.9805 | Pitot Tube No. | "7-6 | Stat Press. | -0.4 | in. H2O | Pretest | 0.000 at 10 in. Hg |
| Date | 04/29/20 | Orifice dH@ | 2.0294 | Pitot Cp | 0.84 | CPM TC | NA | | Posttest | 0.000 at 8 in. Hg |
| Test | 2 | Run # | 2 | Liner Type: | Glass | IMP Out TC | TIO-8948 | | Pretest Pitot leak Check Pos | PASS @ >3" w.c |
| Operators | DJK /MJN | | | | | | | | Posttest Pitot leak Check Neg | PASS @ >3" w.c |

| Sample Point | Sample Time DT | Actual Meter Vol Vm, ft3 | Velocity Head DP, in. H2O | Orifice DH in. H2O | Ideal Point Volume Vm, ft3 | Ideal Meter Vol Vm, ft3 | Sample Train Vacuum in. Hg | Stack Temp Ts, °F | Sample Train Temperatures, °F | | | | | Moisture Content, % |
|--------------|----------------|--------------------------|---------------------------|--------------------|----------------------------|-------------------------|----------------------------|-------------------|-------------------------------|-------|-----------------|-------------|--------------|---------------------|
| | | | | | | | | | Filter | Probe | Impinger Outlet | Meter Inlet | Meter Outlet | |
| Start Time | 1022 | 759.83 | | | | | | | | | | | | |
| 1 | 5.0 | 763.74 | 1.050 | 2.16 | 3.99 | 763.82 | * | 121 | * | * | * | 59 | 59 | 10.1 |
| 2 | 10.0 | 768.17 | 1.300 | 2.67 | 4.44 | 768.26 | * | 121 | * | * | * | 58 | 58 | 10.1 |
| 3 | 15.0 | 772.60 | 1.350 | 2.77 | 4.51 | 772.78 | * | 121 | * | * | * | 58 | 58 | 10.1 |
| 4 | 20.0 | 777.11 | 1.400 | 2.88 | 4.60 | 777.38 | * | 119 | * | * | * | 59 | 59 | 10.1 |
| 5 | 25.0 | 781.68 | 1.350 | 2.78 | 4.53 | 781.91 | * | 119 | * | * | * | 59 | 59 | 10.1 |
| 6 | 30.0 | 785.95 | 1.200 | 2.47 | 4.27 | 786.19 | * | 119 | * | * | * | 60 | 60 | 10.1 |
| 7 | 35.0 | 789.89 | 0.990 | 2.04 | 3.89 | 790.08 | * | 119 | * | * | * | 60 | 60 | 10.1 |
| 8 | 40.0 | 794.08 | 1.200 | 2.46 | 4.27 | 794.35 | * | 123 | * | * | * | 61 | 61 | 10.1 |
| 9 | 45.0 | 798.56 | 1.350 | 2.77 | 4.53 | 798.88 | * | 123 | * | * | * | 61 | 61 | 10.1 |
| 10 | 50.0 | 803.28 | 1.450 | 2.98 | 4.70 | 803.58 | * | 122 | * | * | * | 62 | 62 | 10.1 |
| 11 | 55.0 | 807.77 | 1.300 | 2.68 | 4.46 | 808.04 | * | 122 | * | * | * | 63 | 63 | 10.1 |
| 12 | 60.0 | 812.16 | 1.250 | 2.59 | 4.39 | 812.43 | * | 121 | * | * | * | 64 | 64 | 10.1 |
| 13 | 65.0 | 815.71 | 0.810 | 1.68 | 3.55 | 815.97 | * | 121 | * | * | * | 65 | 65 | 10.1 |
| 14 | 70.0 | 819.22 | 0.830 | 1.72 | 3.59 | 819.57 | * | 122 | * | * | * | 66 | 66 | 10.1 |
| 15 | 75.0 | 822.91 | 0.880 | 1.83 | 3.71 | 823.27 | * | 122 | * | * | * | 66 | 66 | 10.1 |
| 16 | 80.0 | 826.44 | 0.840 | 1.75 | 3.62 | 826.90 | * | 122 | * | * | * | 67 | 67 | 10.1 |
| 17 | 85.0 | 829.91 | 0.730 | 1.52 | 3.39 | 830.28 | * | 121 | * | * | * | 68 | 68 | 10.1 |
| 18 | 90.0 | 832.77 | 0.570 | 1.19 | 3.00 | 833.28 | * | 122 | * | * | * | 69 | 69 | 10.1 |
| 19 | 95.0 | 836.44 | 0.820 | 1.72 | 3.60 | 836.89 | * | 121 | * | * | * | 69 | 69 | 10.1 |
| 20 | 100.0 | 840.19 | 0.860 | 1.80 | 3.69 | 840.57 | * | 122 | * | * | * | 70 | 70 | 10.1 |
| 21 | 105.0 | 843.67 | 0.870 | 1.82 | 3.72 | 844.29 | * | 121 | * | * | * | 70 | 70 | 10.1 |
| 22 | 110.0 | 847.31 | 0.860 | 1.80 | 3.70 | 847.98 | * | 121 | * | * | * | 71 | 71 | 10.1 |
| 23 | 115.0 | 850.97 | 0.870 | 1.83 | 3.72 | 851.71 | * | 121 | * | * | * | 71 | 71 | 10.1 |
| 24 | 120.0 | 854.67 | 0.840 | 1.77 | 3.66 | 855.37 | * | 121 | * | * | * | 72 | 72 | 10.1 |
| End Time | 1226 | | | | | | | | | | | | | |
| Run Time | 120 | | Avg DH= | 2.15 | | | Avg Ts= | 121.13 | | | | Avg Tm= | 64.50 | |

Integrated Gas Sampling Data :

Bag No. 2
Bag Vol. 25 liters
Leak Rate 0 cc/min

Filter No. Quartz
Nozzle No. G-218
Nozzle Dn. 0.218

MOISTURE RECOVERY DATA :

Impinger
Final wt., g
Initial wt., g
Difference

| 1 | 2 | 3 | 4 | 5 | Desiccant | Total | | |
|-------|-------|-------|-------|-------|-----------|-------|--|--|
| 849.8 | 812.4 | 662.3 | 754.5 | 766.4 | 974.0 | | | |
| 743.8 | 751.9 | 656.5 | 749.5 | 766.2 | 944.1 | | | |
| 106.0 | 60.5 | 5.8 | 5.0 | 0.2 | 29.9 | 207.4 | | |

* Data Recorded on Field Data Sheet



EPA Method 29 - Field Data Sheet - Run 3

| | | | | | | | | | | |
|-----------------|------------------------------|-------------|--------|----------------|-------|-------------|----------|---------|-------------------------------|--------------------|
| Project | U.S. Steel Corporation | Meter ID | C-14 | Probe ID | "7-6 | Bar.Press. | 28.20 | in. Hg | Sample Train Leak | Rate, cfm: |
| Sample Location | Line 4 Waste Gas Stack SV118 | Meter Y | 0.9805 | Pitot Tube No. | "7-6 | Stat Press. | -0.4 | in. H2O | Pretest | 0.000 at 10 in. Hg |
| Date | 04/29/20 | Orifice dH@ | 2.0294 | Pitot Cp | 0.84 | CPM TC | NA | | Posttest | 0.000 at 8 in. Hg |
| Test | 2 | Run # | 3 | Liner Type: | Glass | IMP Out TC | TIO-8948 | | Pretest Pitot leak Check Pos | PASS @ >3" w.c |
| Operators | DJK /MJN | | | | | | | | Posttest Pitot leak Check Neg | PASS @ >3" w.c |

| Sample Point | Sample Time DT | Actual Meter Vol Vm, ft3 | Velocity Head DP, in. H2O | Orifice DH in. H2O | Ideal Point Volume Vm, ft³ | Ideal Meter Vol Vm, ft3 | Sample Train Vacuum in. Hg | Stack Temp Ts, °F | Sample Train Temperatures, °F | | | | | Moisture Content, % |
|--------------|----------------|--------------------------|---------------------------|--------------------|----------------------------|-------------------------|----------------------------|-------------------|-------------------------------|-------|-----------------|-------------|--------------|---------------------|
| | | | | | | | | | Filter | Probe | Impinger Outlet | Meter Inlet | Meter Outlet | |
| Start Time | 1240 | 854.91 | | | | | | | | | | | | |
| 1 | 5.0 | 858.58 | 0.880 | 1.86 | 3.76 | 858.67 | * | 122 | * | * | * | 73 | 73 | 9.9 |
| 2 | 10.0 | 862.27 | 0.850 | 1.80 | 3.70 | 862.37 | * | 122 | * | * | * | 73 | 73 | 9.9 |
| 3 | 15.0 | 865.81 | 0.890 | 1.88 | 3.78 | 866.15 | * | 122 | * | * | * | 73 | 73 | 9.9 |
| 4 | 20.0 | 869.55 | 0.920 | 1.94 | 3.85 | 870.00 | * | 122 | * | * | * | 74 | 74 | 9.9 |
| 5 | 25.0 | 873.23 | 0.850 | 1.80 | 3.70 | 873.70 | * | 122 | * | * | * | 74 | 74 | 9.9 |
| 6 | 30.0 | 876.91 | 0.840 | 1.78 | 3.68 | 877.39 | * | 122 | * | * | * | 74 | 74 | 9.9 |
| 7 | 35.0 | 880.36 | 0.760 | 1.60 | 3.50 | 880.89 | * | 124 | * | * | * | 74 | 74 | 9.9 |
| 8 | 40.0 | 883.97 | 0.810 | 1.71 | 3.61 | 884.50 | * | 124 | * | * | * | 75 | 75 | 9.9 |
| 9 | 45.0 | 887.71 | 0.850 | 1.80 | 3.71 | 888.20 | * | 124 | * | * | * | 75 | 75 | 9.9 |
| 10 | 50.0 | 891.17 | 0.790 | 1.67 | 3.57 | 891.78 | * | 124 | * | * | * | 75 | 75 | 9.9 |
| 11 | 55.0 | 894.48 | 0.710 | 1.50 | 3.39 | 895.17 | * | 124 | * | * | * | 75 | 75 | 9.9 |
| 12 | 60.0 | 897.68 | 0.600 | 1.27 | 3.12 | 898.28 | * | 124 | * | * | * | 75 | 75 | 9.9 |
| 13 | 65.0 | 901.90 | 1.050 | 2.23 | 4.12 | 902.40 | * | 122 | * | * | * | 76 | 76 | 9.9 |
| 14 | 70.0 | 906.11 | 1.300 | 2.76 | 4.58 | 906.99 | * | 123 | * | * | * | 76 | 76 | 9.9 |
| 15 | 75.0 | 910.65 | 1.300 | 2.76 | 4.58 | 911.57 | * | 123 | * | * | * | 76 | 76 | 9.9 |
| 16 | 80.0 | 915.30 | 1.350 | 2.86 | 4.67 | 916.24 | * | 123 | * | * | * | 76 | 76 | 9.9 |
| 17 | 85.0 | 919.98 | 1.400 | 2.97 | 4.75 | 921.00 | * | 123 | * | * | * | 76 | 76 | 9.9 |
| 18 | 90.0 | 924.71 | 1.300 | 2.76 | 4.59 | 925.58 | * | 122 | * | * | * | 76 | 76 | 9.9 |
| 19 | 95.0 | 928.94 | 1.100 | 2.34 | 4.22 | 929.81 | * | 122 | * | * | * | 76 | 76 | 9.9 |
| 20 | 100.0 | 933.52 | 1.300 | 2.77 | 4.59 | 934.40 | * | 121 | * | * | * | 75 | 75 | 9.9 |
| 21 | 105.0 | 938.28 | 1.400 | 2.97 | 4.75 | 939.15 | * | 122 | * | * | * | 76 | 76 | 9.9 |
| 22 | 110.0 | 943.04 | 1.350 | 2.87 | 4.67 | 943.82 | * | 122 | * | * | * | 75 | 75 | 9.9 |
| 23 | 115.0 | 947.80 | 1.350 | 2.86 | 4.66 | 948.49 | * | 122 | * | * | * | 75 | 75 | 9.9 |
| 24 | 120.0 | 952.24 | 1.200 | 2.55 | 4.40 | 952.89 | * | 122 | * | * | * | 75 | 75 | 9.9 |
| End Time | 1446 | | | | | | | | | | | | | |
| Run Time | 120 | | Avg DH= | 2.22 | | | Avg Ts= | 122.63 | | | | Avg Tm= | 74.92 | |

Integrated Gas Sampling Data :

Bag No. 3
Bag Vol. 25 liters
Leak Rate 0 cc/min

Filter No. Quartz
Nozzle No. G-218
Nozzle Dn. 0.218

MOISTURE RECOVERY DATA :

Impinger
Final wt., g
Initial wt., g
Difference

| 1 | 2 | 3 | 4 | 5 | Desiccant | Total | | |
|-------|-------|-------|-------|-------|-----------|-------|--|--|
| 864.3 | 787.7 | 653.5 | 778.7 | 762.0 | 1011.9 | | | |
| 717.4 | 752.3 | 648.4 | 775.1 | 761.7 | 983.9 | | | |
| 146.9 | 35.4 | 5.1 | 3.6 | 0.3 | 28.0 | 219.3 | | |

* Data Recorded on Field Data Sheet



EPA METHOD 3A -- Instrument Analysis Data Sheet

Project USS Minutac
Sample Location(s): L4 WGS 50118
Test No: 2
Date: 4-29-20
Operators: DAIC

Analyzer Make / Model / Serial No. Servomex
Analyzer O₂ Range (span), %: 0-22.5
Analyzer CO₂ Range (span), %: 0-9.5

| | Cylinder Serial No. | O ₂ Cert. Conc. | CO ₂ Cert. Conc. |
|--|------------------------|----------------------------|-----------------------------|
| | | | |
| Zero Gas | <u>EB0099389</u> | <u>0</u> | <u>0</u> |
| O ₂ /CO ₂ Mid-range | <u>EB0099404</u> | <u>9.5</u> | <u>4.9</u> |
| O ₂ /CO ₂ High-range | <u>EB0098382</u> | <u>22.5</u> | <u>4.9</u> |

PRETEST ANALYZER CALIBRATION DATA

| | O ₂ | | CO ₂ | |
|-------------|-------------------------|--|-------------------------|--|
| | Cylinder Value, % | Analyzer Calibration Response, % | Cylinder Value, % | Analyzer Calibration Response, % |
| Zero Gas | <u>0</u> | <u>0</u> | <u>0</u> | <u>0.0</u> |
| Mid-range: | <u>9.5</u> | <u>9.5</u> | <u>4.9</u> | <u>4.8</u> |
| High-range: | <u>22.5</u> | <u>22.5</u> | <u>9.5</u> | <u>9.5</u> |

Time of Calibration 1614 to 1619

INTEGRATED BAG ANALYSIS

| | | | |
|---------------------|---------------|-------------|-------------|
| Location/Test No. | <u>L4 WGS</u> | | |
| Run No. | <u>1</u> | <u>2</u> | <u>3</u> |
| Time Sampled | | | |
| Time Analyzed | <u>1621</u> | <u>1625</u> | <u>1626</u> |
| O ₂ , % | <u>17.7</u> | <u>17.8</u> | <u>17.6</u> |
| CO ₂ , % | <u>2.6</u> | <u>2.5</u> | <u>2.9</u> |

POSTTEST ANALYZER CALIBRATION DATA

| | O ₂ | | CO ₂ | |
|-------------|-------------------------|--|-------------------------|--|
| | Cylinder Value, % | Analyzer Calibration Response, % | Cylinder Value, % | Analyzer Calibration Response, % |
| Zero Gas | <u>0</u> | <u>0.0</u> | <u>0</u> | <u>0.0</u> |
| Mid-range: | <u>9.5</u> | <u>9.5</u> | <u>4.9</u> | <u>4.9</u> |
| High-range: | <u>22.5</u> | <u>22.5</u> | <u>9.5</u> | <u>9.5</u> |



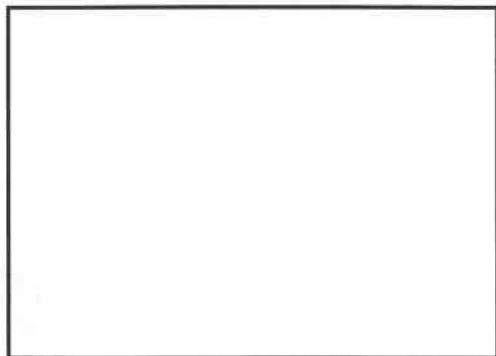
EPA METHOD 2 FIELD DATA SHEET

Project Mine fac
Sample Location 66 WLS SU144
Date 4-30-20
Operators 076/MSN/TAL
Duct Dimensions 192.0 inches
Port Length 15 inches
Pitot Tube No. 7-4 Cp 0.84
Manometer ID C-14 Bar. ID BA-16
Digital Therm ID C-14 T.C. ID 7-4

| | Run 1 | Run 2 | Run 3 | Run 4 |
|-----------------------------------|--------------|-------|-------|-------|
| Bar Press (In Hg) | <u>28.10</u> | | | |
| Stat. Press (In H ₂ O) | <u>-5.31</u> | | | |
| Temp - Dry Bulb °F | | | | |
| Temp - Wet Bulb °F | | | | |
| Moist Content - % | | | | |
| O ₂ % | | | | |
| Time of Meas. | | | | |

Pitot Leak Check Positive: OK Negative: OK

| Traverse Point Information | | | Cyclonic Flow ∠° | Velocity Head - Inches H ₂ O | | | | Stack Temperature - °F | | | |
|----------------------------|--------------|-------|------------------------|---|-------|-------|-------|------------------------|-------|-------|-------|
| Point Number | Inches From: | | | Run 1 | Run 2 | Run 3 | Run 4 | Run 1 | Run 2 | Run 3 | Run 4 |
| | Wall | Port | | ΔP | ΔP | ΔP | ΔP | Temp. | Temp. | Temp. | Temp. |
| A-1 | 4.09 | 19.09 | | | | | | | | | |
| 2 | 12.86 | 27.86 | | | | | | | | | |
| 3 | 22.68 | 37.68 | | | | | | | | | |
| 4 | 34.03 | 49.03 | | | | | | | | | |
| 5 | 48.00 | 63.00 | | | | | | | | | |
| 6 | 68.29 | 83.29 | | | | | | | | | |
| B-1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| C-1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |
| D-1 | | | | | | | | | | | |
| 2 | | | | | | | | | | | |
| 3 | | | | | | | | | | | |
| 4 | | | | | | | | | | | |
| 5 | | | | | | | | | | | |
| 6 | | | | | | | | | | | |



Schematic of Duct Cross-Section

| | Run 1 | Run 2 | Run 3 | Run 4 |
|---------------------------|-------|-------|-------|-------|
| Stack Pres. - In Hg | | | | |
| Duct Area - Sq Ft. | | | | |
| Mole Weight - Md | | | | |
| Mole Weight - Ms | | | | |
| Avg. Temp. - °F | | | | |
| Average $\sqrt{\Delta P}$ | | | | |
| Gas Vel - Ft/Sec | | | | |
| ACFM | | | | |
| SCFM | | | | |
| DSCFM | | | | |



EPA METHOD 29
FIELD DATA SHEET

Project Minntac Meter ID C-14 Probe ID 7-4 Bar. Pres 28.10 in Hg
Smpl Loc 26 WWS SV144 Meter Y 0.9805 Pitot No. 7-4 Stat. Pres -0.31 in H₂O
Test No. 3 Run 1 Orifice H@ 2.0294 Pitot Cp 0.87 Probe Lgth 7 ft
Date 4-26-20 Operators OSK/mj/N/TAK Liner Type: ☒ Glass ☐ S.S. ☐ Other _____ Imp TC 8948

| Sample Train Leak Rate (cfm) | | |
|------------------------------|---------------|--------------------|
| Pretest | <u>0.0</u> | at <u>10</u> in Hg |
| Posttest | <u>0.0</u> | at <u>7</u> in Hg |
| Pitot (3 in.) | Pos. <u>A</u> | Neg. <u>B</u> |

| Sample Point | Sample Time Δt | Meter Volume Vm, ft ³ | Velocity ΔP , in H ₂ O | Orifice ΔH , in H ₂ O | Sample Vacuum, in Hg | Stack Temp. Ts, °F | Sample Train Temperatures, °F | | | | | Oxygen Content, % |
|--------------|------------------------|----------------------------------|---|--|----------------------|--------------------|-------------------------------|--------|-----------------|-------------|-----------------|-------------------|
| | | | | | | | Probe | Filter | Impinger Outlet | Meter Inlet | Meter Outlet | |
| A-6 | 0748 | 952.50 | | | | | | | | | | |
| 5 | 5 | 956.21 | 0.49 | 1.48 | 2.5 | 111 | 248 | 251 | 45 | 62 | 62 | |
| 5 | 10 | 960.40 | 0.55 | 2.18 | 2.5 | 109 | 251 | 254 | 45 | 62 | 62 | |
| 5 | 15 | 964.42 | 0.53 | 2.10 | 2.5 | 110 | 251 | 254 | 48 | 62 | 62 | |
| 3 | 20 | 967.77 | 0.32 | 1.77 | 2.0 | 109 | 252 | 257 | 50 | 62 | 62 | |
| 2 | 25 | 970.81 | 0.37 | 1.22 | 2.0 | 110 | 250 | 251 | 51 | 62 | 62 | |
| 1 | 30 | 974.44 | 0.45 | 1.78 | 2.5 | 111 | 250 | 251 | 51 | 62 | 62 | |
| B-6 | 35 | 977.96 | 0.46 | 1.82 | 2.5 | 112 | 248 | 249 | 49 | 63 | 63 | |
| 5 | 40 | 981.81 | 0.52 | 2.06 | 2.5 | 112 | 251 | 254 | 49 | 63 | 63 | |
| 4 | 45 | 986.01 | 0.60 | 2.38 | 3.0 | 111 | 251 | 250 | 50 | 64 | 64 | |
| 3 | 50 | 990.25 | 0.63 | 2.50 | 3.0 | 112 | 250 | 251 | 52 | 64 | 64 | |
| 2 | 55 | 994.47 | 0.62 | 2.46 | 3.0 | 111 | 250 | 251 | 53 | 64 | 64 | |
| 1 | 60 | 998.61 | 0.58 | 2.30 | 3.0 | 111 | 250 | 251 | 54 | 65 | 65 | |
| C-6 | 65 | 1002.06 | 0.47 | 1.63 | 2.5 | 112 | 251 | 252 | 53 | 65 | 65 | |
| 5 | 70 | 1005.63 | 0.45 | 1.79 | 2.5 | 112 | 250 | 251 | 52 | 66 | 66 | |
| 4 | 75 | 1009.04 | 0.39 | 1.55 | 2.5 | 112 | 249 | 246 | 58 | 66 | 66 | |
| 3 | 80 | 1012.66 | 0.45 | 1.79 | 2.5 | 112 | 249 | 249 | 60 | 67 | 67 | |
| 2 | 85 | 1016.54 | 0.46 | 1.91 | 3.0 | 112 | 248 | 250 | 62 | 67 | 67 | |
| 1 | 90 | 1020.12 | 0.46 | 1.83 | 3.0 | 112 | 249 | 243 | 63 | 68 | 68 | |
| D-6 | 95 | 1023.48 | 0.34 | 1.36 | 2.5 | 112 | 251 | 253 | 65 | 68 | 68 | |
| 5 | 100 | 1026.66 | 0.35 | 1.40 | 2.5 | 112 | 250 | 253 | 64 | 69 | 69 | |
| 4 | 105 | 1030.06 | 0.37 | 1.48 | 2.5 | 112 | 250 | 251 | 62 | 69 | 69 | |
| 3 | 110 | 1033.36 | 0.38 | 1.52 | 2.5 | 112 | 250 | 251 | 62 | 70 | 70 | |
| 2 | 115 | 1036.90 | 0.40 | 1.60 | 2.5 | 112 | 250 | 248 | 62 | 70 | 70 | |
| 1 | 120 | 1040.74 | 0.38 | 1.53 | 2.5 | 111 | 251 | 247 | 62 | 70 | 70 | |
| \bar{Q} | | Vm <u>977.74</u> | \bar{V} <u>0.46</u> | ΔH <u>1.42</u> | | Ts <u>111.33</u> | | | | | Tm <u>65.42</u> | |

| Initialization Values | | | Test Run Times | | ORSAT System | | | Sample Train Components | | | Nozzle Calibration | |
|-----------------------|----------------|------------------|----------------|----------|--------------|---------|----------------------|-------------------------|------------|-----------|--------------------|---------------------|
| Meter Temp | Oxygen Content | Moisture Content | Start Time | End Time | Bag No. | Bag Vol | cc/min * at 15 in Hg | Filter No. | Nozzle No. | Nozzle Dn | Tech. <u>OSK</u> | Date <u>4-26-20</u> |
| Run 1 | 62 | 17.2 | 0748 | 0950 | 1 | 25 | 0.0 | Quartz | 6-254 | 1 | 0.253 | |
| Run 2 | | | | | | | | | 1 | 1 | 0.254 | |
| | | | | | | | | | | | Avg. in. | 0.254 |

Moisture Recovery Data:

| Impinger | 1 | 2 | 3 | 4 | 5 | 6 | Desiccant | Total |
|----------------|-------|-------|-------|-------|-------|---|-----------|-------|
| Final wt., g | 900.5 | 780.1 | 652.1 | 752.2 | 779.6 | | 964.1 | |
| Initial wt., g | 757.6 | 742.1 | 646.7 | 750.2 | 780.0 | | 937.2 | |
| Difference | 142.9 | 33.0 | 84.4 | 2.0 | -0.4 | | 26.9 | 209.8 |

| Air Flows | |
|-----------|---------|
| ACFM | DSCFM |
| 496,282 | 389,196 |



EPA METHOD 29
FIELD DATA SHEET

Project Mining Meter ID C-14 Probe ID 7-Y Bar. Pres 28.10 in Hg
Smpl Loc 66 WLS 5014Y Meter Y 0.9805 Pitot No. 7-Y Stat. Pres -0.31 in H₂O
Test No. 3 Run 2 Orifice H@ 2.029Y Pitot Cp 0.7Y Probe Lgth 7 ft
Date 4-30-20 Operators DK/MSN/TAK Liner Type: ☒ Glass ☐ S.S. ☐ Other _____ Imp TC 8918

| Sample Train Leak Rate (cfm) | | |
|------------------------------|--|--------------------|
| Pretest | <u>0.2</u> | at <u>10</u> in Hg |
| Posttest | <u>0.2</u> | at <u>2</u> in Hg |
| Pitot (3 in.) | Pos. <input checked="" type="checkbox"/> Neg. <input type="checkbox"/> | |

| Sample Point | Sample Time Δt | Meter Volume Vm, ft ³ | Velocity ΔP, in H ₂ O | Orifice ΔH, in H ₂ O | Sample Vacuum, in Hg | Stack Temp. Ts, °F | Sample Train Temperatures, °F | | | | | Oxygen Content, % |
|--------------|----------------|----------------------------------|----------------------------------|---------------------------------|----------------------|--------------------|-------------------------------|--------|-----------------|-------------|--------------|-------------------|
| | | | | | | | Probe | Filter | Impinger Outlet | Meter Inlet | Meter Outlet | |
| A-6 | 5 | 43.70 | 0.36 | 1.43 | 2.0 | 112 | 252 | 252 | 63 | 71 | 71 | |
| 5 | 10 | 43.10 | 0.32 | 1.27 | 2.0 | 112 | 250 | 251 | 58 | 72 | 72 | |
| 4 | 15 | 50.28 | 0.36 | 1.43 | 2.0 | 112 | 250 | 251 | 58 | 72 | 72 | |
| 3 | 20 | 53.52 | 0.35 | 1.37 | 2.0 | 112 | 251 | 252 | 58 | 72 | 72 | |
| 2 | 25 | 56.81 | 0.36 | 1.43 | 2.5 | 113 | 250 | 250 | 58 | 72 | 72 | |
| 1 | 30 | 60.17 | 0.40 | 1.59 | 2.5 | 112 | 251 | 252 | 58 | 72 | 72 | |
| B-6 | 35 | 63.71 | 0.44 | 1.75 | 2.5 | 112 | 252 | 251 | 58 | 72 | 72 | |
| 5 | 40 | 67.36 | 0.45 | 1.79 | 2.5 | 112 | 250 | 248 | 53 | 72 | 72 | |
| 4 | 45 | 71.02 | 0.48 | 1.94 | 3.0 | 113 | 251 | 250 | 52 | 72 | 72 | |
| 3 | 50 | 74.78 | 0.48 | 1.91 | 3.0 | 113 | 248 | 241 | 51 | 73 | 73 | |
| 2 | 55 | 78.74 | 0.53 | 2.11 | 3.0 | 113 | 250 | 249 | 51 | 73 | 73 | |
| 1 | 60 | 82.42 | 0.45 | 1.79 | 2.5 | 112 | 251 | 250 | 52 | 73 | 73 | |
| C-6 | 65 | 86.71 | 0.51 | 2.03 | 3.0 | 112 | 242 | 250 | 52 | 74 | 74 | |
| 5 | 70 | 90.38 | 0.54 | 2.16 | 3.5 | 112 | 252 | 248 | 51 | 74 | 74 | |
| 4 | 75 | 94.80 | 0.59 | 2.36 | 3.5 | 112 | 251 | 252 | 51 | 73 | 73 | |
| 3 | 80 | 99.12 | 0.62 | 2.47 | 4.0 | 112 | 251 | 251 | 54 | 74 | 74 | |
| 2 | 85 | 103.34 | 0.64 | 2.56 | 4.0 | 112 | 250 | 251 | 56 | 74 | 74 | |
| 1 | 90 | 107.53 | 0.59 | 2.36 | 3.5 | 112 | 251 | 252 | 57 | 74 | 74 | |
| D-6 | 95 | 111.73 | 0.34 | 1.36 | 3.0 | 111 | 251 | 252 | 57 | 75 | 75 | |
| 5 | 100 | 114.58 | 0.51 | 2.04 | 3.5 | 112 | 250 | 251 | 60 | 75 | 75 | |
| 4 | 105 | 118.74 | 0.55 | 2.21 | 4.0 | 111 | 250 | 251 | 62 | 74 | 74 | |
| 3 | 110 | 122.91 | 0.54 | 2.17 | 4.0 | 110 | 250 | 249 | 62 | 74 | 74 | |
| 2 | 115 | 126.81 | 0.49 | 1.96 | 3.5 | 111 | 250 | 251 | 63 | 74 | 74 | |
| 1 | 120 | 130.78 | 0.52 | 2.08 | 3.5 | 111 | 251 | 250 | 63 | 74 | 74 | |
| Σ | | Vm=90.34 | 0.48 | ΔH=1.90 | | Ts=111.96 | | | | | Tm=73.48 | |

| Initialization Values | | | Test Run Times | | ORSAT System | | | Sample Train Components | | | Nozzle Calibration | |
|-----------------------|----------------|------------------|----------------|----------|--------------|---------|----------------------|-------------------------|------------|-----------|--------------------|------|
| Meter Temp | Oxygen Content | Moisture Content | Start Time | End Time | Bag No. | Bag Vol | cc/min * at 15 in Hg | Filter No. | Nozzle No. | Nozzle Dn | Tech. | Date |
| 71 | 17.2 | 9.6 | 1002 | 1207 | 2 | 25 | 0.0 | QW-12 | 6-25Y | 0.25Y | | |
| Run 1 | | | | | | | | | | | | |
| Run 2 | | | | | | | | | | | | |
| | | | | | | | | | | | Avg. in. | |

Moisture Recovery Data:

| Impinger | 1 | 2 | 3 | 4 | 5 | 6 | Desiccant | Total |
|----------------|-------|-------|-------|-------|-------|---|-----------|-------|
| Final wt., g | 891.1 | 600.8 | 671.0 | 758.6 | 769.5 | | 988.2 | |
| Initial wt., g | 748.8 | 758.2 | 665.3 | 752.7 | 769.0 | | 963.5 | |
| Difference | 142.3 | 42.6 | 5.7 | 5.9 | 0.5 | | 24.7 | 221.7 |

| Air Flows | |
|-----------|---------|
| ACFM | DSCFM |
| 506,808 | 396,256 |



EPA METHOD 29
FIELD DATA SHEET

Project Mining Meter ID C-14 Probe ID 7-4 Bar. Pres 28.10 in Hg
Smpl Loc 6 hrs 5-144 Meter Y 240.105 Pitot No. 7-4 Stat. Pres -0.31 in H₂O
Test No. 3 Run 3 Orifice H@ 2.294 Pitot Cp 0.44 Probe Lgth 7 ft
Date 4-3-2 Operators 026/MSN/RAK Liner Type: ☒ Glass ☐ S.S. ☐ Other _____ Imp TC 8948

| Sample Train Leak Rate (cfm) | | |
|------------------------------|--|--|
| Pretest | <u>0.0</u> | at <u>10</u> in Hg |
| Posttest | <u>0.0</u> | at <u>7</u> in Hg |
| Pitot (3 in.) | Pos. <input checked="" type="checkbox"/> | Neg. <input checked="" type="checkbox"/> |

| Sample Point | Sample Time Δt | Meter Volume Vm, ft ³ | Velocity ΔP , in H ₂ O | Orifice ΔH , in H ₂ O | Sample Vacuum, in Hg | Stack Temp. Ts, °F | Sample Train Temperatures, °F | | | | | Oxygen Content, % |
|--------------------|------------------------|----------------------------------|---|--|----------------------|--------------------|-------------------------------|--------|-----------------|---------------|--------------|-------------------|
| | | | | | | | Probe | Filter | Impinger Outlet | Meter Inlet | Meter Outlet | |
| A-6 | 1221 | 131.06 | | | | | | | | | | |
| 5 | 5 | 134.78 | 0.47 | 1.88 | 2.5 | 112 | 246 | 250 | 58 | 75 | 75 | |
| 4 | 15 | 138.81 | 0.51 | 2.07 | 2.5 | 112 | 252 | 251 | 55 | 74 | 74 | |
| 3 | 25 | 142.29 | 0.54 | 2.15 | 3.0 | 112 | 250 | 251 | 52 | 74 | 74 | |
| 2 | 35 | 146.68 | 0.60 | 2.39 | 3.0 | 111 | 250 | 251 | 53 | 74 | 74 | |
| 1 | 45 | 151.42 | 0.63 | 2.51 | 3.5 | 112 | 250 | 251 | 53 | 74 | 74 | |
| B-6 | 55 | 155.44 | 0.56 | 2.33 | 3.0 | 111 | 250 | 251 | 52 | 74 | 74 | |
| 5 | 65 | 159.14 | 0.46 | 1.84 | 2.5 | 111 | 250 | 251 | 53 | 74 | 74 | |
| 4 | 75 | 167.31 | 0.56 | 2.23 | 3.0 | 112 | 245 | 251 | 52 | 75 | 75 | |
| 3 | 85 | 167.52 | 0.59 | 2.35 | 3.0 | 112 | 252 | 251 | 51 | 75 | 75 | |
| 2 | 95 | 171.88 | 0.64 | 2.55 | 3.5 | 112 | 249 | 250 | 52 | 74 | 74 | |
| 1 | 105 | 176.19 | 0.60 | 2.39 | 3.5 | 112 | 251 | 250 | 55 | 74 | 74 | |
| C-6 | 115 | 180.22 | 0.54 | 2.15 | 3.0 | 112 | 250 | 251 | 56 | 75 | 75 | |
| 5 | 125 | 183.18 | 0.30 | 1.20 | 2.0 | 112 | 251 | 251 | 59 | 74 | 74 | |
| 4 | 135 | 186.42 | 0.36 | 1.43 | 2.5 | 112 | 250 | 254 | 64 | 74 | 74 | |
| 3 | 145 | 189.89 | 0.40 | 1.59 | 2.5 | 112 | 250 | 254 | 59 | 74 | 74 | |
| 2 | 155 | 193.77 | 0.47 | 1.87 | 3.0 | 113 | 250 | 254 | 59 | 74 | 74 | |
| 1 | 165 | 197.47 | 0.49 | 1.96 | 3.0 | 110 | 251 | 252 | 58 | 74 | 74 | |
| D-6 | 175 | 201.54 | 0.52 | 2.07 | 3.0 | 112 | 251 | 252 | 60 | 74 | 74 | |
| 5 | 185 | 204.95 | 0.33 | 1.31 | 2.5 | 112 | 251 | 257 | 64 | 74 | 74 | |
| 4 | 195 | 208.16 | 0.34 | 1.35 | 2.5 | 113 | 249 | 251 | 65 | 74 | 74 | |
| 3 | 205 | 211.55 | 0.37 | 1.47 | 2.5 | 112 | 251 | 250 | 64 | 74 | 74 | |
| 2 | 215 | 214.87 | 0.30 | 1.51 | 2.5 | 113 | 250 | 251 | 63 | 74 | 74 | |
| 1 | 225 | 218.32 | 0.41 | 1.63 | 3.0 | 113 | 250 | 251 | 63 | 74 | 74 | |
| | 235 | 221.5 | 0.34 | 1.35 | 2.5 | 113 | 250 | 251 | 62 | 73 | 73 | |
| $\bar{\Delta t} =$ | | $V_m = 0.44$ | $\bar{\Delta P} = 0.48$ | $\bar{\Delta H} = 1.89$ | | $T_s = 112.0$ | | | | $T_m = 74.13$ | | |

| Initialization Values | | | Test Run Times | | ORSAT System | | | Sample Train Components | | | Nozzle Calibration | |
|-----------------------|----------------|------------------|----------------|----------|--------------|---------|----------------------|-------------------------|------------|-----------|--------------------|------|
| Meter Temp | Oxygen Content | Moisture Content | Start Time | End Time | Bag No. | Bag Vol | cc/min * at 15 in Hg | Filter No. | Nozzle No. | Nozzle Dn | Tech. | Date |
| 75 | 17.2 | 9.7 | 1221 | 1429 | 3 | 25 | 20 | Quartz | 6-254 | 0.254 | | |
| Run 1 | | | | | | | | | | | 1 | |
| Run 2 | | | | | | | | | | | 2 | |
| | | | | | | | | | | | 3 | |
| | | | | | | | | | | | Avg. in. | |

Moisture Recovery Data:

| Impinger | 1 | 2 | 3 | 4 | 5 | 6 | Desiccant | Total |
|----------------|-------|-------|-------|-------|-------|---|-----------|-------|
| Final wt., g | 909.5 | 784.2 | 655.3 | 761.1 | 791.2 | | 998.9 | |
| Initial wt., g | 755.9 | 749.8 | 651.4 | 756.8 | 779.5 | | 975.8 | |
| Difference | 153.6 | 34.4 | 3.9 | 4.3 | 11.7 | | 23.1 | 221.0 |

| Air Flows | |
|-----------|---------|
| ACFM | DSCFM |
| 506.808 | 396.256 |

* 496.202

399.196

* RMP 5-27-2020



EPA Method 29 - Field Data Sheet - Run 1

| | | | | | | | | | |
|-----------------|------------------------------|-------------|--------|----------------|-------|-------------|----------|---------|--|
| Project | U.S. Steel Corporation | Meter ID | C-14 | Probe ID | 7-4 | Bar.Press. | 28.10 | in. Hg | Sample Train Leak Rate, cfm: |
| Sample Location | Line 6 Waste Gas Stack SV144 | Meter Y | 0.9805 | Pitot Tube No. | 7-4 | Stat Press. | -0.3 | in. H2O | Pretest 0.000 at 10 in. Hg |
| Date | 04/30/20 | Orifice dH@ | 2.0294 | Pitot Cp | 0.84 | CPM TC | NA | | Posttest 0.000 at 7 in. Hg |
| Test | 3 | Run # | 1 | Liner Type: | Glass | IMP Out TC | TIO-8948 | | Pretest Pitot leak Check Pos PASS @ >3" w.c |
| Operators | DJK /MJN | | | | | | | | Posttest Pitot leak Check Neg PASS @ >3" w.c |

| Sample Point | Sample Time DT | Actual Meter Vol Vm, ft3 | Velocity Head DP, in. H2O | Orifice DH in. H2O | Ideal Point Volume Vm, ft3 | Ideal Meter Vol Vm, ft3 | Sample Train Vacuum in. Hg | Stack Temp Ts, °F | Sample Train Temperatures, °F | | | | | Moisture Content, % |
|--------------|----------------|--------------------------|---------------------------|--------------------|----------------------------|-------------------------|----------------------------|-------------------|-------------------------------|-------|-----------------|-------------|--------------|---------------------|
| | | | | | | | | | Filter | Probe | Impinger Outlet | Meter Inlet | Meter Outlet | |
| Start Time | 0744 | 952.50 | | | | | | | | | | | | |
| 1 | 5.0 | 956.21 | 0.490 | 1.94 | 3.81 | 956.31 | * | 111 | * | * | * | 62 | 62 | 9.0 |
| 2 | 10.0 | 960.40 | 0.550 | 2.18 | 4.04 | 960.34 | * | 109 | * | * | * | 62 | 62 | 9.0 |
| 3 | 15.0 | 964.42 | 0.530 | 2.10 | 3.96 | 964.30 | * | 110 | * | * | * | 62 | 62 | 9.0 |
| 4 | 20.0 | 967.77 | 0.370 | 1.47 | 3.32 | 967.62 | * | 109 | * | * | * | 62 | 62 | 9.0 |
| 5 | 25.0 | 970.81 | 0.310 | 1.23 | 3.04 | 970.66 | * | 110 | * | * | * | 62 | 62 | 9.0 |
| 6 | 30.0 | 974.44 | 0.450 | 1.78 | 3.65 | 974.30 | * | 111 | * | * | * | 62 | 62 | 9.0 |
| 7 | 35.0 | 977.96 | 0.460 | 1.82 | 3.69 | 977.99 | * | 112 | * | * | * | 63 | 63 | 9.0 |
| 8 | 40.0 | 981.81 | 0.520 | 2.06 | 3.92 | 981.91 | * | 112 | * | * | * | 63 | 63 | 9.0 |
| 9 | 45.0 | 986.01 | 0.600 | 2.38 | 4.21 | 986.13 | * | 111 | * | * | * | 64 | 64 | 9.0 |
| 10 | 50.0 | 990.25 | 0.630 | 2.50 | 4.32 | 990.45 | * | 112 | * | * | * | 64 | 64 | 9.0 |
| 11 | 55.0 | 994.47 | 0.620 | 2.46 | 4.29 | 994.74 | * | 111 | * | * | * | 64 | 64 | 9.0 |
| 12 | 60.0 | 998.61 | 0.580 | 2.30 | 4.15 | 998.90 | * | 111 | * | * | * | 65 | 65 | 9.0 |
| 13 | 65.0 | 1002.06 | 0.410 | 1.63 | 3.50 | 1002.40 | * | 112 | * | * | * | 65 | 65 | 9.0 |
| 14 | 70.0 | 1005.63 | 0.450 | 1.79 | 3.67 | 1006.06 | * | 112 | * | * | * | 66 | 66 | 9.0 |
| 15 | 75.0 | 1009.00 | 0.390 | 1.55 | 3.42 | 1009.48 | * | 112 | * | * | * | 66 | 66 | 9.0 |
| 16 | 80.0 | 1012.66 | 0.450 | 1.79 | 3.67 | 1013.16 | * | 112 | * | * | * | 67 | 67 | 9.0 |
| 17 | 85.0 | 1016.34 | 0.480 | 1.91 | 3.80 | 1016.96 | * | 112 | * | * | * | 67 | 67 | 9.0 |
| 18 | 90.0 | 1020.12 | 0.460 | 1.83 | 3.72 | 1020.68 | * | 112 | * | * | * | 68 | 68 | 9.0 |
| 19 | 95.0 | 1023.44 | 0.340 | 1.36 | 3.21 | 1023.89 | * | 112 | * | * | * | 68 | 68 | 9.0 |
| 20 | 100.0 | 1026.66 | 0.350 | 1.40 | 3.26 | 1027.14 | * | 112 | * | * | * | 69 | 69 | 9.0 |
| 21 | 105.0 | 1030.06 | 0.370 | 1.48 | 3.35 | 1030.50 | * | 112 | * | * | * | 69 | 69 | 9.0 |
| 22 | 110.0 | 1033.36 | 0.380 | 1.52 | 3.40 | 1033.89 | * | 112 | * | * | * | 70 | 70 | 9.0 |
| 23 | 115.0 | 1036.90 | 0.400 | 1.60 | 3.49 | 1037.38 | * | 112 | * | * | * | 70 | 70 | 9.0 |
| 24 | 120.0 | 1040.24 | 0.380 | 1.53 | 3.41 | 1040.79 | * | 111 | * | * | * | 70 | 70 | 9.0 |
| End Time | 0950 | | | | | | | | | | | | | |
| Run Time | 120 | | Avg DH= | 1.82 | | | Avg Ts= | 111.33 | | | | Avg Tm= | 65.42 | |

Integrated Gas Sampling Data :

Bag No. 1
Bag Vol. 25 liters
Leak Rate 0 cc/min

Filter No. Quartz
Nozzle No. G-254
Nozzle Dn. 0.254

MOISTURE RECOVERY DATA :

Impinger
Final wt., g
Initial wt., g
Difference

| 1 | 2 | 3 | 4 | 5 | Desiccant | Total | | |
|-------|-------|-------|-------|-------|-----------|-------|--|--|
| 900.5 | 780.1 | 652.1 | 752.2 | 779.6 | 964.1 | | | |
| 757.6 | 747.1 | 646.7 | 750.2 | 780.0 | 937.2 | | | |
| 142.9 | 33.0 | 5.4 | 2.0 | -0.4 | 26.9 | 209.8 | | |

* Data Recorded on Field Data Sheet



EPA Method 29 - Field Data Sheet - Run 2

| | | | | | | | | | | |
|-----------------|------------------------------|-------------|--------|----------------|-------|-------------|----------|---------|-------------------------------|--------------------|
| Project | U.S. Steel Corporation | Meter ID | C-14 | Probe ID | 7-4 | Bar.Press. | 28.10 | in. Hg | Sample Train Leak | Rate, cfm: |
| Sample Location | Line 6 Waste Gas Stack SV144 | Meter Y | 0.9805 | Pitot Tube No. | 7-4 | Stat Press. | -0.3 | in. H2O | Pretest | 0.000 at 10 in. Hg |
| Date | 04/30/20 | Orifice dH@ | 2.0294 | Pitot Cp | 0.84 | CPM TC | NA | | Posttest | 0.000 at 7 in. Hg |
| Test | 3 | Run # | 2 | Liner Type: | Glass | IMP Out TC | TIO-8948 | | Pretest Pitot leak Check Pos | PASS @ >3" w.c |
| Operators | DJK /MJN | | | | | | | | Posttest Pitot leak Check Neg | PASS @ >3" w.c |

| Sample Point | Sample Time DT | Actual Meter Vol Vm, ft3 | Velocity Head DP, in. H2O | Orifice DH in. H2O | Ideal Point Volume Vm, ft3 | Ideal Meter Vol Vm, ft3 | Sample Train Vacuum in. Hg | Stack Temp Ts, °F | Sample Train Temperatures, °F | | | | | Moisture Content, % |
|--------------|----------------|--------------------------|---------------------------|--------------------|----------------------------|-------------------------|----------------------------|-------------------|-------------------------------|-------|-----------------|-------------|--------------|---------------------|
| | | | | | | | | | Filter | Probe | Impinger Outlet | Meter Inlet | Meter Outlet | |
| Start Time | 1002 | 40.44 | | | | | | | | | | | | |
| 1 | 5.0 | 43.70 | 0.360 | 1.43 | 3.30 | 43.74 | * | 112 | * | * | * | 71 | 71 | 9.6 |
| 2 | 10.0 | 47.10 | 0.320 | 1.27 | 3.12 | 46.86 | * | 112 | * | * | * | 72 | 72 | 9.6 |
| 3 | 15.0 | 50.28 | 0.360 | 1.43 | 3.31 | 50.17 | * | 112 | * | * | * | 72 | 72 | 9.6 |
| 4 | 20.0 | 53.52 | 0.350 | 1.39 | 3.26 | 53.43 | * | 112 | * | * | * | 72 | 72 | 9.6 |
| 5 | 25.0 | 56.81 | 0.360 | 1.43 | 3.31 | 56.74 | * | 113 | * | * | * | 72 | 72 | 9.6 |
| 6 | 30.0 | 60.17 | 0.400 | 1.59 | 3.48 | 60.22 | * | 113 | * | * | * | 72 | 72 | 9.6 |
| 7 | 35.0 | 63.71 | 0.440 | 1.75 | 3.66 | 63.88 | * | 112 | * | * | * | 72 | 72 | 9.6 |
| 8 | 40.0 | 67.36 | 0.450 | 1.79 | 3.70 | 67.57 | * | 112 | * | * | * | 72 | 72 | 9.6 |
| 9 | 45.0 | 71.02 | 0.480 | 1.91 | 3.81 | 71.38 | * | 113 | * | * | * | 72 | 72 | 9.6 |
| 10 | 50.0 | 74.78 | 0.480 | 1.91 | 3.81 | 75.20 | * | 113 | * | * | * | 73 | 73 | 9.6 |
| 11 | 55.0 | 78.74 | 0.530 | 2.11 | 4.01 | 79.21 | * | 113 | * | * | * | 73 | 73 | 9.6 |
| 12 | 60.0 | 82.42 | 0.450 | 1.79 | 3.70 | 82.91 | * | 112 | * | * | * | 73 | 73 | 9.6 |
| 13 | 65.0 | 86.31 | 0.510 | 2.03 | 3.94 | 86.85 | * | 112 | * | * | * | 74 | 74 | 9.6 |
| 14 | 70.0 | 90.38 | 0.540 | 2.16 | 4.06 | 90.91 | * | 112 | * | * | * | 74 | 74 | 9.6 |
| 15 | 75.0 | 94.80 | 0.590 | 2.36 | 4.24 | 95.15 | * | 112 | * | * | * | 73 | 73 | 9.6 |
| 16 | 80.0 | 99.12 | 0.620 | 2.47 | 4.34 | 99.49 | * | 112 | * | * | * | 74 | 74 | 9.6 |
| 17 | 85.0 | 103.34 | 0.640 | 2.56 | 4.42 | 103.91 | * | 112 | * | * | * | 74 | 74 | 9.6 |
| 18 | 90.0 | 107.53 | 0.590 | 2.36 | 4.24 | 108.15 | * | 112 | * | * | * | 74 | 74 | 9.6 |
| 19 | 95.0 | 110.73 | 0.340 | 1.36 | 3.23 | 111.38 | * | 111 | * | * | * | 75 | 75 | 9.6 |
| 20 | 100.0 | 114.58 | 0.510 | 2.04 | 3.95 | 115.34 | * | 112 | * | * | * | 75 | 75 | 9.6 |
| 21 | 105.0 | 118.74 | 0.550 | 2.21 | 4.11 | 119.45 | * | 111 | * | * | * | 74 | 74 | 9.6 |
| 22 | 110.0 | 122.91 | 0.540 | 2.17 | 4.07 | 123.51 | * | 110 | * | * | * | 74 | 74 | 9.6 |
| 23 | 115.0 | 126.81 | 0.490 | 1.96 | 3.87 | 127.39 | * | 111 | * | * | * | 74 | 74 | 9.6 |
| 24 | 120.0 | 130.78 | 0.520 | 2.08 | 3.99 | 131.38 | * | 111 | * | * | * | 74 | 74 | 9.6 |
| End Time | 1209 | | | | | | | | | | | | | |
| Run Time | 120 | | Avg DH= | 1.90 | | | Avg Ts= | 111.96 | | | | Avg Tm= | 73.13 | |

Integrated Gas Sampling Data :

| | |
|-----------|-----------|
| Bag No. | 2 |
| Bag Vol. | 25 liters |
| Leak Rate | 0 cc/min |

| | |
|------------|--------|
| Filter No. | Quartz |
| Nozzle No. | G-254 |
| Nozzle Dn. | 0.254 |

MOISTURE RECOVERY DATA :

| |
|----------------|
| Impinger |
| Final wt., g |
| Initial wt., g |
| Difference |

| 1 | 2 | 3 | 4 | 5 | Desiccant | Total | | |
|-------|-------|-------|-------|-------|-----------|-------|--|--|
| 891.1 | 800.8 | 671.0 | 758.6 | 769.5 | 988.2 | | | |
| 748.8 | 758.2 | 665.3 | 752.7 | 769.0 | 963.5 | | | |
| 142.3 | 42.6 | 5.7 | 5.9 | 0.5 | 24.7 | 221.7 | | |

* Data Recorded on Field Data Sheet



EPA Method 29 - Field Data Sheet - Run 3

| | | | | | | | | | | |
|-----------------|------------------------------|-------------|--------|----------------|-------|-------------|----------|---------|-------------------------------|--------------------|
| Project | U.S. Steel Corporation | Meter ID | C-14 | Probe ID | 7-4 | Bar.Press. | 28.10 | in. Hg | Sample Train Leak | Rate, cfm: |
| Sample Location | Line 6 Waste Gas Stack SV144 | Meter Y | 0.9805 | Pitot Tube No. | 7-4 | Stat Press. | -0.3 | in. H2O | Pretest | 0.000 at 10 in. Hg |
| Date | 04/30/20 | Orifice dH@ | 2.0294 | Pitot Cp | 0.84 | CPM TC | NA | | Posttest | 0.000 at 7 in. Hg |
| Test | 3 | Run # | 3 | Liner Type: | Glass | IMP Out TC | TIO-8948 | | Pretest Pitot leak Check Pos | PASS @ >3" w.c |
| Operators | DJK /MJN | | | | | | | | Posttest Pitot leak Check Neg | PASS @ >3" w.c |

| Sample Point | Sample Time DT | Actual Meter Vol Vm, ft3 | Velocity Head DP, in. H2O | Orifice DH in. H2O | Ideal Point Volume Vm, ft3 | Ideal Meter Vol Vm, ft3 | Sample Train Vacuum in. Hg | Stack Temp Ts, °F | Sample Train Temperatures, °F | | | | | Moisture Content, % |
|--------------|----------------|--------------------------|---------------------------|--------------------|----------------------------|-------------------------|----------------------------|-------------------|-------------------------------|-------|-----------------|-------------|--------------|---------------------|
| | | | | | | | | | Filter | Probe | Impinger Outlet | Meter Inlet | Meter Outlet | |
| Start Time | 1221 | 131.06 | | | | | | | | | | | | |
| 1 | 5.0 | 134.78 | 0.470 | 1.88 | 3.79 | 134.85 | * | 112 | * | * | * | 75 | 75 | 9.7 |
| 2 | 10.0 | 138.81 | 0.510 | 2.04 | 3.95 | 138.80 | * | 112 | * | * | * | 74 | 74 | 9.7 |
| 3 | 15.0 | 142.79 | 0.540 | 2.15 | 4.05 | 142.85 | * | 112 | * | * | * | 74 | 74 | 9.7 |
| 4 | 20.0 | 146.68 | 0.600 | 2.39 | 4.27 | 147.13 | * | 111 | * | * | * | 74 | 74 | 9.7 |
| 5 | 25.0 | 151.42 | 0.630 | 2.51 | 4.37 | 151.50 | * | 112 | * | * | * | 74 | 74 | 9.7 |
| 6 | 30.0 | 155.44 | 0.560 | 2.23 | 4.13 | 155.63 | * | 111 | * | * | * | 74 | 74 | 9.7 |
| 7 | 35.0 | 159.14 | 0.460 | 1.84 | 3.75 | 159.38 | * | 111 | * | * | * | 74 | 74 | 9.7 |
| 8 | 40.0 | 163.31 | 0.560 | 2.23 | 4.13 | 163.51 | * | 112 | * | * | * | 75 | 75 | 9.7 |
| 9 | 45.0 | 167.52 | 0.590 | 2.35 | 4.24 | 167.75 | * | 112 | * | * | * | 75 | 75 | 9.7 |
| 10 | 50.0 | 171.88 | 0.640 | 2.55 | 4.42 | 172.17 | * | 112 | * | * | * | 74 | 74 | 9.7 |
| 11 | 55.0 | 176.19 | 0.600 | 2.39 | 4.27 | 176.44 | * | 112 | * | * | * | 74 | 74 | 9.7 |
| 12 | 60.0 | 180.22 | 0.540 | 2.15 | 4.05 | 180.50 | * | 112 | * | * | * | 75 | 75 | 9.7 |
| 13 | 65.0 | 183.18 | 0.300 | 1.20 | 3.03 | 183.53 | * | 112 | * | * | * | 74 | 74 | 9.7 |
| 14 | 70.0 | 186.42 | 0.360 | 1.43 | 3.32 | 186.85 | * | 112 | * | * | * | 74 | 74 | 9.7 |
| 15 | 75.0 | 189.89 | 0.400 | 1.59 | 3.49 | 190.34 | * | 112 | * | * | * | 74 | 74 | 9.7 |
| 16 | 80.0 | 193.77 | 0.470 | 1.87 | 3.78 | 194.12 | * | 113 | * | * | * | 74 | 74 | 9.7 |
| 17 | 85.0 | 197.44 | 0.490 | 1.96 | 3.87 | 197.99 | * | 110 | * | * | * | 74 | 74 | 9.7 |
| 18 | 90.0 | 201.54 | 0.520 | 2.07 | 3.98 | 201.97 | * | 112 | * | * | * | 74 | 74 | 9.7 |
| 19 | 95.0 | 204.95 | 0.330 | 1.31 | 3.18 | 205.15 | * | 112 | * | * | * | 74 | 74 | 9.7 |
| 20 | 100.0 | 208.16 | 0.340 | 1.35 | 3.22 | 208.37 | * | 113 | * | * | * | 74 | 74 | 9.7 |
| 21 | 105.0 | 211.55 | 0.370 | 1.47 | 3.36 | 211.73 | * | 112 | * | * | * | 74 | 74 | 9.7 |
| 22 | 110.0 | 214.87 | 0.380 | 1.51 | 3.40 | 215.13 | * | 113 | * | * | * | 74 | 74 | 9.7 |
| 23 | 115.0 | 218.32 | 0.410 | 1.63 | 3.53 | 218.67 | * | 113 | * | * | * | 74 | 74 | 9.7 |
| 24 | 120.0 | 221.50 | 0.340 | 1.35 | 3.22 | 221.89 | * | 113 | * | * | * | 73 | 73 | 9.7 |
| End Time | 1429 | | | | | | | | | | | | | |
| Run Time | 120 | | Avg DH= | 1.89 | | | Avg Ts= | 112.00 | | | | Avg Tm= | 74.13 | |

Integrated Gas Sampling Data :

Bag No. 3
Bag Vol. 25 liters
Leak Rate 0 cc/min

Filter No. Quartz
Nozzle No. G-254
Nozzle Dn. 0.254

MOISTURE RECOVERY DATA :

Impinger
Final wt., g
Initial wt., g
Difference

| 1 | 2 | 3 | 4 | 5 | Desiccant | Total | | |
|-------|-------|-------|-------|-------|-----------|-------|--|--|
| 909.5 | 784.2 | 655.3 | 761.1 | 781.2 | 998.9 | | | |
| 755.9 | 749.8 | 651.4 | 756.8 | 779.5 | 975.8 | | | |
| 153.6 | 34.4 | 3.9 | 4.3 | 1.7 | 23.1 | 221.0 | | |

* Data Recorded on Field Data Sheet



EPA METHOD 3A -- Instrument Analysis Data Sheet

Project USS MinnTec
Sample Location(s): LG W65 SU144
Test No: 3
Date: 4-30-20
Operators: DAK

Analyzer Make / Model / Serial No. Servomex
Analyzer O₂ Range (span), %: 0-22.5
Analyzer CO₂ Range (span), %: 0-9.5

| | Cylinder Serial No. | O ₂ Cert. Conc. | CO ₂ Cert. Conc. |
|--|------------------------|----------------------------|-----------------------------|
| | | | |
| Zero Gas | <u>EB 0099389</u> | <u>0</u> | <u>0</u> |
| O ₂ /CO ₂ Mid-range | <u>EB 0099404</u> | <u>9.5</u> | <u>9.5</u> |
| O ₂ /CO ₂ High-range | <u>EB 0098389</u> | <u>22.5</u> | <u>4.9</u> |

PRETEST ANALYZER CALIBRATION DATA

| | O ₂ | | CO ₂ | |
|-------------|-------------------------|--|-------------------------|--|
| | Cylinder Value, % | Analyzer Calibration Response, % | Cylinder Value, % | Analyzer Calibration Response, % |
| Zero Gas | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> |
| Mid-range: | <u>9.5</u> | <u>9.5</u> | <u>4.9</u> | <u>4.9</u> |
| High-range: | <u>22.5</u> | <u>22.5</u> | <u>9.5</u> | <u>9.5</u> |

Time of Calibration 1438 to 1440

INTEGRATED BAG ANALYSIS

| | | | |
|---------------------|---------------|-------------|-------------|
| Location/Test No. | <u>LG W65</u> | | |
| Run No. | <u>1</u> | <u>2</u> | <u>3</u> |
| Time Sampled | | | <u>10</u> |
| Time Analyzed | <u>1441</u> | <u>1443</u> | <u>1445</u> |
| O ₂ , % | <u>17.5</u> | <u>17.4</u> | <u>17.2</u> |
| CO ₂ , % | <u>2.8</u> | <u>2.9</u> | <u>3.0</u> |

POSTTEST ANALYZER CALIBRATION DATA

| | O ₂ | | CO ₂ | |
|-------------|-------------------------|--|-------------------------|--|
| | Cylinder Value, % | Analyzer Calibration Response, % | Cylinder Value, % | Analyzer Calibration Response, % |
| Zero Gas | <u>0</u> | <u>0</u> | <u>0</u> | <u>0</u> |
| Mid-range: | <u>9.5</u> | <u>9.5</u> | <u>4.9</u> | <u>4.9</u> |
| High-range: | <u>22.5</u> | <u>22.5</u> | <u>9.5</u> | <u>9.5</u> |

Appendix C

Laboratory Reports and Sample Chain of Custody

Laboratory Results Summary of EPA Method 29 Mercury Analysis

Line 3 Waste Gas Stack (SV103)

Method 29 Mercury Mass Determination

Front Half (Filterable)

| Inputs | Symbol | Units | Run 1 | Run 2 | Run 3 | Blank (MHg _{fthb}) |
|---------------------------------|---------------------|-------|-------|-------|-------|------------------------------|
| Analysis #1, Total | -- | µg | 0.753 | 0.438 | 0.405 | < 0.1 |
| Analysis #2, Total | -- | µg | 0.745 | 0.439 | 0.407 | < 0.1 |
| Front Half Net Mass Hg, Average | MHg _{fthm} | µg | 0.749 | 0.439 | 0.406 | < 0.1 |

Back Half

| Inputs | Symbol | Units | Run 1 | Run 2 | Run 3 | Blanks |
|---|--------------------|-------|-------|-------|-------|--------|
| 10% H ₂ O ₂ / 5% HNO ₃ | | | | | | |
| Analysis #1, Total µg | -- | µg | 0.869 | 0.917 | 1.30 | < 0.2 |
| Analysis #2, Total µg | -- | µg | 0.874 | 0.907 | 1.32 | < 0.2 |
| Net Mass Average | MHg _{bh2} | µg | 0.872 | 0.912 | 1.31 | < 0.2 |

Empty Impinger

| | | | | | | |
|-----------------------|---------------------|----|-------|-------|-------|-------|
| Analysis #1, Total µg | -- | µg | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| Analysis #2, Total µg | -- | µg | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| Net Mass Average | MHg _{bh3A} | µg | < 0.2 | < 0.2 | < 0.2 | < 0.2 |

KMnO₄

| | | | | | | |
|-----------------------|---------------------|----|------|------|------|-------|
| Analysis #1, Total µg | -- | µg | 1.92 | 2.16 | 3.51 | < 0.5 |
| Analysis #2, Total µg | -- | µg | 1.96 | 2.13 | 3.49 | < 0.5 |
| Net Mass Average | MHg _{bh3B} | µg | 1.94 | 2.15 | 3.50 | < 0.5 |

HCl

| | | | | | | |
|--------------------|---------------------|----|------|------|-------|-------|
| Analysis #1, Total | -- | µg | 1.68 | 1.59 | 0.775 | < 0.4 |
| Analysis #2, Total | -- | µg | 1.65 | 1.59 | 0.794 | < 0.4 |
| Net Mass Average | MHg _{bh3C} | µg | 1.67 | 1.59 | 0.785 | < 0.4 |

| | | | | | | |
|--|--------------------|----|------|------|------|--|
| Total Back Half Net Mass Hg, Average MHg _{bhm} = M(Hg _{bh2} +Hg _{bh3A} +Hg _{bh3B} +Hg _{bh3C}) | MHg _{bhm} | µg | 4.68 | 4.85 | 5.79 | |
|--|--------------------|----|------|------|------|--|

Mercury Mass Determinations

| | | | | | | |
|---|------------------|----|------|------|------|--|
| Final Total Mercury Mass⁽²⁾ MHg _t = M(Hg _{fthm} + MHg _{bhm}) | MHg _t | µg | 5.43 | 5.29 | 6.20 | |
|---|------------------|----|------|------|------|--|

Note: The "<" sign indicates the mass is below method detection limits. All calculations forward use the detection limit for concentration and emission determinations and no blank correction is made.

Laboratory Results Summary of EPA Method 29 Mercury Analysis

Line 4 Waste Gas Stack (SV118)

Method 29 Mercury Mass Determination

Front Half (Filterable)

| Inputs | Symbol | Units | Run 1 | Run 2 | Run 3 | Blank (MHg _{fthb}) |
|---------------------------------|---------------------|-------|-------|-------|-------|------------------------------|
| Analysis #1, Total | -- | µg | < 0.1 | 0.142 | 0.125 | < 0.1 |
| Analysis #2, Total | -- | µg | < 0.1 | 0.146 | 0.125 | < 0.1 |
| Front Half Net Mass Hg, Average | MHg _{fthm} | µg | < 0.1 | 0.144 | 0.125 | < 0.1 |

Back Half

| Inputs | Symbol | Units | Run 1 | Run 2 | Run 3 | Blanks |
|---|--------------------|-------|-------|-------|-------|--------|
| 10% H ₂ O ₂ / 5% HNO ₃ | | | | | | |
| Analysis #1, Total µg | -- | µg | 1.78 | 1.94 | 2.04 | < 0.20 |
| Analysis #2, Total µg | -- | µg | 1.75 | 1.93 | 2.04 | < 0.20 |
| Net Mass Average | MHg _{bh2} | µg | 1.77 | 1.94 | 2.04 | < 0.20 |

Empty Impinger

| | | | | | | |
|-----------------------|---------------------|----|-------|-------|-------|-------|
| Analysis #1, Total µg | -- | µg | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| Analysis #2, Total µg | -- | µg | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| Net Mass Average | MHg _{bh3A} | µg | < 0.2 | < 0.2 | < 0.2 | < 0.2 |

KMnO₄

| | | | | | | |
|-----------------------|---------------------|----|------|------|------|-------|
| Analysis #1, Total µg | -- | µg | 2.93 | 3.00 | 4.37 | < 0.5 |
| Analysis #2, Total µg | -- | µg | 2.96 | 2.97 | 4.35 | < 0.5 |
| Net Mass Average | MHg _{bh3B} | µg | 2.95 | 2.99 | 4.36 | < 0.5 |

HCl

| | | | | | | |
|--------------------|---------------------|----|------|------|------|-------|
| Analysis #1, Total | -- | µg | 2.35 | 1.74 | 1.30 | < 0.4 |
| Analysis #2, Total | -- | µg | 2.36 | 1.73 | 1.28 | < 0.4 |
| Net Mass Average | MHg _{bh3C} | µg | 2.36 | 1.74 | 1.29 | < 0.4 |

| | | | | | | |
|--|--------------------|----|------|------|------|--|
| Total Back Half Net Mass Hg, Average MHg _{bhm} = M(Hg _{bh2} +Hg _{bh3A} +Hg _{bh3B} +Hg _{bh3C}) | MHg _{bhm} | µg | 7.27 | 6.86 | 7.89 | |
|--|--------------------|----|------|------|------|--|

Mercury Mass Determinations

| | | | | | | |
|--|------------------|----|------|------|------|--|
| Final Total Mercury Mass⁽²⁾ MHg _t = (MHg _{fthm} + MHg _{bhm}) - MHg _{blank} | MHg _t | µg | 7.37 | 7.00 | 8.02 | |
|--|------------------|----|------|------|------|--|

Note: The "<" sign indicates the mass is below method detection limits. All calculations forward use the detection limit for concentration and emission determinations and no blank correction is made.

Laboratory Results Summary of EPA Method 29 Mercury Analysis

Line 6 Waste Gas Stack (SV144)

Method 29 Mercury Mass Determination

Front Half (Filterable)

| Inputs | Symbol | Units | Run 1 | Run 2 | Run 3 | Blank (MHg _{fthb}) |
|---------------------------------|---------------------|-------|-------|-------|-------|------------------------------|
| Analysis #1, Total | -- | µg | 0.169 | < 0.1 | < 0.1 | < 0.1 |
| Analysis #2, Total | -- | µg | 0.169 | < 0.1 | < 0.1 | < 0.1 |
| Front Half Net Mass Hg, Average | MHg _{fthm} | µg | 0.169 | < 0.1 | < 0.1 | < 0.1 |

Back Half

| Inputs | Symbol | Units | Run 1 | Run 2 | Run 3 | Blanks |
|---|--------------------|-------|-------|-------|-------|--------|
| 10% H ₂ O ₂ / 5% HNO ₃ | | | | | | |
| Analysis #1, Total µg | -- | µg | 0.639 | 0.696 | 0.681 | < 0.2 |
| Analysis #2, Total µg | -- | µg | 0.623 | 0.746 | 0.685 | < 0.2 |
| Net Mass Average | MHg _{bh2} | µg | 0.631 | 0.721 | 0.683 | < 0.2 |

Empty Impinger

| | | | | | | |
|-----------------------|---------------------|----|-------|-------|-------|-------|
| Analysis #1, Total µg | -- | µg | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| Analysis #2, Total µg | -- | µg | < 0.2 | < 0.2 | < 0.2 | < 0.2 |
| Net Mass Average | MHg _{bh3A} | µg | < 0.2 | < 0.2 | < 0.2 | < 0.2 |

KMnO₄

| | | | | | | |
|-----------------------|---------------------|----|------|------|------|-------|
| Analysis #1, Total µg | -- | µg | 3.04 | 4.97 | 6.34 | < 0.5 |
| Analysis #2, Total µg | -- | µg | 3.03 | 4.94 | 6.27 | < 0.5 |
| Net Mass Average | MHg _{bh3B} | µg | 3.04 | 4.96 | 6.31 | < 0.5 |

HCl

| | | | | | | |
|--------------------|---------------------|----|------|------|-------|-------|
| Analysis #1, Total | -- | µg | 2.92 | 1.63 | 0.627 | < 0.4 |
| Analysis #2, Total | -- | µg | 2.91 | 1.70 | 0.605 | < 0.4 |
| Net Mass Average | MHg _{bh3C} | µg | 2.92 | 1.67 | 0.616 | < 0.4 |

| | | | | | | |
|--|--------------------|----|------|------|------|--|
| Total Back Half Net Mass Hg, Average MHg _{bhm} = M(Hg _{bh2} +Hg _{bh3A} +Hg _{bh3B} +Hg _{bh3C}) | MHg _{bhm} | µg | 6.78 | 7.54 | 7.80 | |
|--|--------------------|----|------|------|------|--|

Mercury Mass Determinations

| | | | | | | |
|--|------------------|----|------|------|------|--|
| Final Total Mercury Mass⁽²⁾ MHg _t = (MHg _{fthm} + MHg _{bhm}) - MHg _{blank} | MHg _t | µg | 6.95 | 7.64 | 7.90 | |
|--|------------------|----|------|------|------|--|

Note: The "<" sign indicates the mass is below method detection limits. All calculations forward use the detection limit for concentration and emission determinations and no blank correction is made.

Barr Engineering

5150 West 76th Street
Edina, MN 55439

Project Number: 23/69-1736.20 100 001

Mercury

EPA Method 29 Analysis

Analytical Report
34752



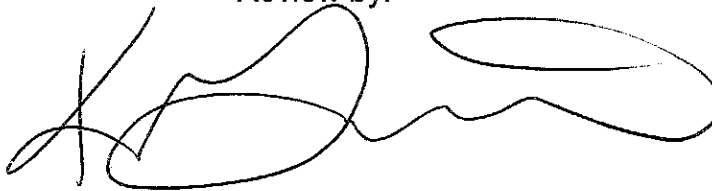
Element One, Inc.

6319-D Carolina Beach Rd., Wilmington, NC 28412

910-793-0128 FAX: 910-792-6853 e1lab@e1lab.com

The following data for Analytical Report 34752
has been reviewed for completeness, accuracy,
adherence to method protocol,
and compliance with quality assurance guidelines.

Review by:

A handwritten signature in black ink, appearing to be 'Katie Gattis', written over a horizontal line.

Katie Gattis, Quality Assurance Officer
May 8, 2020

Report Reviewed and Finalized By:

A handwritten signature in black ink, appearing to be 'Ken Smith', written over a horizontal line.

Ken Smith, Laboratory Director
May 8, 2020

SUMMARY OF RESULTS

Summary of Analysis

Summary of Method 29 Mercury Analysis

| Run Number | | Average Total | Front Half | H ₂ O ₂ /HNO ₃ | Empty Impinger | KMnO ₄ | HCl |
|----------------------------|----|---------------|------------|--|-------------------|-------------------|-------|
| | | Catch, µg | µg | µg | µg | µg | µg |
| Line 3 Waste Gas-T1-M29-R1 | #1 | 5.23 | 0.753 | 0.869 | < 0.2 | 1.92 | 1.68 |
| | #2 | | 0.745 | 0.874 | < 0.2 | 1.96 | 1.65 |
| Line 3 Waste Gas-T1-M29-R2 | #1 | 5.08 | 0.438 | 0.917 | < 0.2 | 2.16 | 1.59 |
| | #2 | | 0.439 | 0.907 | < 0.2 | 2.13 | 1.59 |
| Line 3 Waste Gas-T1-M29-R3 | #1 | 6.00 | 0.405 | 1.30 | < 0.2 | 3.51 | 0.775 |
| | #2 | | 0.407 | 1.32 | < 0.2 | 3.49 | 0.794 |
| Line 4 Waste Gas-T1-M29-R1 | #1 | 7.06 | < 0.1 | 1.78 | < 0.2 | 2.93 | 2.35 |
| | #2 | | < 0.1 | 1.75 | < 0.2 | 2.96 | 2.36 |
| Line 4 Waste Gas-T1-M29-R2 | #1 | 6.80 | 0.142 | 1.94 | < 0.2 | 3.00 | 1.74 |
| | #2 | | 0.146 | 1.93 | < 0.2 | 2.97 | 1.73 |
| Line 4 Waste Gas-T1-M29-R3 | #1 | 7.82 | 0.125 | 2.04 | < 0.2 | 4.37 | 1.30 |
| | #2 | | 0.125 | 2.04 | < 0.2 | 4.35 | 1.28 |
| Line 6 Waste Gas-T1-M29-R1 | #1 | 6.75 | 0.169 | 0.639 | < 0.2 | 3.04 | 2.92 |
| | #2 | | 0.169 | 0.623 | < 0.2 | 3.03 | 2.91 |
| Line 6 Waste Gas-T1-M29-R2 | #1 | 7.35 | < 0.1 | 0.696 | < 0.2 | 4.97 | 1.63 |
| | #2 | | < 0.1 | 0.746 | < 0.2 | 4.94 | 1.70 |
| Line 6 Waste Gas-T1-M29-R3 | #1 | 7.61 | < 0.1 | 0.681 | < 0.2 | 6.34 | 0.627 |
| | #2 | | < 0.1 | 0.685 | < 0.2 | 6.27 | 0.605 |
| Reagent Blank | #1 | < 0.5 | < 0.1 | < 0.2 | < 0.2 | < 0.5 | < 0.4 |
| | #2 | | < 0.1 | < 0.2 | < 0.2 | < 0.5 | < 0.4 |

ANALYTICAL NARRATIVE

Element One Analytical Narrative

| | | | |
|------------|-----------------------|-----------------|-------------|
| Client: | Barr Engineering | Element One #: | 34752 |
| Client ID: | 23/69-1736.20 100 001 | Analyst: | MAR, DKH |
| Method: | Methods 29 | Dates Received: | 05/05/20 |
| Analytes: | Hg | Dates Analyzed: | 05/07-08/20 |

Summary of Analysis

The Method 29 samples were digested, prepared, and analyzed according to Method 29 protocol. Samples were analyzed for mercury on a PerkinElmer FIMS-100 CVAA mercury analyzer.

Detection Limits

The FIMS-100 CVAA instrument reporting limit for mercury was 0.004 µg per aliquot analyzed.

Analysis QA/QC

Duplicate analyses relative percent difference (RPD) and spike sample recovery data are summarized in the Quality Control Section. All QA/QC data was within the criteria of the method.

Additional Comments

The reported results have not been corrected for any blank values or spike recovery values. The reported results relate only to the items tested or calibrated.

QUALITY CONTROL SUMMARY

Summary of Quality Control Data

Mercury Duplicate Analysis RPD

(Method 29 QC limits: < 10% for RPD)

| Run Number | Front Half | H ₂ O ₂ /HNO ₃ | Empty Imp | KMnO ₄ | HCl |
|----------------------------|------------|---|-----------|-------------------|------|
| Line 3 Waste Gas-T1-M29-R1 | 1.0% | 0.7% | NA | 1.9% | 1.4% |
| Line 3 Waste Gas-T1-M29-R2 | 0.3% | 1.1% | NA | 1.5% | 0.2% |
| Line 3 Waste Gas-T1-M29-R3 | 0.4% | 1.4% | NA | 0.4% | 2.5% |
| Line 4 Waste Gas-T1-M29-R1 | NA | 1.6% | NA | 1.0% | 0.3% |
| Line 4 Waste Gas-T1-M29-R2 | 3.3% | 0.2% | NA | 0.9% | 0.4% |
| Line 4 Waste Gas-T1-M29-R3 | 0.5% | 0.2% | NA | 0.3% | 1.4% |
| Line 6 Waste Gas-T1-M29-R1 | 0.2% | 2.6% | NA | 0.6% | 0.4% |
| Line 6 Waste Gas-T1-M29-R2 | NA | 7.0% | NA | 0.6% | 4.3% |
| Line 6 Waste Gas-T1-M29-R3 | NA | 0.5% | NA | 1.1% | 3.6% |
| Reagent Blank | NA | NA | NA | NA | NA |

Mercury Spike Recoveries

(Method 29 QC limits: 75-125% for Spike Recoveries)

| Run Number | | Front Half | H ₂ O ₂ /HNO ₃ | Empty Imp | KMnO ₄ | HCl |
|----------------------------|----|------------|---|-----------|-------------------|-----|
| Line 3 Waste Gas-T1-M29-R3 | #1 | 100% | 109% | 101% | 108% | 98% |
| | #2 | 100% | 108% | 100% | 107% | 98% |
| Line 4 Waste Gas-T1-M29-R3 | #1 | 97% | 106% | 107% | 104% | 97% |
| | #2 | 96% | 107% | 107% | 103% | 98% |
| Line 6 Waste Gas-T1-M29-R3 | #1 | 109% | 115% | 103% | 105% | 98% |
| | #2 | 109% | 115% | 102% | 104% | 97% |

SAMPLE CUSTODY

Barr Engineering Co. Chain of Custody



Request for Laboratory Analytical Services

Sample Origination State:

☐ IA ☐ ND ☐ WI
☐ ME ☐ SD ☐ Other:
☒ MN ☐ WI

COC Number: 10395

COC 1 of 2

Report
Results To

Check One:



Barr Engineering Company
 3128 14th Avenue East
 Hibbing, MN 55435-4803
 (218) 262-8600



Barr Engineering Company
 5150 West 76th Street
 Edina, MN 55439-2330
 (952) 832-2600

Project Contact: Tom Kuchinski TKuchinski@barr.com
 (Print Name) (email)

Send
Invoice ToProject Number 23 / 69 - 1736.20 / 000001

Barr Engineering Company
 Attn: Accounts Payable
 4300 Marketpointe Drive
 Minneapolis, MN 55435-4803
 Ph. (952) 832-2600 Fax (952) 832-2601

Special instructions and/or specific regulatory requirements:
(method, limit of detection, etc.)

request front 1/2 & back 1/2
 separate

Requested Due Date:

☒ Standard Turn
 Around Time

☐ Rush
 (mm/dd/yyyy)

METHOD

SAMPLE FRACTION

| Sample Identification | Date/Time Collected | Media I.D. # | Type | | | METHOD | | | | | | | | | | Total No. of Containers | Remarks | | | | | |
|--------------------------------|---------------------|--------------|------|-------|----|---------|----|--|--|--|--|--|---|--------|------|-------------------------|---------|------|-----|------|---------|------------|
| | | | Grab | Comp. | QC | EPA 241 | Hg | | | | | | | IR 011 | G111 | | | BH13 | T04 | 2456 | HCL 011 | DF |
| 1. Line 3 Waste Gas SV103 TIR1 | 4/20/20 | AIR | | X | | ✓ | ✓ | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 6 | |
| 2. " " TIR2 | | | | X | | ✓ | ✓ | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 6 | |
| 3. " " TIR3 | | | | X | | ✓ | ✓ | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 6 | |
| 4. Blank TIR0 | | | | | X | ✓ | ✓ | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 6 | |
| 5. Line 4 Waste Gas SV118 TIR1 | 4-29-20 | AIR | | X | | ✓ | ✓ | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 1 | |
| 6. " " TIR2 | | | | X | | ✓ | ✓ | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 6 | |
| 7. " " TIR3 | | | | X | | ✓ | ✓ | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 6 | |
| 8. " " TIR3 | | | | X | | ✓ | ✓ | | | | | | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 6 | |
| 9. " " TIR0 | 4-29-20 | | | | X | | | | | | | | | | | | | | | | 1 | Hold Blank |
| 10. | | | | | | | | | | | | | | | | | | | | | | |

Chain of
CustodyCollected by (Print Name): Tom Kuchinski BARRCollector's Signature: Tom Kuchinski

Date/Time:

Laboratory: Element 1Method of Shipment: ☐ Sampler ☒ FedEx ☐ UPS ☐ Other:Sample Condition upon Receipt: ☒ Acceptable ☐ Other (explain)

Samples received in good condition. No empty containers.

Relinquished by:

Tom Kuchinski
Pete Hamer

Received by:

Pete Hamer

Date/Time:

5/4/20 1300

5/4/20 1030

Received at Lab by: Lee Burt

5,5,20 1030

Distribution: White-Original Accompanies Shipment to Lab; Yellow - Field Copy.

Version 2 - Created 06/01/14

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34752 Barr Engineering M29 Report Packet
 Page 10 of 29

Request for Laboratory Analytical Services

☐ IA ☐ ND ☐ WI
☐ MI ☐ SD Other: _____
☒ MN ☐ WI

COC 2 of 2

Barr Engineering Company
Attn: Accounts Payable
4300 Marketpointe Drive
Minneapolis, MN 55435-4803
Ph. (952) 832-2600 Fax (952) 832-2601

| | |
|---------|-------|
| 5.5.212 | 10317 |
|---------|-------|

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ANALYTICAL DATA

Analytical Calculations

Mercury-

$$\text{Mercury Results } (\mu\text{g}) = \frac{\text{CVAA Results } (\mu\text{g})}{\text{Aliquot (ml)}} * \text{Final Volume (ml)}$$

Where-

CVAA Results= Raw sample reading (μg)--*Hg-Data Sheet*

Aliquot= Sample Aliquot (Alq.)--*Hg-Data Sheet*

Final Volume=Final Volume (FV)*--*Sample Submission*

* With the exception of the BH fraction where-
=Received Volume (BV)--*Sample Submission*

Analytical Calculations

Spike Recovery-

$$\text{Spike (\%)} = \frac{(\text{Spiked Result } (\mu\text{g}) - \text{Sample Result } (\mu\text{g}))}{\text{Spike Amount } (\mu\text{g})} \times 100$$

Where-

Spike Result = Raw sample concentration (μg)--*Hg-Data Sheet*

Sample Result = Raw sample concentration (μg)--*Hg-Data Sheet*

Spike Amount—*Hg Run Sheet*

Duplicate Analysis RPD-

$$\text{RPD (\%)} = \frac{(\text{Duplicate Result } (\mu\text{g}) - \text{Sample Result } (\mu\text{g}))}{\text{Average } (\mu\text{g})} \times 100$$

Where-

Sample Result and Duplicate Results=Raw sample concentration (μg)--*Hg-Data Sheet*

$$\text{Average} = \frac{(\text{Duplicate} + \text{Sample Results})}{2}$$

FH/BH Separate

Analysis Due Date 05.13.20
QA/QC/Report Due Date 05.15.20

Client: Barr Engineering
Project No 23/69-1736.20 100 001

Date Received 05.05.20
Time Received 1030

HNO₃ Lot: 59283 EMQ HF Lot: 5118030 Fisher HCl Lot: 4118110 Fisher
Volume Marked ☒ Y / N Volume Loss Y ☒ N / ? Ref. Method: 29

Sample Identification

| | | | | | |
|---|--------------------------------------|---|--------------------------------------|----|--------------------------------------|
| 1 | Line 3 Waste Gas-T1-M29-R1 | 4 | Line 4 Waste Gas-T2-M29-R1 | 7 | Line 6 Waste Gas-T3-M29-R1 |
| 2 | Line 3 Waste Gas-T1-M29-R2 | 5 | Line 4 Waste Gas-T2-M29-R2 | 8 | Line 6 Waste Gas-T3-M29-R2 |
| | Line 3 Waste Gas-T1-M29-R2 Duplicate | | Line 4 Waste Gas-T2-M29-R2 Duplicate | | Line 6 Waste Gas-T3-M29-R2 Duplicate |
| 3 | Line 3 Waste Gas-T1-M29-R3 | 6 | Line 4 Waste Gas-T2-M29-R3 | 9 | Line 6 Waste Gas-T3-M29-R3 |
| | Line 3 Waste Gas-T1-M29-R3 Spike | | Line 4 Waste Gas-T2-M29-R3 Spike | | Line 6 Waste Gas-T3-M29-R3 Spike |
| | | | | 10 | Reagent Blank |

Analyses Requested

Samples 1-10 Hg

| Runs / FB | Fill / Ace (FH) | HNO ₃ (FH) | 5% HNO ₃ /10% H ₂ O ₂ (BH) | HNO ₃ (A) | KMnO ₄ (B) | HCl (C) |
|-----------|-----------------|---|---|---|---|---|
| | pH <2.0 Y / N | pH <2.0 <input checked="" type="checkbox"/> N | pH <2.0 <input checked="" type="checkbox"/> N | pH <2.0 <input checked="" type="checkbox"/> N | pH <2.0 <input checked="" type="checkbox"/> N | pH <2.0 <input checked="" type="checkbox"/> N |
| Lab ID | Fil ID | BV ml | BV ml | FV ml | BV ml | FV ml |
| 1 | | 126 | 180 | 530 | 68 | 200 |
| 2.D | | 112 | | 565 | 116 | 570 |
| 3.S | | 158 | | 550 | 88 | 475 |
| 4 | | 148 | | 515 | 136 | 520 |
| 5.D | | 160 | | 470 | 102 | 605 |
| 6.S | | 174 | | 535 | 92 | 580 |
| 7 | | 108 | | 495 | 100 | 460 |
| 8.D | | 128 | | 485 | 64 | 450 |
| 9.S | | 134 | | 490 | 88 | 420 |

M-29 Reagent Blank

| Lab ID | Fraction | BV, ml | FV, ml | Comments |
|--------|---|--------|--------|-----------------------|
| 10 | C 7 FH Acetone Blank | | | |
| | C 8A FH 0.1N HNO ₃ | 230 | 100 | Used 100 mL |
| | C 8A A 0.1N HNO ₃ | 230 | - | |
| | C 8B B DI H ₂ O | 110 | - | |
| | C 9 BH 5% HNO ₃ /10% H ₂ O ₂ | 212 | - | |
| | C 10 B 4% KMnO ₄ /10% H ₂ SO ₄ | 220 | - | 100mL C10 + 33 mL C8B |
| | C 11 C 8N HCl DI H ₂ O | 230 | 400 | |
| | C 12 FH Filter | | 100 | |

Lab Communications

123 signed w/0.1 ml 25 ppm standard 02/12/20-M

Fractions Received: Runs: C1, C3, C4, C5A, C5B, C5C—RB; C12, C8A, C8B, C9, C10, C11 —05.05.20 LLB

SS Page 1 of 1
5/5/2020 2:46:09 PM
SS by LLB
Labeled By/Date MM 5/5/20

FH Prep By/Date MM 5/7/20 A Prep By/Date DKH 5/16/20
BH Prep By/Date MM 5/16/20 B Prep By/Date DKH 5/16/20
BH/FH Prep By/Date — C Prep By/Date MM 5/7/20
PM Prep By/Date — ID Verification By / Date TAD 5/5/20

MERCURY BATCH DIGESTION - RUN WORKSHEET

Date Prepared/Digested: 5/6/20 Prep By: MM/ghw SIF File #: 050720-1
 Block #1 Temperature: 94.95 Start Time: 5:45 Machine ID: E1
 Block #2 Temperature: ~95 Stop Time: 8:40 Batch Analyst: MM
 Block #3 Temperature: ~95 Typed By: MM Verified By: DKH

| A/S | Curve & QC's | 0.4ug/ml working std | | BV, ml | FV, ml | Standard Lot Numbers |
|-----|--------------------|----------------------|--|--------|--------|-------------------------------|
| 1 | Lab BLK (3/ batch) | 0 | | 40 | 40 | Standard #1 (for working std) |
| 2 | 0.004 ug | 0.01ml | | 40 | 40 | Lot #: 4807882 RSCN |
| 3 | 0.04 ug | 0.10ml | | 40 | 40 | Working Standard |
| 4 | 0.08 ug | 0.20ml | | 40 | 40 | Lot #: 453-194-1 by: ghw |
| 5 | 0.16 ug | 0.40ml | | 40 | 40 | Standard #2 (QC #2): |
| 6 | 0.20ug | 0.50ml | | 40 | 40 | Lot #: 453-194-2 |
| | | | | | | Standard #3 (QC #3): |
| | | | | | | Lot #: 453-194-3 |
| 7 | QC #2= 0.08ug | 0.2ml #2 std | | 40 | 40 | |
| 8 | QC #3= 0.08ug | 0.2ml #3 std | | 40 | 40 | Curve prepared by: <u>MM</u> |

Initial Review By: MM

Date: 5/7/20

Time: 12:15

Final QC Review By: DKH

Date: 5/7/20

Time: 1400

Comments:

| A/S | LAB # | Method | Wt (g)/ FV (mL) | Prep Aliquot Used, mL | Aliquot or Calc Mass | FV, mL or "1" for conc. | Comments |
|------|---------------|--------|-----------------|-----------------------|----------------------|-------------------------|----------|
| ✓ 9 | 73926-20 BLK | 7470A | | | 0.1 | 5 | TV=5.8 |
| ✓ 10 | L/L | | | | 1 | 1 | =0.008 |
| ✓ 11 | 34749-751 BLK | | | | 20 | | |
| ✓ 12 | -118K+ | | | | | | |
| ✓ 13 | 34749-1 | | | | | | |
| 14 | -2 | | | | | | |
| 15 | -3 | | | | | | |
| 16 | -4 | | | | | | |
| 17 | -5 | | | | | | |
| 18 | -6 | | | | | | |
| 19 | -7 | | | | | | |

NOTES: Lab blanks and spikes must be prepared with each batch digestion

"+" Denotes spike for Hg. Use calibration working 0.4ug/ml standard at the rate of 0.20ml per 40ml sample, unless otherwise noted.

Digestion chemicals to be added in order at the following rate per 40ml volumes.

H₂SO₄ @ 2.0ml..... HNO₃ @ 1.0ml..... KMnO₄ @ 6.0ml..... Persulfate @ 3.2ml

H₂SO₄ Lot # 191965 HPR HNO₃ Lot # 59283 EMO HCl Lot # 418110 FWH

Persulfate Lot # 453-183-2 KMnO₄ Lot # 453-183-4 Hydrox Lot # 453-182-7

Clear samples after digestion with 2.4 ml of Hydroxylamine solution.

SIF File #: 050720-1

| A/S | LAB # | Method | Wt (g)/ FV (mL) | Prep Aliquot Used, mL | Aliquot or Calc Mass | FV, mL or "1" for conc. | Comments |
|------|------------------|--------|-----------------|-----------------------|----------------------|-------------------------|----------|
| ✓ 20 | 34749-8 | 7470A | | | 2.0 | 1 | |
| ✓ 21 | 34750 | | | | | | |
| ✓ 22 | -0 ug | | | | | | |
| ✓ 23 | 34751 | | | | | | |
| 24 | - + | | | | | | |
| ✓ 25 | 34740-748 F2 Blk | | | | | | |
| ✓ 26 | -F2 Blk + | | | | | | |
| ✓ 27 | 34740-1 | | | | | | |
| 28 | -2 | | | | | | |
| 29 | -3-15g | | | | | | |
| 30 | -3-15g Dup | | | | | | |
| 31 | -3-20g | | | | | | |
| 32 | -3-20g Dup | | | | | | |
| ✓ 33 | - + | | | | | | |
| ✓ 34 | 34748-1.1 | | | | | | |
| 35 | -1.2 | | | | | | |
| 36 | -1.3 | | | | | | |
| 37 | -2.1 | | | | | | |
| 38 | -2.2 | | | | | | |
| 39 | -2.3 | | | | | | |
| ✓ 40 | -2.3 + | ↓ | | | ↓ | ↓ | |
| ✓ 41 | 34752-1A | M29 | | | 4 | 2.00 | |
| 42 | -2A | | | | | | |
| 43 | -2A0 | | | | | | |
| 44 | -3A | | | | | | |
| 45 | -3A + | | | | | | |
| 46 | -4A | | | | | | |
| 47 | -5A | | | | | | |
| 48 | -5A0 | | | | | | |
| 49 | -6A | | | | | | |
| 50 | -6A + | | | | | | |
| 51 | -7A | | | | | | |
| 52 | -8A | | | | | | |
| 53 | -8A0 | | | | | | |
| 54 | -9A | ↓ | | | ↓ | ↓ | |

SIF File #: 050720-1

| A/S | LAB # | Method | Wt (g)/ FV (mL) | Prep Aliquot Used, mL | Aliquot or Calc Mass | FV, mL or "1" for conc. | Comments |
|-----|--------------|--------|-----------------|-----------------------|----------------------|-------------------------|----------|
| ✓ | 55 34752-9A+ | M29 | | | 4 | 200 | |
| | 56 -10A | ↓ | | | ↓ | ↓ | |
| ✓ | 57 34741 LAB | 245.1 | | | 40 | 1 | |
| | 58 -LAB+ | ↓ | | | ↓ | ↓ | |
| | 59 -1.1 | | | | | | |
| | 60 -1.1+ | ↓ | | | ↓ | ↓ | |
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MERCURY BATCH DIGESTION - RUN WORKSHEET

Date Prepared/Digested: 5/6/20 Prep By: MM/gh SIF File #: 050720-2
 Block #1 Temperature: 0A.95 Start Time: 5:45 Machine ID: f2
 Block #2 Temperature: -95 Stop Time: 8:00 Batch Analyst: MM
 Block #3 Temperature: -95 Typed By: MM Verified By: DKH

| A/S | Curve & QC's | 0.4ug/ml working std | | BV, ml | FV, ml | Standard Lot Numbers |
|-----|-----------------------|-------------------------|--|--------|--------|---|
| 1 | Lab BLK (3/ batch) | 0 | | 40 | 40 | Standard #1 (for working std) Lot #: 4807882 NJLUA |
| 2 | 0.004 ug | 0.01ml | | 40 | 40 | Working Standard |
| 3 | 0.04 ug | 0.10ml | | 40 | 40 | Lot #: 447-194-1 by: DM |
| 4 | 0.08 ug | 0.20ml | | 40 | 40 | Standard #2 (QC #2): |
| 5 | 0.16 ug | 0.40ml | | 40 | 40 | Lot #: 443-194-2 |
| 6 | 0.20ug | 0.50ml | | 40 | 40 | Standard #3 (QC #3): |
| | | | | | | Lot #: 447-194-3 |
| 7 | QC #2= 0.08ug | 0.2ml #2 std | | 40 | 40 | |
| 8 | QC #3= 0.08ug | 0.2ml #3 std | | 40 | 40 | Curve prepared by: MM |

Initial Review By: MM Date: 5/7/20 Time: 1:00
 Final QC Review By: MM Date: 5/7/20 Time: 1415
 Comments: _____

| A/S | LAB # | Method | Wt (g)/ FV (mL) | Prep Aliquot Used, mL | Aliquot or Calc Mass | FV, mL or "1" for conc. | Comments |
|-----|-------------|--------|--------------------|--------------------------|-------------------------|----------------------------|----------|
| 9 | 37926-20 BL | 7770A | | | 0.1 | 5 | 77 = 5.8 |
| 10 | L/L | ↓ | | | | 1 | 20,000 |
| 11 | 37743-1 B | M29 | | | 4 | 500 | |
| 12 | -23 | ↓ | | | | | |
| 13 | -23 B | ↓ | | | | | |
| 14 | -3 B | ↓ | | | | | |
| 15 | -3 B + | ↓ | | | | | |
| 16 | -4 B | ↓ | | | | | |
| 17 | -5 B | ↓ | | | | | |
| 18 | -5 B P | ↓ | | | | | |
| 19 | -6 B | ↓ | | | | | |

NOTES: Lab blanks and spikes must be prepared with each batch digestion

"+" Denotes spike for Hg. Use calibration working 0.4ug/ml standard at the rate of 0.20ml per 40ml sample, unless otherwise noted.

Digestion chemicals to be added in order at the following rate per 40ml volumes.

H₂SO₄ @ 2.0ml..... HNO₃ @ 1.0ml..... KMnO₄ @ 6.0ml..... Persulfate @ 3.2ml

H₂SO₄ Lot # 191965 Rm HNO₃ Lot # 59283 EMD HCl Lot # 411810 Rm

Persulfate Lot # 443-183-2 KMnO₄ Lot # 443-183-1 Hydrox Lot # 443-182-7

Clear samples after digestion with 2.4 ml of Hydroxylamine solution.

SIF File #: 050720-2

| A/S | LAB # | Method | Wt (g)/ FV (mL) | Prep Aliquot Used, mL | Aliquot or Calc Mass | FV, mL or "1" for conc. | Comments |
|-----|------------|--------|-----------------|-----------------------|----------------------|-------------------------|----------|
| 20 | 34747-68 + | M29 | | | † | 500 | |
| 21 | -78 | | | | | | |
| 22 | -88 | | | | | | |
| 23 | -88 Ø | | | | | | |
| 24 | -98 | | | | | | |
| 25 | -98 + | | | | | | |
| 26 | -108 | | | | | | |
| 27 | -118 | | | | | | |
| 28 | -118 Ø | | | | | | |
| 29 | -128 | | | | | | |
| 30 | -128 + | | | | | | |
| 31 | -138 | | | | | | |
| 32 | -148 | | | | | | |
| 33 | -148 Ø | | | | | | |
| 34 | -158 | | | | | | |
| 35 | -158 + | | | | | | |
| 36 | -168 | | | | | | |
| 37 | -178 | | | | | | |
| 38 | -178 Ø | | | | | | |
| 39 | -188 | | | | | | |
| 40 | -188 + | | | | | | |
| 41 | -198 | | | | | | |
| 42 | -208 | | | | | | |
| 43 | -208 Ø | | | | | | |
| 44 | -218 | | | | | | |
| 45 | -218 + | | | | | | |
| 46 | -228 | | | | | | |
| 47 | -238 | | | | | | |
| 48 | -238 Ø | | | | | | |
| 49 | -248 | | | | | | |
| 50 | -248 + | | | | | | |
| 51 | -258 | | | | | | |
| 52 | -268 | | | | | ✓ | |
| 53 | 34752-18 | | | | | 500 | |
| 54 | -28 | ✓ | | | ✓ | 600 | |

SIF File #: 050720-2

| A/S | LAB # | Method | Wt (g)/ FV (mL) | Prep Aliquot Used, mL | Aliquot or Calc Mass | FV, mL or "1" for conc. | Comments |
|-----|-----------|--------|-----------------|-----------------------|----------------------|-------------------------|----------|
| 55 | 34752-287 | M29 | | | 4 | 600 | |
| 56 | -33 | ↓ | | | ↓ | 500 | |
| 57 | -33+ | | | | | ↓ | |
| 58 | -40 | | | | | 600 | |
| 59 | -58 | | | | | 700 | |
| 60 | -580 | | | | | ↓ | |
| 61 | -60 | | | | | 600 | |
| 62 | -60+ | | | | | ↓ | |
| 63 | -70 | | | | | 500 | |
| 64 | -80 | | | | | ↓ | |
| 65 | -880 | | | | | ↓ | |
| 66 | -90 | | | | | ↓ | |
| 67 | -98+ | | | | | ↓ | |
| 68 | -100 | ↓ | | | ↓ | ↓ | |
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MERCURY BATCH DIGESTION - RUN WORKSHEET

Date Prepared/Digested: 5/7/20 Prep By: MM/PM SIF File #: 050820-21
 Block #1 Temperature: 93.31 Start Time: 5:45 Machine ID: FA
 Block #2 Temperature: ~95 Stop Time: 8:00 Batch Analyst: MM
 Block #3 Temperature: ~95 Typed By: MM Verified By: DKH

| A/S | Curve & QC's | 0.4ug/ml working std | BV, ml | FV, ml | Standard Lot Numbers |
|-----|--------------------|----------------------|--------|--------|-------------------------------|
| 1 | Lab BLK (3/ batch) | 0 | 40 | 40 | Standard #1 (for working std) |
| 2 | 0.004 ug | 0.01ml | 40 | 40 | Lot #: 4801332 2100A |
| 3 | 0.04 ug | 0.10ml | 40 | 40 | Working Standard |
| 4 | 0.08 ug | 0.20ml | 40 | 40 | Lot #: 493-194-1 by: DKH |
| 5 | 0.16 ug | 0.40ml | 40 | 40 | Standard #2 (QC #2): |
| 6 | 0.20ug | 0.50ml | 40 | 40 | Lot #: 493-194-2 |
| | | | | | Standard #3 (QC #3): |
| | | | | | Lot #: 493-194-3 |
| 7 | QC #2= 0.08ug | 0.2ml #2 std | 40 | 40 | |
| 8 | QC #3= 0.08ug | 0.2ml #3 std | 40 | 40 | Curve prepared by: DKH |

Initial Review By: MM Date: 5/8/20 Time: 11:55

Final QC Review By: DKH Date: 5-8-2020 Time: 1401

Comments: 3+737-123 FM + 3+737-123 + 3,8, +
Data sent to 34743 2/15/20

| A/S | LAB # | Method | Wt (g)/ FV (mL) | Prep Aliquot Used, mL | Aliquot or Calc Mass | FV, mL or "1" for conc. | Comments |
|-----|-------------------|--------|-----------------|-----------------------|----------------------|-------------------------|----------|
| 9 | 33926-200C | 7470A | | | 0.1 | 5 | TV=5.8 |
| 10 | ✓ 12 | ↓ | | | 1 | 1 | 50.098 |
| 11 | ✓ 3+737-123 | 7471B | | | 20 | | |
| 12 | -123 + | ↓ | | | ↓ | | |
| 13 | -3 | ↓ | 1.1701/40 | 20 | 0.58505 | | |
| 14 | -3 D | ↓ | 1.0474/40 | ↓ | 0.52370 | | |
| 15 | -3 + | ↓ | 1.0139/40 | ↓ | 0.50695 | | |
| 16 | ✓ 3+749 F121K | 7470A | | | 20 | | |
| 17 | -F121K + | ↓ | | | ↓ | | |
| 18 | -2A-50 g | ↓ | | | ↓ | | |
| 19 | ✓ 3+746-700 F281K | ↓ | | | ↓ | | |

NOTES: Lab blanks and spikes must be prepared with each batch digestion

"+" Denotes spike for Hg. Use calibration working 0.4ug/ml standard at the rate of 0.20ml per 40ml sample, unless otherwise noted.

Digestion chemicals to be added in order at the following rate per 40ml volumes.

H₂SO₄ @ 2.0ml..... HNO₃ @ 1.0ml..... KMnO₄ @ 6.0ml..... Persulfate @ 3.2ml

H₂SO₄ Lot # 191905 Fm HNO₃ Lot # 59280 EMO HCl Lot # 408110 Fm

Persulfate Lot # 493-183-2 KMnO₄ Lot # 493-184-2 Hydrox Lot # 493-182-7

Clear samples after digestion with 2.4 ml of Hydroxylamine solution.

| A/S | LAB # | Method | Wt (g)/ FV (mL) | Prep Aliquot Used, mL | Aliquot or Calc Mass | FV, mL or "1" for conc. | Comments |
|------|-----------------|--------|-----------------|-----------------------|----------------------|-------------------------|------------|
| 20 | 34746-760 H2gM4 | 7470A | | | 20 | 1 | |
| ✓ 21 | 34746-1 | | | | | | |
| 22 | -10ug | | | | | | |
| 23 | -3 | | | | | | |
| 24 | -3 + | | | | | | |
| ✓ 25 | 34758-1 | | | | | | |
| ✓ 26 | 34759-1 | | | | | | |
| 27 | -2 | | | | | | |
| ✓ 28 | 34760-1 | | | | | | |
| 29 | -2 | | | | | | |
| 30 | 34752-1L | M29 | | | 4 | 400 | |
| 31 | -2C | | | | | | |
| 32 | -2C0 | | | | | | |
| 33 | -3C | | | | | | |
| 34 | -3C+ | | | | | | |
| 35 | -4C | | | | | | |
| 36 | -5C | | | | | | |
| 37 | -5C0 | | | | | | |
| 38 | -6C | | | | | | |
| 39 | -6C+ | | | | | | |
| 40 | -7C | | | | | | |
| 41 | -8C | | | | | | |
| 42 | -8C0 | | | | | | |
| 43 | -9C | | | | | | |
| 44 | -9C+ | | | | | | |
| 45 | -10C | | | | | | |
| 46 | -100 FM | | | | ✓ | 100 | |
| 47 | -100 FM+ | | | | 1.6 | | 1/2 spiked |
| 48 | -1 FM | | | | 4 | | |
| 49 | -2 FM | | | | | | |
| 50 | -2 FM0 | | | | | | |
| 51 | -3 FM | | | | | | |
| 52 | -3 FM+ | | | | | | |
| 53 | -4 FM | | | | | | |
| 54 | -5 FM | | | | | | |

SIF File #: 050820-21

| A/S | LAB # | Method | Wt (g)/ FV (mL) | Prep Aliquot Used, mL | Aliquot or Calc Mass | FV, mL or "1" for conc. | Comments |
|-----|--------------|--------|-----------------|-----------------------|----------------------|-------------------------|----------------------|
| 55 | 34752-S M9 | M29 | | | 4 | 100 | |
| 56 | -6 FM | ↓ | | | ↓ | ↓ | |
| 57 | -6 FM+ | | | | | | |
| 58 | -7 FM | | | | | | |
| 59 | -8 FM | | | | | | |
| 60 | -8 FM D | | | | | | |
| 61 | -9 FM | | | | | | |
| 62 | -9 FM+ | | | | | | |
| 63 | -10 FM | | | | | | |
| 64 | 34752-L23 FM | ↓ | | | 2 | 100 | 2X |
| 65 | -68 FM+ | ↓ | | | 0.8 | ↓ | TV = 0.04 1/2 picked |
| 66 | | | | | | | |
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MERCURY BATCH DIGESTION - RUN WORKSHEET

Date Prepared/Digested: 5/7/20 Prep By: MM/ghm SIF File #: 050820-2
 Block #1 Temperature: 93.31 Start Time: 5:45 Machine ID: FL
 Block #2 Temperature: ~93 Stop Time: 8:00 Batch Analyst: MM
 Block #3 Temperature: ~93 Typed By: MM Verified By: DKH

| A/S | Curve & QC's | 0.4ug/ml working std | | BV, ml | FV, ml | Standard Lot Numbers |
|-----|--------------------|----------------------|--|--------|--------|--|
| 1 | Lab BLK (3/ batch) | 0 | | 40 | 40 | Standard #1 (for working std) |
| 2 | 0.004 ug | 0.01ml | | 40 | 40 | Lot #: <u>4807682</u> RSCA |
| 3 | 0.04 ug | 0.10ml | | 40 | 40 | Working Standard |
| 4 | 0.08 ug | 0.20ml | | 40 | 40 | Lot #: <u>Mg3-194-1</u> by: <u>ghm</u> |
| 5 | 0.16 ug | 0.40ml | | 40 | 40 | Standard #2 (QC #2): |
| 6 | 0.20ug | 0.50ml | | 40 | 40 | Lot #: <u>Mg3-194-2</u> |
| | | | | | | Standard #3 (QC #3): |
| | | | | | | Lot #: <u>Mg3-194-3</u> |
| 7 | QC #2= 0.08ug | 0.2ml #2 std | | 40 | 40 | |
| 8 | QC #3= 0.08ug | 0.2ml #3 std | | 40 | 40 | Curve prepared by: <u>DKH</u> |

Initial Review By: MM Date: 5/8/20 Time: 1:20
 Final QC Review By: DKH Date: 5/8/20 Time: 1:42
 Comments: 3437-1A, 3437-2A, 3437-3A, 3437-4A, 3437-5A, 3437-6A 5/8/20

| A/S | LAB # | Method | Wt (g)/ FV (mL) | Prep Aliquot Used, mL | Aliquot or Calc Mass | FV, mL or "1" for conc. | Comments |
|-----|--------------------|--------------|-----------------|-----------------------|----------------------|-------------------------|---------------|
| 9 | <u>32926-20 BL</u> | <u>7470A</u> | | | <u>0.1</u> | <u>5</u> | <u>TV=5.8</u> |
| 10 | <u>LR</u> | | | | <u>1</u> | <u>1</u> | <u>=0.006</u> |
| ✓11 | <u>34743-1A</u> | <u>M29</u> | | | <u>4</u> | <u>200</u> | |
| 12 | <u>-2A</u> | | | | | | |
| 13 | <u>-2AD</u> | | | | | | |
| 14 | <u>-3A</u> | | | | | | |
| 15 | <u>-3A+</u> | | | | | | |
| 16 | <u>-4A</u> | | | | | | |
| 17 | <u>-5A</u> | | | | | | |
| 18 | <u>-5AD</u> | | | | | | |
| 19 | <u>-6A</u> | | | | | | |

NOTES: Lab blanks and spikes must be prepared with each batch digestion

"+" Denotes spike for Hg. Use calibration working 0.4ug/ml standard at the rate of 0.20ml per 40ml sample, unless otherwise noted.

Digestion chemicals to be added in order at the following rate per 40ml volumes.

H_2SO_4 @ 2.0ml..... HNO_3 @ 1.0ml..... $KMnO_4$ @ 6.0ml..... Persulfate @ 3.2ml

H_2SO_4 Lot # 191965 RSV HNO_3 Lot # 59283 EMV HCl Lot #: 4118150 ANR

Persulfate Lot # Mg3-193-2 $KMnO_4$ Lot # Mg3-197-2 Hydrox Lot#: Mg3-182-7

Clear samples after digestion with 2.4 ml of Hydroxylamine solution.

SIF File #: 050820-12

| A/S | LAB # | Method | Wt (g)/ FV (mL) | Prep Aliquot Used, mL | Aliquot or Calc Mass | FV, mL or "1" for conc. | Comments |
|------|-----------|--------|-----------------|-----------------------|----------------------|-------------------------|----------|
| ✓ 20 | 34743-6A+ | M29 | | | 4 | 200 | |
| 21 | -7A | | | | | | |
| 22 | -8A | | | | | | |
| 23 | -8AD | | | | | | |
| 24 | -9A | | | | | | |
| 25 | -9A+ | | | | | | |
| 26 | -10A | | | | | | |
| 27 | -11A | | | | | | |
| 28 | -10AD | | | | | | |
| 29 | -12A | | | | | | |
| 30 | -12A+ | | | | | | |
| 31 | -13A | | | | | | |
| 32 | -14A | | | | | | |
| 33 | -14AD | | | | | | |
| 34 | -15A | | | | | | |
| 35 | -15A+ | | | | | | |
| 36 | -16A | | | | | | |
| 37 | -17A | | | | | | |
| 38 | -17AD | | | | | | |
| 39 | -18A | | | | | | |
| 40 | -18A+ | | | | | | |
| 41 | -19A | | | | | | |
| 42 | -20A | | | | | | |
| 43 | -20AD | | | | | | |
| 44 | -21A | | | | | | |
| 45 | -22A+ | | | | | | |
| 46 | -22A | | | | | | |
| 47 | -23A | | | | | | |
| 48 | -23AD | | | | | | |
| 49 | -24A | | | | | | |
| 50 | -24A+ | | | | | | |
| 51 | -25A | | | | | | |
| 52 | -26A | ✓ | | | ✓ | ✓ | |
| ✓ 53 | 34752-18H | | | | 4 | 53.0 | |
| 54 | -28H | ✓ | | | ↓ | 56.5 | |

SIF File #: 05082072

| A/S | LAB # | Method | Wt (g)/ FV (mL) | Prep Aliquot Used, mL | Aliquot or Calc Mass | FV, mL or "1" for conc. | Comments |
|-----|------------|--------|-----------------|-----------------------|----------------------|-------------------------|----------|
| 55 | 34752-2BHD | M2A | | | 4 | 56.5 | |
| 56 | -3BH | | | | | 55.0 | |
| 57 | -3BH+ | | | | | ↓ | |
| 58 | -4BH | | | | | 51.5 | |
| 59 | -5BH | | | | | 47.0 | |
| 60 | -5BHD | | | | | ↓ | |
| 61 | -6BH | | | | | 53.5 | |
| 62 | -6BH+ | | | | | ↓ | |
| 63 | -7BH | | | | | 49.5 | |
| 64 | -8BH | | | | | 48.5 | |
| 65 | -8BHD | | | | | ↓ | |
| 66 | -9BH | | | | | 49.0 | |
| 67 | -9BH+ | | | | | ↓ | |
| 68 | -10BH | | | | | 21.2 | |
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PerkinElmer FIMS-100 CVAA Mercury Analyzer

| Sample_ID | Date | Time | Mean_Sig | Mean_Rd | Mean_Rt | Units | Alq. | Vol. | Sig 1 | Reading-1 | Result-1 | Sig 2 | Reading-2 | Result-2 | Cor. Coeff. |
|--------------------|----------|-------------|------------|------------|------------|-------|------|------|-------------|------------|------------|------------|------------|------------|-------------|
| Calib Blank | 5/7/2020 | 9:57:44 AM | 0.00034492 | | | µg | | | 0.00034673 | | | 0.00034311 | | | |
| STD1 = .004ug | 5/7/2020 | 9:59:27 AM | 0.00038348 | | | µg | | | 0.00038998 | | | 0.00037697 | | | |
| STD2 = .04ug | 5/7/2020 | 10:01:08 AM | 0.00470385 | | | µg | | | 0.00470339 | | | 0.00470431 | | | |
| STD3 = .08ug | 5/7/2020 | 10:02:52 AM | 0.0093786 | | | µg | | | 0.00938251 | | | 0.00937469 | | | |
| STD4 = .16ug | 5/7/2020 | 10:04:46 AM | 0.01836008 | | | µg | | | 0.01833193 | | | 0.01838823 | | | |
| STD5 = .2ug | 5/7/2020 | 10:06:39 AM | 0.0224345 | | | µg | | | 0.02244948 | | | 0.02241951 | | | |
| Reagent Blank | 5/7/2020 | 10:08:31 AM | -2.58E-05 | -0.0002272 | -0.0002272 | µg | | | -3.42E-05 | -0.0003013 | -0.0003013 | -1.74E-05 | -0.000153 | -0.000153 | |
| 0.004ug = DL | 5/7/2020 | 10:10:13 AM | 0.00041519 | 0.00365324 | 0.00365324 | µg | | | 0.00042545 | 0.00374345 | 0.00374345 | 0.00040494 | 0.00356303 | 0.00356303 | 0.999666649 |
| 0.080ug = QC STD 3 | 5/7/2020 | 10:11:56 AM | 0.00919576 | 0.08091241 | 0.08091241 | µg | | | 0.00926175 | 0.08149303 | 0.08149303 | 0.00912977 | 0.08033178 | 0.08033178 | 0.999666649 |
| 0.080ug = QC STD 2 | 5/7/2020 | 10:13:49 AM | 0.00921508 | 0.08108245 | 0.08108245 | µg | | | 0.00923197 | 0.08123103 | 0.08123103 | 0.0091982 | 0.08093388 | 0.08093388 | 0.999666649 |
| Reagent Blank | 5/7/2020 | 10:15:41 AM | -2.48E-05 | -0.0002183 | -0.0002183 | µg | | | -3.73E-05 | -0.000328 | -0.000328 | -1.23E-05 | -0.0001085 | -0.0001085 | 0.999666649 |
| 0.004ug = DL | 5/7/2020 | 11:20:04 AM | 0.00041846 | 0.00368198 | 0.00368198 | µg | | | 0.00043329 | 0.00381247 | 0.00381247 | 0.00040363 | 0.0035515 | 0.0035515 | 0.999666649 |
| 0.080ug = QC STD 2 | 5/7/2020 | 11:21:46 AM | 0.00935345 | 0.08229991 | 0.08229991 | µg | | | 0.00935404 | 0.08230509 | 0.08230509 | 0.00935286 | 0.08229474 | 0.08229474 | 0.999666649 |
| Reagent Blank | 5/7/2020 | 11:23:38 AM | -6.37E-05 | -0.0005601 | -0.0005601 | µg | | | -6.04E-05 | -0.0005311 | -0.0005311 | -6.69E-05 | -0.0005891 | -0.0005891 | 0.999666649 |
| 34752-1 A | 5/7/2020 | 11:28:47 AM | -0.0001985 | -0.0015191 | -0.0759542 | µg | 4 | 200 | -0.0001839 | -0.0013908 | -0.0695399 | -0.000213 | -0.0016474 | -0.0823685 | 0.999666649 |
| 34752-2 A | 5/7/2020 | 11:30:30 AM | -0.0001317 | -0.0009318 | -0.0465898 | µg | 4 | 200 | -0.0001318 | -0.0009328 | -0.0466393 | -0.0001316 | -0.0009308 | -0.0465403 | 0.999666649 |
| 34752-2 A DUP | 5/7/2020 | 11:32:12 AM | -9.53E-05 | -0.0006113 | -0.0305649 | µg | 4 | 200 | -7.48E-05 | -0.0004308 | -0.0215377 | -0.0001158 | -0.0007918 | -0.0395921 | 0.999666649 |
| 34752-3 A | 5/7/2020 | 11:33:55 AM | -0.0002207 | -0.0017149 | -0.0857456 | µg | 4 | 200 | -0.0002087 | -0.0016091 | -0.080455 | -0.0002327 | -0.0018207 | -0.0910361 | 0.999666649 |
| 34752-3 A SPK | 5/7/2020 | 11:35:37 AM | 0.00912299 | 0.08049932 | 4.0249662 | µg | 4 | 200 | 0.00913915 | 0.08064146 | 4.0320731 | 0.00910684 | 0.08035719 | 4.01785929 | 0.999666649 |
| 34752-4 A | 5/7/2020 | 11:37:31 AM | -0.0001887 | -0.0014331 | -0.0716575 | µg | 4 | 200 | -0.0001905 | -0.0014489 | -0.0724446 | -0.0001869 | -0.0014174 | -0.0708703 | 0.999666649 |
| 34752-5 A | 5/7/2020 | 11:39:15 AM | -0.0002403 | -0.0018873 | -0.0943674 | µg | 4 | 200 | -0.0002281 | -0.0017802 | -0.0890078 | -0.0002525 | -0.0019945 | -0.0997271 | 0.999666649 |
| 34752-5 A DUP | 5/7/2020 | 11:40:58 AM | -0.0001739 | -0.0013031 | -0.065156 | µg | 4 | 200 | -0.0001658 | -0.0012319 | -0.0615975 | -0.000182 | -0.0013743 | -0.0687145 | 0.999666649 |
| 0.004ug = DL | 5/7/2020 | 11:42:41 AM | 0.0003699 | 0.00325469 | 0.00325469 | µg | | | 0.00036897 | 0.0032465 | 0.0032465 | 0.00037083 | 0.00326289 | 0.00326289 | 0.999666649 |
| 0.080ug = QC STD 2 | 5/7/2020 | 11:44:24 AM | 0.00926886 | 0.08155558 | 0.08155558 | µg | | | 0.00930802 | 0.08190018 | 0.08190018 | 0.00922969 | 0.08121099 | 0.08121099 | 0.999666649 |
| Reagent Blank | 5/7/2020 | 11:46:15 AM | -2.47E-05 | -0.0002176 | -0.0002176 | µg | | | -2.20E-05 | -0.0001933 | -0.0001933 | -2.75E-05 | -0.000242 | -0.000242 | 0.999666649 |
| 34752-6 A | 5/7/2020 | 11:47:58 AM | -0.0001766 | -0.0013267 | -0.0663332 | µg | 4 | 200 | -0.0001854 | -0.0014038 | -0.0701889 | -0.0001678 | -0.0012495 | -0.0624775 | 0.999666649 |
| 34752-6 A SPK | 5/7/2020 | 11:49:41 AM | 0.00968251 | 0.08542247 | 4.27112357 | µg | 4 | 200 | 0.0096882 | 0.08547252 | 4.27362611 | 0.00967683 | 0.08537242 | 4.26862103 | 0.999666649 |
| 34752-7 A | 5/7/2020 | 11:51:34 AM | -0.0002061 | -0.001586 | -0.0793008 | µg | 4 | 200 | -0.0002025 | -0.0015544 | -0.0777209 | -0.0002097 | -0.0016176 | -0.0808807 | 0.999666649 |
| 34752-8 A | 5/7/2020 | 11:53:18 AM | -0.0002146 | -0.0016612 | -0.0830603 | µg | 4 | 200 | -0.0001922 | -0.0014637 | -0.0731825 | -0.0002371 | -0.0018588 | -0.092938 | 0.999666649 |
| 34752-8 A DUP | 5/7/2020 | 11:55:01 AM | -0.0002062 | -0.001587 | -0.07935 | µg | 4 | 200 | -0.0002185 | -0.0016954 | -0.0847678 | -0.0001939 | -0.0014786 | -0.0739322 | 0.999666649 |
| 34752-9 A | 5/7/2020 | 11:56:44 AM | -0.0002269 | -0.0017697 | -0.088485 | µg | 4 | 200 | -0.0002106 | -0.0016257 | -0.0812865 | -0.0002433 | -0.0019137 | -0.0956835 | 0.999666649 |
| 34752-9 A SPK | 5/7/2020 | 11:58:28 AM | 0.00926329 | 0.08173377 | 4.0866885 | µg | 4 | 200 | 0.00929572 | 0.08201914 | 4.10095701 | 0.00923086 | 0.08144484 | 4.07241999 | 0.999666649 |
| 34752-10 A | 5/7/2020 | 12:00:21 PM | -0.0002529 | -0.0019978 | -0.0998912 | µg | 4 | 200 | -0.0002559 | -0.0020242 | -0.101208 | -0.0002499 | -0.0019715 | -0.0985744 | 0.999666649 |
| 0.004ug = DL | 5/7/2020 | 12:05:41 PM | 0.00041151 | 0.00362087 | 0.00362087 | µg | | | 0.00040375 | 0.00355253 | 0.00355253 | 0.00041928 | 0.00368921 | 0.00368921 | 0.999666649 |
| 0.080ug = QC STD 2 | 5/7/2020 | 12:07:23 PM | 0.00934779 | 0.08225014 | 0.08225014 | µg | | | 0.00932987 | 0.08209246 | 0.08209246 | 0.00936571 | 0.08240782 | 0.08240782 | 0.999666649 |
| Reagent Blank | 5/7/2020 | 12:09:15 PM | -2.57E-05 | -0.0002264 | -0.0002264 | µg | | | -1.09E-05 | -9.60E-05 | -9.60E-05 | -4.06E-05 | -0.0003569 | -0.0003569 | 0.999666649 |
| Calib Blank | 5/7/2020 | 10:51:08 AM | 0.0003025 | | | µg | | | 0.00029834 | | | 0.00030665 | | | |
| STD1 = .004ug | 5/7/2020 | 10:52:50 AM | 0.00042109 | | | µg | | | 0.00042663 | | | 0.00041555 | | | |
| STD2 = .04ug | 5/7/2020 | 10:54:32 AM | 0.00475179 | | | µg | | | 0.00478369 | | | 0.00471988 | | | |
| STD3 = .08ug | 5/7/2020 | 10:56:15 AM | 0.0097157 | | | µg | | | 0.00971873 | | | 0.00971267 | | | |
| STD4 = .16ug | 5/7/2020 | 10:58:09 AM | 0.0192772 | | | µg | | | 0.0192987 | | | 0.0192557 | | | |
| STD5 = .2ug | 5/7/2020 | 11:00:03 AM | 0.02391632 | | | µg | | | 0.02383983 | | | 0.02399281 | | | |
| Reagent Blank | 5/7/2020 | 11:01:56 AM | 1.50E-05 | 0.00012464 | 0.00012464 | µg | | | -3.32E-06 | -2.76E-05 | -2.76E-05 | 3.32E-05 | 0.00027692 | 0.00027692 | |
| 0.004ug = DL | 5/7/2020 | 11:03:37 AM | 0.00044304 | 0.00369079 | 0.00369079 | µg | | | 0.00045529 | 0.00377292 | 0.00377292 | 0.00043319 | 0.00360867 | 0.00360867 | 0.999958454 |
| 0.080ug = QC STD 3 | 5/7/2020 | 11:05:19 AM | 0.00959359 | 0.07991969 | 0.07991969 | µg | | | 0.00956636 | 0.07969282 | 0.07969282 | 0.00962083 | 0.08014656 | 0.08014656 | 0.999958454 |
| 0.080ug = QC STD 2 | 5/7/2020 | 11:07:13 AM | 0.00980824 | 0.08170784 | 0.08170784 | µg | | | 0.00982942 | 0.08188423 | 0.08188423 | 0.00978707 | 0.08153144 | 0.08153144 | 0.999958454 |
| Reagent Blank | 5/7/2020 | 11:09:05 AM | -3.30E-05 | -0.0002753 | -0.0002753 | µg | | | -2.53E-05 | -0.000211 | -0.000211 | -4.08E-05 | -0.0003396 | -0.0003396 | 0.999958454 |
| 0.004ug = DL | 5/7/2020 | 11:51:07 AM | 0.00044977 | 0.00374682 | 0.00374682 | µg | | | 0.00044376 | 0.00369672 | 0.00369672 | 0.00045578 | 0.00379693 | 0.00379693 | 0.999958454 |
| 0.080ug = QC STD 2 | 5/7/2020 | 11:52:48 AM | 0.01011102 | 0.08423017 | 0.08423017 | µg | | | 0.0101098 | 0.08421998 | 0.08421998 | 0.01011225 | 0.08424037 | 0.08424037 | 0.999958454 |
| Reagent Blank | 5/7/2020 | 11:54:41 AM | 4.51E-05 | 0.00037556 | 0.00037556 | µg | | | 3.25E-05 | 0.00027096 | 0.00027096 | 5.76E-05 | 0.00048016 | 0.00048016 | 0.999958454 |
| 34752-1 B | 5/7/2020 | 12:06:55 PM | 0.00188091 | 0.01554433 | 1.94304121 | µg | 4 | 500 | 0.00186334 | 0.01539793 | 1.92474186 | 0.00189848 | 0.01569072 | 1.96134056 | 0.999958454 |
| 34752-2 B | 5/7/2020 | 12:08:38 PM | 0.00172843 | 0.01427411 | 2.14111658 | µg | 4 | 600 | 0.00174094 | 0.01437831 | 2.15674695 | 0.00171592 | 0.01416991 | 2.12548621 | 0.999958454 |
| 34752-2 B DUP | 5/7/2020 | 12:10:21 PM | 0.00174123 | 0.01438076 | 2.15711399 | µg | 4 | 600 | 0.001770353 | 0.01406669 | 2.11000276 | 0.00177894 | 0.01469483 | 2.20422522 | 0.999958454 |
| 34752-3 B | 5/7/2020 | 12:12:04 PM | 0.00337453 | 0.02798702 | 3.49837741 | µg | 4 | 500 | 0.0033812 | 0.02804253 | 3.50531593 | 0.00336787 | 0.02793151 | 3.4914389 | 0.999958454 |
| 0.004ug = DL | 5/7/2020 | 12:13:47 PM | 0.00046462 | 0.00387049 | 0.00387049 | µg | | | 0.00045805 | 0.00381584 | 0.00381584 | 0.00047118 | 0.00392514 | 0.00392514 | 0.999958454 |
| 0.080ug = QC STD 2 | 5/7/2020 | 12:15:29 PM | 0.01015779 | 0.08461976 | 0.08461976 | µg | | | 0.01018631 | 0.08485731 | 0.08485731 | 0.01012927 | 0.0843822 | 0.0843822 | 0.999958454 |
| Reagent Blank | 5/7/2020 | 12:17:21 PM | 5.85E-05 | 0.00048753 | 0.00048753 | µg | | | 5.76E-05 | 0.0004798 | 0.0004798 | 5.95E-05 | 0.00049526 | 0.00049526 | 0.999958454 |
| 34752-3 B SPK | 5/7/2020 | 12:19:03 PM | 0.01372932 | 0.11424788 | 14.2809852 | µg | 4 | 500 | 0.01376483 | 0.11454369 | 14.3179615 | 0.01369381 | 0.11395207 | 14.2440089 | 0.999958454 |
| 34752-4 B | 5/7/2020 | 12:20:56 PM | 0.00237102 | 0.0196272 | 2.94408001 | µg | 4 | 600 | 0.00235919 | 0.0195287 | 2.9293054 | 0.00238284 | 0.0197257 | 2.95885462 | 0.999958454 |
| 34752-5 B | 5/7/2020 | 12:22:40 PM | 0.0006348 | 0.01706521 | 2.98641121 | µg | 4 | 700 | 0.00207246 | 0.01714007 | 2.99951221 | 0.00205449 | 0.01699034 | 2.9733102 | 0.999958454 |
| 34752-5 B DUP | 5/7/2020 | 12:24:24 PM | 0.00207973 | 0.01720064 | 3.01011209 | µg | 4 | 700 | 0.00207128 | 0.01713026 | 2.99779596 | 0.00208818 | 0.01727102 | 3.02242821 | 0.999958454 |
| 34752-6 B | 5/7/2020 | 12:26:08 PM | 0.00350312 | 0.02905822 | 4.3587334 | µg | 4 | 600 | 0.00350901 | 0.02910725 | 4.36608745 | 0.00349724 | 0.0290092 | 4.35137934 | 0.999958454 |
| 34752-6 B SPK | 5/7/2020 | 12:27:51 PM | 0.0134359 | 0.1180348 | 16.7705219 | µg | 4 | 600 | 0.01352178 | 0.1125189 | 16.8778346 | 0.01335002 | 0.11108806 | 16.6632092 | 0.9999584 |

PerkinElmer FIMS-100 CVAA Mercury Analyzer

| Sample_ID | Date | Time | Mean_Sig | Mean_Rd | Mean_Rt | Units | Alq. | Vol. | Sig 1 | Reading-1 | Result-1 | Sig 2 | Reading-2 | Result-2 | Cor. Coeff. |
|--------------------|----------|-------------|-------------|------------|--------------|-------|------|------|-------------|------------|--------------|------------|------------|---------------|-------------|
| 0.080ug = QC STD 2 | 5/8/2020 | 9:58:45 AM | 0.00702833 | 0.08050988 | 0.08050988 | µg | | | 0.00701095 | 0.08031087 | 0.08031087 | 0.0070457 | 0.08070889 | 0.08070889 | 0.999962172 |
| Reagent Blank | 5/8/2020 | 10:00:27 AM | 9.10E-06 | 0.0001042 | 0.0001042 | µg | | | 7.75E-06 | 8.87E-05 | 8.87E-05 | 1.04E-05 | 0.00011967 | 0.00011967 | 0.999962172 |
| 0.004ug = DL | 5/8/2020 | 10:19:19 AM | 0.00029519 | 0.00338137 | 0.00338137 | µg | | | 0.00028584 | 0.00327428 | 0.00327428 | 0.00030453 | 0.00348846 | 0.00348846 | 0.999962172 |
| 0.080ug = QC STD 2 | 5/8/2020 | 10:21:02 AM | 0.00688062 | 0.07881785 | 0.07881785 | µg | | | 0.0068742 | 0.07874432 | 0.07874432 | 0.00688704 | 0.07889138 | 0.07889138 | 0.999962172 |
| Reagent Blank | 5/8/2020 | 10:22:43 AM | 6.86E-06 | 7.85E-05 | 7.85E-05 | µg | | | 1.83E-05 | 0.00020962 | 0.00020962 | -4.59E-06 | -5.25E-05 | -5.25E-05 | 0.999962172 |
| 34752-1 C | 5/8/2020 | 10:26:07 AM | 0.00146549 | 0.01666395 | 0.0166639478 | µg | 4 | 400 | 0.00147565 | 0.01678148 | 0.01678148 | 0.00145523 | 0.01654641 | 0.0165464149 | 0.999962172 |
| 34752-2 C | 5/8/2020 | 10:27:49 AM | 0.00139581 | 0.01586578 | 0.0158657816 | µg | 4 | 400 | 0.00139469 | 0.01585292 | 0.01585292 | 0.00139693 | 0.01587865 | 0.01587865 | 0.999962172 |
| 34752-2 C DUP | 5/8/2020 | 10:29:32 AM | 0.00139931 | 0.01590587 | 0.0159058739 | µg | 4 | 400 | 0.00139086 | 0.01580905 | 0.0158090511 | 0.00140776 | 0.01600027 | 0.0160026967 | 0.999962172 |
| 34752-3 C | 5/8/2020 | 10:31:15 AM | 0.00069574 | 0.00784643 | 0.0078464315 | µg | 4 | 400 | 0.00068714 | 0.00774791 | 0.0077479094 | 0.00070434 | 0.00794495 | 0.0079449536 | 0.999962172 |
| 34752-3 C SPK | 5/8/2020 | 10:32:58 AM | 0.000752953 | 0.08612787 | 0.0861278664 | µg | 4 | 400 | 0.000752636 | 0.08609163 | 0.0860916292 | 0.00753269 | 0.0861641 | 0.0861641036 | 0.999962172 |
| 34752-4 C | 5/8/2020 | 10:34:42 AM | 0.00206795 | 0.02356515 | 0.0235651467 | µg | 4 | 400 | 0.00206486 | 0.02352981 | 0.0235298358 | 0.00207103 | 0.02360046 | 0.0236004576 | 0.999962172 |
| 34752-5 C | 5/8/2020 | 10:36:26 AM | 0.00152553 | 0.01735178 | 0.0173517806 | µg | 4 | 400 | 0.00152865 | 0.01738751 | 0.0173875119 | 0.00152241 | 0.01731605 | 0.0173160493 | 0.999962172 |
| 34752-5 C DUP | 5/8/2020 | 10:38:11 AM | 0.00149747 | 0.01703035 | 0.0170303457 | µg | 4 | 400 | 0.00148867 | 0.01692947 | 0.0169294682 | 0.00150628 | 0.01713122 | 0.0171312233 | 0.999962172 |
| 34752-6 C | 5/8/2020 | 10:39:54 AM | 0.00113993 | 0.0129347 | 0.0129346963 | µg | 4 | 400 | 0.00114757 | 0.01302215 | 0.0130221488 | 0.0011323 | 0.01284724 | 0.0128472437 | 0.999962172 |
| 0.004ug = DL | 5/8/2020 | 10:41:36 AM | 0.00029595 | 0.00339014 | 0.00339014 | µg | | | 0.00030532 | 0.00349745 | 0.00349745 | 0.00028658 | 0.00328283 | 0.00328283 | 0.999962172 |
| 0.080ug = QC STD 2 | 5/8/2020 | 10:43:18 AM | 0.00691126 | 0.07916884 | 0.07916884 | µg | | | 0.00693315 | 0.07941966 | 0.07941966 | 0.00688936 | 0.07891802 | 0.07891802 | 0.999962172 |
| Reagent Blank | 5/8/2020 | 10:45:00 AM | -9.54E-06 | -0.0001093 | -0.0001093 | µg | | | -1.26E-06 | -1.44E-05 | -1.44E-05 | -1.78E-05 | -0.0002042 | -0.0002042 | 0.999962172 |
| 34752-6 C SPK | 5/8/2020 | 10:46:42 AM | 0.00795093 | 0.09095508 | 0.0909550768 | µg | 4 | 400 | 0.00792606 | 0.09067012 | 0.0906701166 | 0.00797581 | 0.09124004 | 0.0912400371 | 0.999962172 |
| 34752-7 C | 5/8/2020 | 10:48:24 AM | 0.00255557 | 0.02915085 | 0.0291508521 | µg | 4 | 400 | 0.00256007 | 0.0292025 | 0.0292025001 | 0.00255016 | 0.02909092 | 0.02909092041 | 0.999962172 |
| 34752-8 C | 5/8/2020 | 10:50:07 AM | 0.00146754 | 0.01668741 | 0.0166874118 | µg | 4 | 400 | 0.00143595 | 0.0163256 | 0.0163255981 | 0.00149912 | 0.01704923 | 0.0170492256 | 0.999962172 |
| 34752-8 C DUP | 5/8/2020 | 10:51:50 AM | 0.00157508 | 0.01791934 | 0.0179193445 | µg | 4 | 400 | 0.001617 | 0.01839957 | 0.0183995653 | 0.00153316 | 0.01743912 | 0.0174391238 | 0.999962172 |
| 34752-9 C | 5/8/2020 | 10:53:33 AM | 0.00054867 | 0.00616177 | 0.0061617658 | µg | 4 | 400 | 0.00055839 | 0.00627309 | 0.0062730927 | 0.00053895 | 0.00605044 | 0.006050439 | 0.999962172 |
| 34752-9 C SPK | 5/8/2020 | 10:55:15 AM | 0.00737121 | 0.08431433 | 0.0843143283 | µg | 4 | 400 | 0.00742629 | 0.08494532 | 0.0849453213 | 0.00731613 | 0.08368334 | 0.0836833353 | 0.999962172 |
| 34752-10 C | 5/8/2020 | 10:56:58 AM | -0.0001305 | -0.0016186 | -0.00161858 | µg | 4 | 400 | -0.0001167 | -0.0014605 | -0.001460526 | -0.0001443 | -0.0017766 | -0.00177665 | 0.999962172 |
| 34752 LRB FH | 5/8/2020 | 10:58:40 AM | 0.0001299 | -0.0016115 | -0.00162876 | µg | 4 | 100 | -0.0001336 | -0.0016534 | -0.00165347 | -0.0001263 | -0.0015696 | -0.00156964 | 0.999962172 |
| 34752 LRB FH SPK | 5/8/2020 | 11:00:24 AM | 0.0039767 | 0.04543007 | 0.0454300739 | µg | 1.6 | 100 | 0.00396773 | 0.04532723 | 0.04532723 | 0.00398568 | 0.04553291 | 0.04553291 | 0.999962172 |
| 34752-1 FH | 5/8/2020 | 11:02:08 AM | 0.0026269 | 0.02996795 | 0.029967951 | µg | 4 | 100 | 0.00264033 | 0.0301218 | 0.0301218 | 0.00261347 | 0.02981411 | 0.02981411 | 0.999962172 |
| 0.004ug = DL | 5/8/2020 | 11:03:51 AM | 0.00030126 | 0.00345097 | 0.00345097 | µg | | | 0.00030316 | 0.00347277 | 0.00347277 | 0.00029936 | 0.00342918 | 0.00342918 | 0.999962172 |
| 0.080ug = QC STD 2 | 5/8/2020 | 11:05:33 AM | 0.00679708 | 0.07786098 | 0.07786098 | µg | | | 0.00679433 | 0.07782943 | 0.07782943 | 0.00679984 | 0.07789252 | 0.07789252 | 0.999962172 |
| Reagent Blank | 5/8/2020 | 11:07:15 AM | -3.47E-06 | -3.97E-05 | -3.97E-05 | µg | | | 5.23E-06 | 5.99E-05 | 5.99E-05 | -1.22E-05 | -0.0001394 | -0.0001394 | 0.999962172 |
| 34752-2 FH | 5/8/2020 | 11:08:58 AM | 0.00154125 | 0.01753182 | 0.01753182 | µg | 4 | 100 | 0.00153897 | 0.01750572 | 0.01750572 | 0.00154353 | 0.01755792 | 0.01755792 | 0.999962172 |
| 34752-2 FH DUP | 5/8/2020 | 11:10:42 AM | 0.00156976 | 0.01785843 | 0.01785843 | µg | 4 | 100 | 0.00156901 | 0.01784981 | 0.01784981 | 0.00157052 | 0.01786705 | 0.01786705 | 0.999962172 |
| 34752-3 FH | 5/8/2020 | 11:12:25 AM | 0.00142892 | 0.01624509 | 0.01624509 | µg | 4 | 100 | 0.00142575 | 0.01620874 | 0.01620874 | 0.0014321 | 0.01628144 | 0.01628144 | 0.999962172 |
| 34752-3 FH SPK | 5/8/2020 | 11:14:08 AM | 0.00844029 | 0.09656068 | 0.09656068 | µg | 4 | 100 | 0.00844572 | 0.09662285 | 0.09662285 | 0.00843486 | 0.09649851 | 0.09649851 | 0.999962172 |
| 34752-4 FH | 5/8/2020 | 11:15:51 AM | 0.00029169 | 0.00321797 | 0.00321797 | µg | 4 | 100 | 0.00027941 | 0.00307732 | 0.00307732 | 0.00030396 | 0.00335863 | 0.00335863 | 0.999962172 |
| 34752-5 FH | 5/8/2020 | 11:17:34 AM | 0.00051314 | 0.00575469 | 0.00575469 | µg | 4 | 100 | 0.00050491 | 0.00566051 | 0.00566051 | 0.00052136 | 0.00584888 | 0.00584888 | 0.999962172 |
| 34752-5 FH DUP | 5/8/2020 | 11:19:17 AM | 0.00046695 | 0.00522661 | 0.00522661 | µg | 4 | 100 | 0.00047002 | 0.00526078 | 0.00526078 | 0.00046388 | 0.00519045 | 0.00519045 | 0.999962172 |
| 34752-6 FH | 5/8/2020 | 11:21:01 AM | 0.00044749 | 0.00500267 | 0.00500267 | µg | 4 | 100 | 0.00044853 | 0.00501468 | 0.00501468 | 0.00044644 | 0.00499066 | 0.00499066 | 0.999962172 |
| 34752-6 FH SPK | 5/8/2020 | 11:22:44 AM | 0.00716428 | 0.08194397 | 0.08194397 | µg | 4 | 100 | 0.00719798 | 0.08232997 | 0.08232997 | 0.00713059 | 0.08155797 | 0.08155797 | 0.999962172 |
| 34752-7 FH | 5/8/2020 | 11:24:27 AM | 0.00060132 | 0.00677061 | 0.00677061 | µg | 4 | 100 | 0.00060231 | 0.00677622 | 0.00677622 | 0.00060133 | 0.006765 | 0.006765 | 0.999962172 |
| 0.004ug = DL | 5/8/2020 | 11:29:34 AM | 0.00029388 | 0.00336643 | 0.00336643 | µg | | | 0.0002921 | 0.00334606 | 0.00334606 | 0.00029566 | 0.0033868 | 0.0033868 | 0.999962172 |
| 0.080ug = QC STD 2 | 5/8/2020 | 11:31:17 AM | 0.00690718 | 0.07912208 | 0.07912208 | µg | | | 0.00695223 | 0.07963817 | 0.07963817 | 0.00686212 | 0.07860599 | 0.07860599 | 0.999962172 |
| Reagent Blank | 5/8/2020 | 11:32:58 AM | 3.68E-06 | 4.22E-05 | 4.22E-05 | µg | | | 1.31E-05 | 0.00015017 | 0.00015017 | -5.75E-06 | -6.59E-05 | -6.59E-05 | 0.999962172 |
| 34752-8 FH | 5/8/2020 | 11:34:40 AM | 0.00030496 | 0.00337002 | 0.00337002 | µg | 4 | 100 | 0.00030159 | 0.00333314 | 0.00333314 | 0.00030833 | 0.00340863 | 0.00340863 | 0.999962172 |
| 34752-8 FH DUP | 5/8/2020 | 11:36:25 AM | 0.0003012 | 0.00332701 | 0.00332701 | µg | 4 | 100 | 0.00030121 | 0.00332708 | 0.00332708 | 0.0003012 | 0.00332694 | 0.00332694 | 0.999962172 |
| 34752-9 FH | 5/8/2020 | 11:38:09 AM | 0.00029464 | 0.0032518 | 0.0032518 | µg | 4 | 100 | 0.00028358 | 0.00312511 | 0.00312511 | 0.0003057 | 0.00337848 | 0.00337848 | 0.999962172 |
| 34752-9 FH SPK | 5/8/2020 | 11:39:53 AM | 0.00760439 | 0.0869854 | 0.0869854 | µg | 4 | 100 | 0.00759885 | 0.08692196 | 0.08692196 | 0.00760993 | 0.08704884 | 0.08704884 | 0.999962172 |
| 34752-10 FH | 5/8/2020 | 11:41:36 AM | -0.000119 | -0.0014869 | -0.0014869 | µg | 4 | 100 | -0.0001242 | -0.0015457 | -0.0015457 | -0.0001139 | -0.0014282 | -0.0014282 | 0.999962172 |
| 0.004ug = DL | 5/8/2020 | 11:46:46 AM | 0.00032923 | 0.00377135 | 0.00377135 | µg | | | 0.00033949 | 0.00388889 | 0.00388889 | 0.00031897 | 0.00365382 | 0.00365382 | 0.999962172 |
| 0.080ug = QC STD 3 | 5/8/2020 | 11:48:29 AM | 0.00685854 | 0.07856496 | 0.07856496 | µg | | | 0.00685191 | 0.07848905 | 0.07848905 | 0.0068517 | 0.07864087 | 0.07864087 | 0.999962172 |
| Reagent Blank | 5/8/2020 | 11:50:11 AM | 1.07E-05 | 0.00012287 | 0.00012287 | µg | | | 3.66E-06 | 4.20E-05 | 4.20E-05 | 1.78E-05 | 0.00020377 | 0.00020377 | 0.999962172 |
| Calib Blank | 5/8/2020 | 9:30:07 AM | 0.00027896 | | | µg | | | 0.00029773 | | | 0.00026018 | | | |
| STD1 = .004ug | 5/8/2020 | 9:31:49 AM | 0.00036568 | | | µg | | | 0.00038642 | | | 0.00034495 | | | |
| STD2 = .04ug | 5/8/2020 | 9:33:32 AM | 0.00435377 | | | µg | | | 0.00434671 | | | 0.00436082 | | | |
| STD3 = .08ug | 5/8/2020 | 9:35:15 AM | 0.00870423 | | | µg | | | 0.00870167 | | | 0.00870679 | | | |
| STD4 = .16ug | 5/8/2020 | 9:36:59 AM | 0.01772187 | | | µg | | | 0.01773297 | | | 0.01771078 | | | |
| STD5 = .2ug | 5/8/2020 | 9:38:52 AM | 0.02231689 | | | µg | | | 0.02226932 | | | 0.02236445 | | | |
| Reagent Blank | 5/8/2020 | 9:40:45 AM | -3.52E-05 | -0.0003173 | -0.0003173 | µg | | | -6.04E-05 | -0.0005444 | -0.0005444 | -1.00E-05 | -9.03E-05 | -9.03E-05 | |
| 0.004ug = DL | 5/8/2020 | 9:42:26 AM | 0.0003615 | 0.00325676 | 0.00325676 | µg | | | 0.00035911 | 0.00323521 | 0.00323521 | 0.00036389 | 0.00327832 | 0.00327832 | 0.999909657 |
| 0.080ug = QC STD 3 | 5/8/2020 | 9:44:08 AM | 0.00916687 | 0.08258453 | 0.08258453 | µg | | | 0.00919412 | 0.08282999 | 0.08282999 | | | | |

PerkinElmer FIMS-100 CVAA Mercury Analyzer

| Sample_ID | Date | Time | Mean_Sig | Mean_Rd | Mean_Rt | Units | Alq. | Vol. | Sig 1 | Reading-1 | Result-1 | Sig 2 | Reading-2 | Result-2 | Cor. Coeff. |
|--------------------|----------|-------------|------------|------------|------------|-------|------|------|------------|------------|------------|------------|------------|------------|-------------|
| 34752-10 BH | 5/8/2020 | 12:00:18 PM | -0.0001019 | -0.0006009 | -0.0318479 | µg | 4 | 212 | -0.0001054 | -0.0006323 | -0.0335119 | -9.84E-05 | -0.0005695 | -0.0301839 | 0.999909657 |
| 0.004ug = DL | 5/8/2020 | 12:02:01 PM | 0.00038839 | 0.00349898 | 0.00349898 | µg | | | 0.00038946 | 0.00350868 | 0.00350868 | 0.00038731 | 0.00348928 | 0.00348928 | 0.999909657 |
| 0.080ug = QC STD 2 | 5/8/2020 | 12:07:28 PM | 0.00950839 | 0.08566131 | 0.08566131 | µg | | | 0.00962821 | 0.08674077 | 0.08674077 | 0.00938857 | 0.08458185 | 0.08458185 | 0.999909657 |
| Reagent Blank | 5/8/2020 | 12:09:20 PM | 0.00013526 | 0.00121858 | 0.00121858 | µg | | | 0.00012365 | 0.00111396 | 0.00111396 | 0.00014688 | 0.00132321 | 0.00132321 | 0.999909657 |

Appendix D

Calibration Data



Routine Dry Gas Meter Calibration

Control Module: C-14
DGM S/N : 17087358
Date : 4/22/2020
Technician : DJK

Leak checks
Negative Pass 15 in. Hg
Positive : Pass > 5 in. W.C

Barometric Press. : 28.40
Previous Y : 1.0030
Previous dH@ : 1.9500

| Orifice Diff Pressure, in. W.C. | Wet Test Volume, Ft³ | Dry Gas Meter Temp, °F | | Wet Test Meter Temp, °F | Dry Gas Volume Ft³ | Elapsed Time of Cal. Point | | Meter Coefficient Y | Orifice Coefficient dH@ |
|---------------------------------------|----------------------------|---------------------------|-----------------|-------------------------------|--------------------------|----------------------------------|------------|---------------------------|-------------------------------|
| | | Inlet | Outlet | | | | | | |
| Nominal 0.50 | Initial 3083.00 | Initial 73.0 | Initial 73.0 | Initial 73.5 | Initial 162.100 | | | 0.9821 | 2.0066 |
| Actual | Final 3088.00 | Final 73.0 | Final 73.0 | Final 73.5 | Final 167.180 | Minutes 12 | Sec. 56 | | |
| 0.50 | Total 5.00 | Average 73.0 | Average 73.0 | Average 73.5 | Total 5.080 | Minutes 12.93 | | | |
| | | 73.0 Tm | | | | | | | |
| Nominal 1.00 | Initial 3089.00 | Initial 73.0 | Initial 73.0 | Initial 73.5 | Initial 168.180 | | | 0.9811 | 1.9914 |
| Actual | Final 3096.00 | Final 74.0 | Final 74.0 | Final 73.0 | Final 175.300 | Minutes 12 | Sec. 46 | | |
| 1.00 | Total 7.00 | Average 73.5 | Average 73.5 | Average 73.3 | Total 7.120 | 12.77 | | | |
| | | 73.5 Tm | | | | | | | |
| Nominal 2.00 | Initial 3070.00 | Initial 71.0 | Initial 71.0 | Initial 74.0 | Initial 148.930 | | | 0.9835 | 2.0540 |
| Actual | Final 3081.00 | Final 72.0 | Final 72.0 | Final 73.5 | Final 160.010 | Minutes 14 | Sec. 22 | | |
| 2.00 | Total 11.00 | Average 71.5 | Average 71.5 | Average 73.8 | Total 11.080 | 14.37 | | | |
| | | 71.5 Tm | | | | | | | |
| Nominal 3.00 | Initial 3097.00 | Initial 74.0 | Initial 74.0 | Initial 73.0 | Initial 176.320 | | | 0.9804 | 2.0431 |
| Actual | Final 3109.00 | Final 75.0 | Final 75.0 | Final 73.0 | Final 188.500 | Minutes 12 | Sec. 49 | | |
| 3.00 | Total 12.00 | Average 74.5 | Average 74.5 | Average 73.0 | Total 12.180 | 12.82 | | | |
| | | 74.5 Tm | | | | | | | |
| Nominal 4.00 | Initial 3110.00 | Initial 75.0 | Initial 75.0 | Initial 73.0 | Initial 189.550 | | | 0.9754 | 2.0519 |
| Actual | Final 3124.00 | Final 75.0 | Final 75.0 | Final 73.0 | Final 203.810 | Minutes 12 | Sec. 59 | | |
| 4.00 | Total 14.00 | Average 75.0 | Average 75.0 | Average 73.0 | Total 14.260 | 12.98 | | | |
| | | 75.0 Tm | | | | | | | |
| Average | | | | | | | | 0.9805 | 2.0294 |

Reviewed By:

Emission Measurement Center (EMC) Approved Alternate Method (ALT-009)
Alternative Method 5 Post-Test Calibration
Line 3 Waste Gas Stack (SV103)
Control Module C-14

| Input Data | Symbol | Units | Run 1 | Run 2 | Run 3 |
|---|--------------------|--|-------------|-------------|-------------|
| Test date | - | - | 4/28/2020 | 4/28/2020 | 4/28/2020 |
| Test period | - | - | 0758 - 1003 | 1016 - 1221 | 1238 - 1442 |
| Total run time | t | min | 120 | 120 | 120 |
| Total sample volume measured by dry gas meter | V _m | acf | 82.5 | 83.0 | 84.2 |
| Average dry gas meter temp | T _m | °F | 47.4 | 56.4 | 58.3 |
| Absolute average dry gas meter temp | T _m | °R | 507.1 | 516.0 | 518.0 |
| Barometric pressure | P _b | inches Hg | 28.0 | 28.0 | 28.0 |
| Conversion factor (29.92/528)(0.75) ² | --- | (in Hg/°R) cfm ² | 0.0319 | 0.0319 | 0.0319 |
| Average orifice meter differential | Δ h _{avg} | in. H ₂ O | 1.66 | 1.65 | 1.69 |
| Orifice meter calibration coefficient | Δ H _@ | in. H ₂ O | 2.03 | 2.03 | 2.03 |
| Dry molecular weight of stack gas | M _d | lb/lb-mole | 29.14 | 29.14 | 29.12 |
| Dry molecular weight of air | --- | lb/lb-mole | 29.00 | 29.00 | 29.00 |
| Specific gravity of mercury | --- | Dimensionless | 13.60 | 13.60 | 13.60 |
| Dry gas meter calibration check value | Y _{qa} | Dimensionless | 0.9942 | 0.9943 | 0.9965 |
| Dry gas meter calibration factor | Y | Dimensionless | 0.9805 | 0.9805 | 0.9805 |
| Average of Y _{qa} 's from test run series | 0.9950 | $Y_{qa} = \frac{t}{V_m} \sqrt{\frac{0.0319 \cdot T_m}{\Delta H_{@} (P_b + \frac{\Delta h_{avg}}{13.6})} \frac{29}{M_d}} \cdot (\sqrt{\Delta h_{avg}})$ | | | |
| Dry gas meter calibration factor | 0.9805 | | | | |
| % difference between average Y _{qa} 's and Y | -1.48% | | | | |
| (must be within ± 5%) | | | | | |

Emission Measurement Center (EMC) Approved Alternate Method (ALT-009)
Alternative Method 5 Post-Test Calibration
Line 4 Waste Gas Stack (SV118)
Control Module C-14

| Input Data | Symbol | Units | Run 1 | Run 2 | Run 3 |
|---|--------------------|--|-------------|-------------|-------------|
| Test date | - | - | 4/29/2020 | 4/29/2020 | 4/29/2020 |
| Test period | - | - | 0756 - 1005 | 1022 - 1226 | 1240 - 1446 |
| Total run time | t | min | 120 | 120 | 120 |
| Total sample volume measured by dry gas meter | V _m | acf | 93.8 | 94.8 | 97.3 |
| Average dry gas meter temp | T _m | °F | 53.0 | 64.5 | 74.9 |
| Absolute average dry gas meter temp | T _m | °R | 512.6 | 524.2 | 534.6 |
| Barometric pressure | P _b | inches Hg | 28.2 | 28.2 | 28.2 |
| Conversion factor (29.92/528)(0.75) ² | --- | (in Hg/°R) cfm ² | 0.0319 | 0.0319 | 0.0319 |
| Average orifice meter differential | Δ h _{avg} | in. H ₂ O | 2.14 | 2.15 | 2.22 |
| Orifice meter calibration coefficient | Δ H _@ | in. H ₂ O | 2.03 | 2.03 | 2.03 |
| Dry molecular weight of stack gas | M _d | lb/lb-mole | 29.14 | 29.14 | 29.14 |
| Dry molecular weight of air | --- | lb/lb-mole | 29.00 | 29.00 | 29.00 |
| Specific gravity of mercury | --- | Dimensionless | 13.60 | 13.60 | 13.60 |
| Dry gas meter calibration check value | Y _{qa} | Dimensionless | 0.9947 | 0.9985 | 0.9977 |
| Dry gas meter calibration factor | Y | Dimensionless | 0.9805 | 0.9805 | 0.9805 |
| Average of Y _{qa} 's from test run series | 0.9970 | $Y_{qa} = \frac{t}{V_m} \sqrt{\frac{0.0319 \cdot T_m}{\Delta H_{@} (P_b + \frac{\Delta h_{avg}}{13.6})} \frac{29}{M_d}} \cdot (\sqrt{\Delta h_{avg}})$ | | | |
| Dry gas meter calibration factor | 0.9805 | | | | |
| % difference between average Y _{qa} 's and Y | -1.68% | | | | |
| (must be within ± 5%) | | | | | |

Emission Measurement Center (EMC) Approved Alternate Method (ALT-009)
Alternative Method 5 Post-Test Calibration
Line 6 Waste Gas Stack (SV144)
Control Module C-14

| Input Data | Symbol | Units | Run 1 | Run 2 | Run 3 |
|---|--------------------|--|-------------|-------------|-------------|
| Test date | - | - | 4/30/2020 | 4/30/2020 | 4/30/2020 |
| Test period | - | - | 0744 - 0950 | 1002 - 1209 | 1221 - 1429 |
| Total run time | t | min | 120 | 120 | 120 |
| Total sample volume measured by dry gas meter | V _m | acf | 87.7 | 90.3 | 90.4 |
| Average dry gas meter temp | T _m | °F | 65.4 | 73.1 | 74.1 |
| Absolute average dry gas meter temp | T _m | °R | 525.1 | 532.8 | 533.8 |
| Barometric pressure | P _b | inches Hg | 28.1 | 28.1 | 28.1 |
| Conversion factor (29.92/528)(0.75) ² | --- | (in Hg/°R) cfm ² | 0.0319 | 0.0319 | 0.0319 |
| Average orifice meter differential | Δ h _{avg} | in. H ₂ O | 1.82 | 1.90 | 1.89 |
| Orifice meter calibration coefficient | Δ H _@ | in. H ₂ O | 2.03 | 2.03 | 2.03 |
| Dry molecular weight of stack gas | M _d | lb/lb-mole | 29.14 | 29.14 | 29.14 |
| Dry molecular weight of air | --- | lb/lb-mole | 29.00 | 29.00 | 29.00 |
| Specific gravity of mercury | --- | Dimensionless | 13.60 | 13.60 | 13.60 |
| Dry gas meter calibration check value | Y _{qa} | Dimensionless | 0.9941 | 0.9944 | 0.9932 |
| Dry gas meter calibration factor | Y | Dimensionless | 0.9805 | 0.9805 | 0.9805 |
| Average of Y _{qa} 's from test run series | 0.9939 | $Y_{qa} = \frac{t}{V_m} \sqrt{\frac{0.0319 \cdot T_m}{\Delta H_{@} (P_b + \frac{\Delta h_{avg}}{13.6})} \frac{29}{M_d}} \cdot (\sqrt{\Delta h_{avg}})$ | | | |
| Dry gas meter calibration factor | 0.9805 | | | | |
| % difference between average Y _{qa} 's and Y | -1.37% | | | | |
| (must be within ± 5%) | | | | | |

Meter Pyrometer Calibration

| Meter I.D. | | C-14 | | | | | |
|-------------------|------------------|---|----------|----------|----------|----------|----------|
| Temperature | CL-300-100F | | | | | | |
| Calibrator Used | CL-3512-A | X | X | X | X | X | X |
| DATE | | 1/2/2020 | 1/2/2020 | 1/2/2020 | 1/2/2020 | 1/2/2020 | 1/2/2020 |
| TECHNICIAN | | RMP | RMP | RMP | RMP | RMP | RMP |
| Thermocouple I.D. | | T.C. 1 | T.C. 2 | T.C. 3 | T.C. 4 | T.C. 5 | T.C. 6 |
| Reference °F | Acceptable Range | ** If not within Acceptable Range, unit not to be used within range at which failure occurred. | | | | | |
| 1950 | 1932 to 1968 | 1955 | | | | 1956 | 1956 |
| 1800 | 1784 to 1816 | 1802 | | | | 1802 | 1802 |
| 1600 | 1585 to 1615 | 1604 | | | | 1604 | 1604 |
| 1400 | 1387 to 1413 | 1401 | | | | 1401 | 1401 |
| 1200 | 1188 to 1212 | 1194 | | | | 1204 | 1204 |
| 1000 | 990 to 1010 | 1002 | | | | 1002 | 1002 |
| 900 | 890 to 910 | 902 | | | | 902 | 901 |
| 800 | 791 to 809 | 801 | | | | 802 | 802 |
| 700 | 692 to 708 | 703 | | | | 703 | 703 |
| 600 | 593 to 607 | 600 | | | | 600 | 600 |
| 500 | 493 to 507 | 498 | 498 | 498 | | 498 | 498 |
| 400 | 394 to 406 | 398 | 398 | 398 | | 398 | 398 |
| 300 | 295 to 305 | 299 | 299 | 299 | | 299 | 299 |
| 200 | 196 to 204 | 199 | 199 | 199 | | 199 | 199 |
| 150 | 146 to 154 | 148 | 148 | 148 | 147 | 148 | 148 |
| 100 | 96 to 104 | 97 | 97 | 97 | 96 | 97 | 97 |
| 50 | 47 to 53 | 49 | 48 | 47 | 47 | 47 | 47 |
| 0 | -3 to 3 | 0 | | | -1 | 0 | 0 |
| -50 | -53 to -47 | -51 | | | -52 | -51 | -51 |

Pass/Fail based on +/- 0.75% of Rankine value

Fail indicated by cell highlighting

Reviewed by:





THERMOCOUPLE CALIBRATION

Meter Out

THERMOCOUPLE ID C14-O

Cal Date: 12/31/2019

CALIBRATION TECHNICIAN: SL1

REFERENCE STANDARDS

Hart Scientific 9103-A s/n A1B289

Fluke 9144 s/n B5A077

TRACEABILITY

Report No. T19-1212-TN-2

Report No. T19-1212-TN-3

DATE

12/12/2019

12/12/2019

LABORATORY

NBS Calibrations

NBS Calibrations

| Temperature Calibration Points | 20 | 70 | 150 |
|--------------------------------|------|------|-------|
| Reference Deg F (To) | 20 | 70 | 150 |
| Probe Temp (deg F) | 21.1 | 70.2 | 148.5 |
| Difference (degrees) | 1.1 | 0.2 | 1.5 |

| | | | |
|---|-----|-----|-----|
| TC Meets Method 5 Specifications: (± 2.0 °F) | YES | YES | YES |
|---|-----|-----|-----|

Reviewed by:



THERMOCOUPLE CALIBRATION

THERMOCOUPLE ID 4-3

Cal Date: 12/30/2019

Method 5 Probe

CALIBRATION TECHNICIAN: SL1

REFERENCE STANDARDS

Hart Scientific 9103-A s/n A1B289

Fluke 9144 s/n B5A077

TRACEABILITY

Report No. T19-1212-TN-2

Report No. T19-1212-TN-3

DATE

12/12/2019

12/12/2019

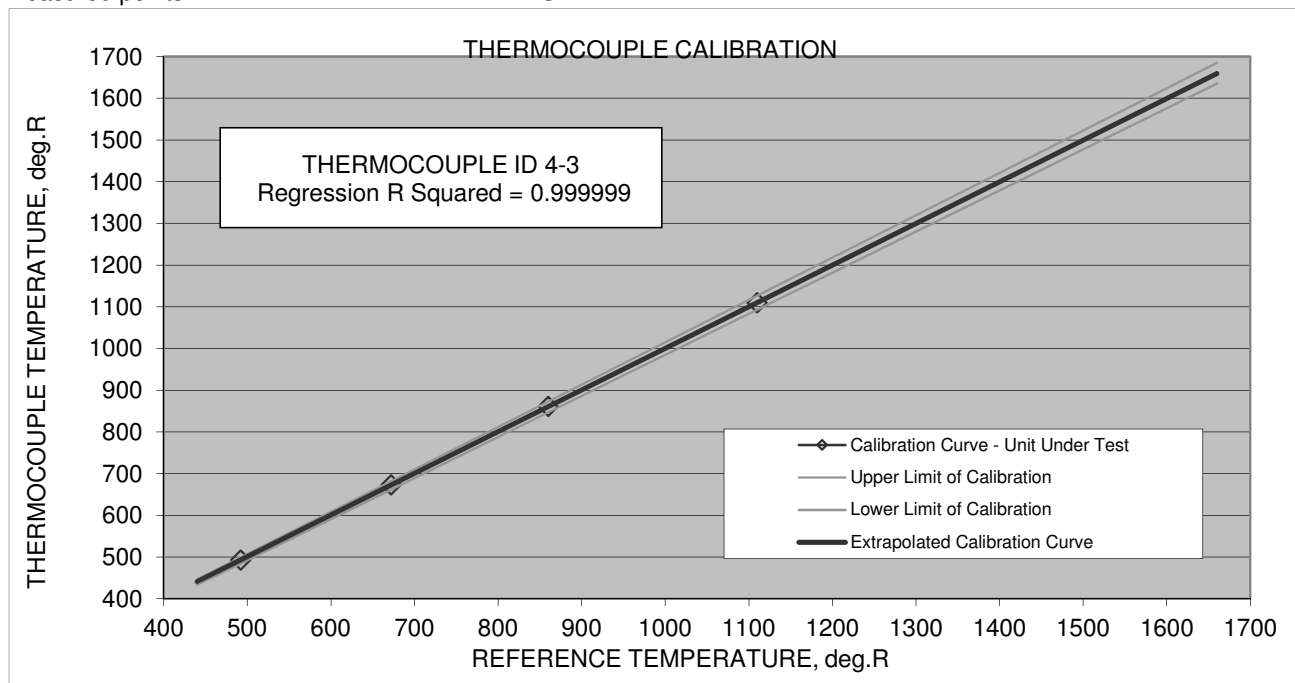
LABORATORY

NBS Calibrations

NBS Calibrations

Temperature Calibration Points

| | 32 | 212 | 400 | 650 | Ambient |
|--|------|------|------|------|---------|
| Reference Deg F (To) | 32 | 212 | 400 | 650 | 70 |
| Probe Temp (deg F) | 33 | 213 | 401 | 650 | 70.7 |
| Reference Temp (deg R) deg F + 460 | 492 | 672 | 860 | 1110 | 530 |
| Probe Temp (deg R), deg F + 460 | 493 | 673 | 861 | 1110 | 530.7 |
| Difference (degrees) | -1 | -1 | -1 | 0 | -0.7 |
| % Diff Abs. T | 0.2% | 0.1% | 0.1% | 0.0% | 0.1% |
| Is difference less than 1.5% at all measured points? | YES | | | | |



Are extrapolated limits less than 1.5%? YES

FAHRENHEIT
CALIBRATION RANGE
-20 1200

If not acceptable, describe corrective action:

Reviewed by:



THERMOCOUPLE CALIBRATION

THERMOCOUPLE ID 7-4

Cal Date: 12/31/2019

Method 5 Probe

CALIBRATION TECHNICIAN: SL1

REFERENCE STANDARDS

Hart Scientific 9103-A s/n A1B289

TRACEABILITY

Report No. T19-1212-TN-2

DATE

12/12/2019

LABORATORY

NBS Calibrations

Fluke 9144 s/n B5A077

Report No. T19-1212-TN-3

12/12/2019

NBS Calibrations

Temperature Calibration Points

32

212

400

650

Ambient

Reference Deg F (To)

32

212

400

650

70

Probe Temp (deg F)

33

213

398

648

70.2

Reference Temp (deg R) deg F + 460

492

672

860

1110

530

Probe Temp (deg R), deg F + 460

493

673

858

1108

530.2

Difference (degrees)

-1

-1

2

2

-0.2

% Diff Abs. T

0.2%

0.1%

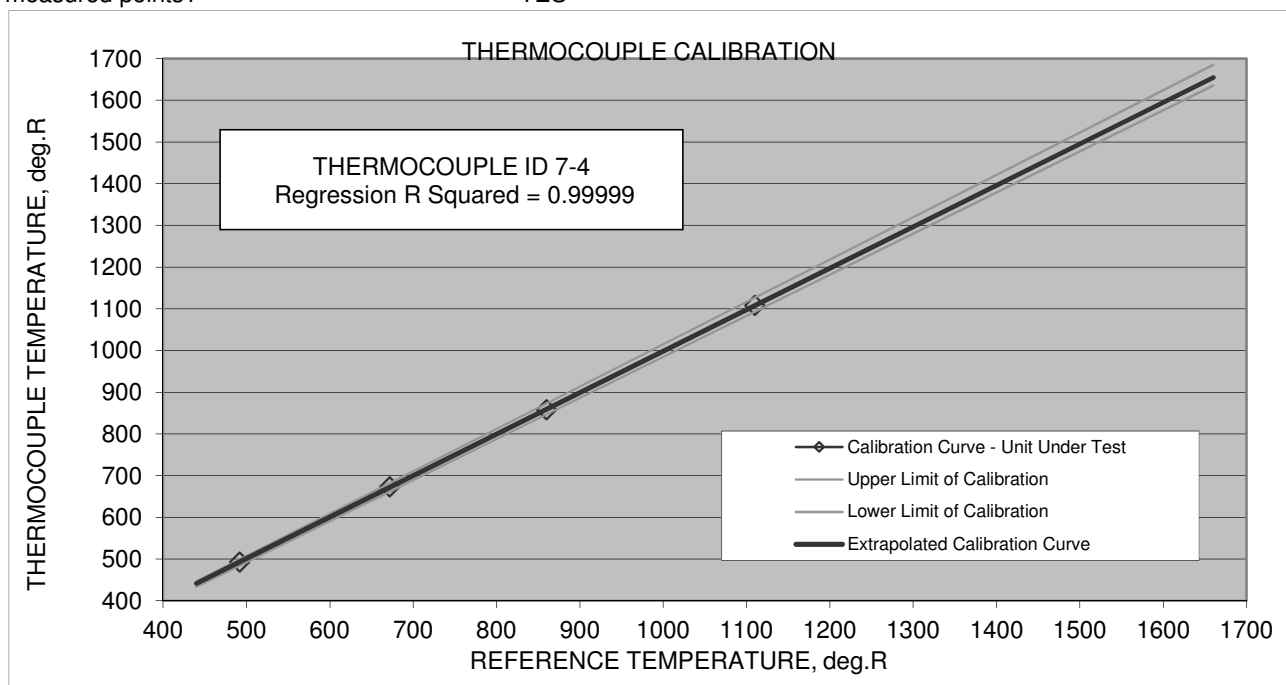
0.2%

0.2%

0.0%

Is difference less than 1.5% at all measured points?

YES



Are extrapolated limits less than 1.5%?

YES

FAHRENHEIT
CALIBRATION RANGE

-20

1200

If not acceptable, describe corrective action:

Reviewed by:



THERMOCOUPLE CALIBRATION

THERMOCOUPLE ID 7-6

Cal Date: 12/31/2019

Method 5 Probe

CALIBRATION TECHNICIAN: SL1

REFERENCE STANDARDS

Hart Scientific 9103-A s/n A1B289

TRACEABILITY

Report No. T19-1212-TN-2

DATE

12/12/2019

LABORATORY

NBS Calibrations

Fluke 9144 s/n B5A077

Report No. T19-1212-TN-3

12/12/2019

NBS Calibrations

Temperature Calibration Points

32

212

400

650

Ambient

Reference Deg F (To)

32

212

400

650

70

Probe Temp (deg F)

33.3

213

397

648

70.2

Reference Temp (deg R) deg F + 460

492

672

860

1110

530

Probe Temp (deg R), deg F + 460

493.3

673

857

1108

530.2

Difference (degrees)

-1.3

-1

3

2

-0.2

% Diff Abs. T

0.3%

0.1%

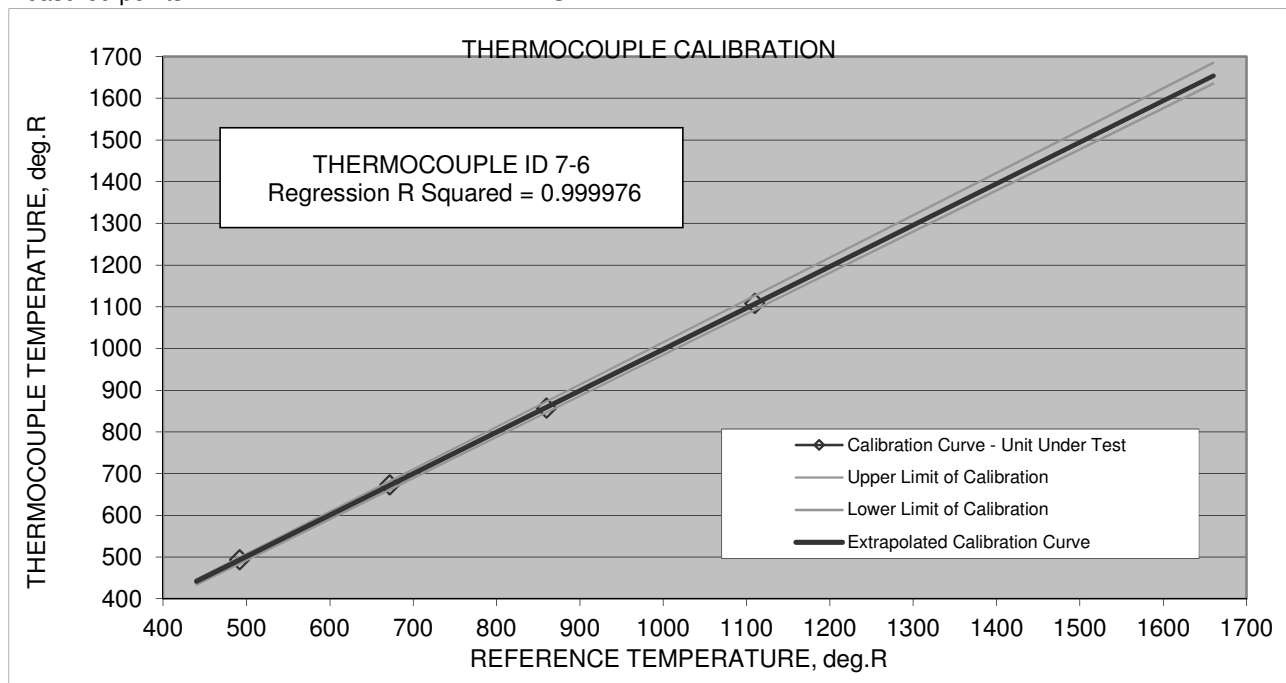
0.3%

0.2%

0.0%

Is difference less than 1.5% at all measured points?

YES



Are extrapolated limits less than 1.5%?

YES

FAHRENHEIT
CALIBRATION RANGE
-20 1200

If not acceptable, describe corrective action:

Reviewed by:



THERMOCOUPLE CALIBRATION

Impinger Outlet

THERMOCOUPLE ID TIO-8948

Cal Date: 3/4/2020

CALIBRATION TECHNICIAN: SL1

REFERENCE STANDARDS

Hart Scientific 9103-A s/n A1B289

Fluke 9144 s/n B5A077

TRACEABILITY

Report No. T19-1212-TN-2

Report No. T19-1212-TN-3

DATE

12/12/2019

12/12/2019

LABORATORY

NBS Calibrations

NBS Calibrations

| Temperature Calibration Points | 20 | 70 | 150 |
|---|------|------|-------|
| Reference Deg F (To) | 20 | 70 | 150 |
| Probe Temp (deg F) | 20.6 | 70.0 | 149.7 |
| Difference (degrees) | 0.6 | 0.0 | 0.3 |
| TC Meets Method 5 Specifications: (± 2.0 °F) | YES | YES | YES |

Reviewed by: *David Herbst*



S-Type Pitot Tube Geometry Check

Pitot Tube
Number: 4-3
Length: 4 ft
Function: M-5 Probe / Free

Inspection Date:

1-8-20

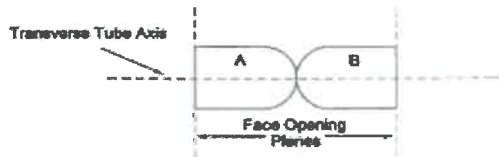
Technician:

DAH

1. Are face openings perpendicular to tube axis?

☒ YES (go to 2)

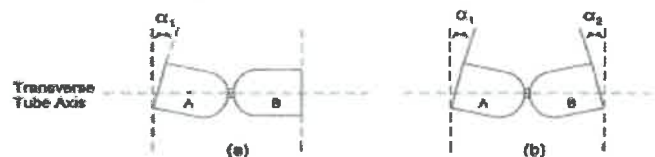
☐ NO (go to 1a)



1a. If NO, is angle less than 10°?

☐ YES (go to 2)

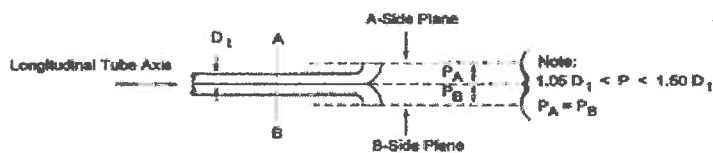
☐ NO (discontinue use)



2. Are face openings parallel to longitudinal axis?

☒ YES (go to 3)

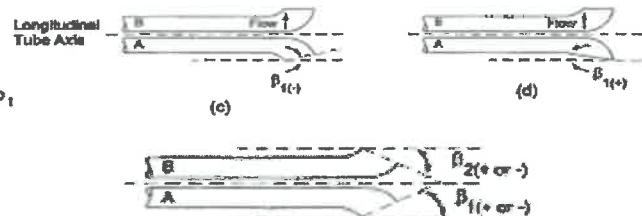
☐ NO (go to 2a)



2a. If NO, is angle less than 5°?

☐ YES (go to 3)

☐ NO (discontinue use)



3. Are legs of equal length?

☒ YES (go to 4)

☐ NO (go to 3a)



3a. If NO, is difference less than 1/8 inch?

☐ YES (go to 4)

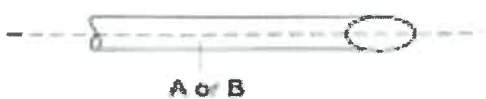
☐ NO (discontinue use)



4. Are center-lines of legs coincident?

☒ YES (go to 5)

☐ NO (go to 4a)



4a. If NO, are center-lines of face openings less than 1/32 inch?

☐ YES (go to 5)

☐ NO (discontinue use)



5. Does this pitot tube pass all of the above criteria?

☒ YES

☐ NO

I certify that the pitot tube meets or exceeds all specifications and criteria listed in 40 CFR Part 60, Appendix A, EPA Method 2, and is assigned a pitot tube certification factor of 0.84.

Technician Signature:

DAH

Reviewed by:

[Signature]



S-Type Pitot Tube Geometry Check

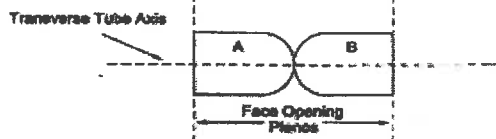
Pitot Tube
Number: 7-4
Length: 7 ft
Function: M-5 Probe / Free

Inspection Date: 1-3-20
Technician: DAH

1. Are face openings perpendicular to tube axis?

☒ YES (go to 2)

☐ NO (go to 1a)



1a. If NO, is angle less than 10°?

☐ YES (go to 2)

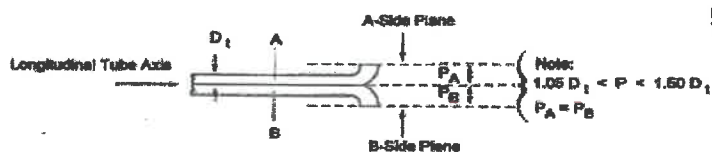
☐ NO (discontinue use)



2. Are face openings parallel to longitudinal axis?

☒ YES (go to 3)

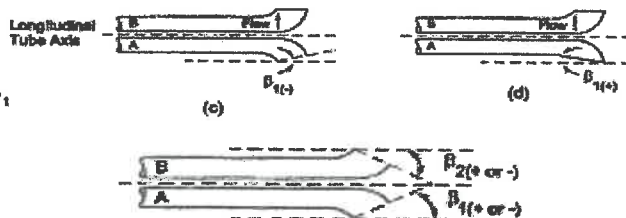
☐ NO (go to 2a)



2a. If NO, is angle less than 5°?

☐ YES (go to 3)

☐ NO (discontinue use)



3. Are legs of equal length?

☒ YES (go to 4)

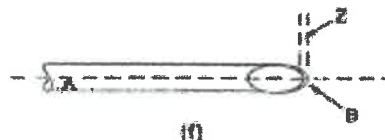
☐ NO (go to 3a)



3a. If NO, is difference less than 1/8 inch?

☐ YES (go to 4)

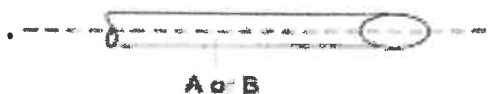
☐ NO (discontinue use)



4. Are center-lines of legs coincident?

☒ YES (go to 5)

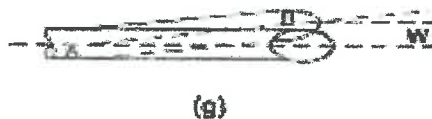
☐ NO (go to 4a)



4a. If NO, are center-lines of face openings less than 1/32 inch?

☐ YES (go to 5)

☐ NO (discontinue use)



5. Does this pitot tube pass all of the above criteria?

☒ YES

☐ NO

I certify that the pitot tube meets or exceeds all specifications and criteria listed in 40 CFR Part 60, Appendix A, EPA Method 2, and is assigned a pitot tube certification factor of 0.84.

Technician Signature: DAH

Reviewed by: [Signature]



S-Type Pitot Tube Geometry Check

Pitot Tube

Number:

7-6

Length:

7 ft

Function:

M-5 Probe / Free

Inspection Date:

1-3-20

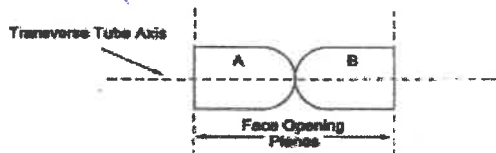
Technician:

DAH

1. Are face openings perpendicular to tube axis?

☒ YES (go to 2)

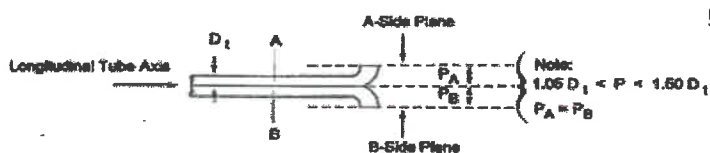
☐ NO (go to 1a)



2. Are face openings parallel to longitudinal axis?

☒ YES (go to 3)

☐ NO (go to 2a)



1a. If NO, is angle less than 10°?

☐ YES (go to 2)

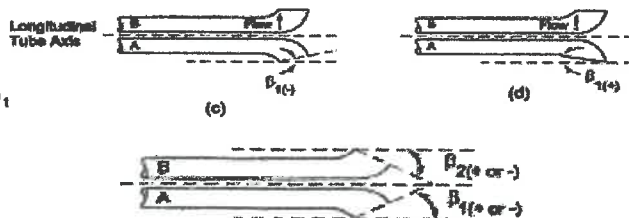
☐ NO (discontinue use)



2a. If NO, is angle less than 5°?

☐ YES (go to 3)

☐ NO (discontinue use)



3. Are legs of equal length?

☒ YES (go to 4)

☐ NO (go to 3a)



3a. If NO, is difference less than 1/8 inch?

☐ YES (go to 4)

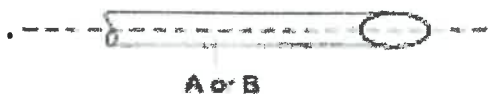
☐ NO (discontinue use)



4. Are center-lines of legs coincident?

☒ YES (go to 5)

☐ NO (go to 4a)



4a. If NO, are center-lines of face openings less than 1/32 inch?

☐ YES (go to 5)

☐ NO (discontinue use)



5. Does this pitot tube pass all of the above criteria?

☒ YES

☐ NO

I certify that the pitot tube meets or exceeds all specifications and criteria listed in 40 CFR Part 60, Appendix A, EPA Method 2, and is assigned a pitot tube certification factor of 0.84.

Technician Signature:

DAH

Reviewed by:

[Signature]

U.S. Steel Corporation
Minntac
Mountain Iron, Minnesota

Barr Engineering Co.
May 26, 2020

Nozzle Calibration
Line 3 Waste Gas Stack (SV103)

Nozzle Calibration

Nozzle No.

| |
|-------|
| G-218 |
|-------|

Used for Runs:

| |
|---|
| 1 |
|---|

 -

| |
|---|
| 3 |
|---|

Point Measurement, inches

| | |
|---------|-------|
| 1 | 0.218 |
| 2 | 0.218 |
| 3 | 0.218 |
| Average | 0.218 |

Test Date 4/28/2020
Date Measured: 4/208/2020
Technician: TAK
Signature: Tom Kuchinski

U.S. Steel Corporation
Minntac
Mountain Iron, Minnesota

Barr Engineering Co.
May 26, 2020

Method 4 Balance Check
Line 3 Waste Gas Stack (SV103)

EPA Method 4 Balance Check

| | |
|--------------------------|--------|
| Class II Weight Amount = | 1000.0 |
| Balance Response= | 1000.0 |
| Difference | 0.0 |
| Pass | PASS |

Test Date 4/28/2020
Date Measured: 4/28/2020
Technician: TAK
Signature: Tom Kuchinski

U.S. Steel Corporation
Minntac
Mountain Iron, Minnesota

Barr Engineering Co.
May 26, 2020

Nozzle Calibration
Line 4 Waste Gas Stack (SV118)

Nozzle Calibration

Nozzle No.

| |
|-------|
| G-218 |
|-------|

Used for Runs:

| |
|---|
| 1 |
|---|

 -

| |
|---|
| 3 |
|---|

Point Measurement, inches

| | |
|---------|-------|
| 1 | 0.218 |
| 2 | 0.218 |
| 3 | 0.218 |
| Average | 0.218 |

Test Date 4/29/2020
Date Measured: 4/28/2020
Technician: TAK
Signature: Tom Kuchinski

U.S. Steel Corporation
Minntac
Mountain Iron, Minnesota

Barr Engineering Co.
May 26, 2020

Method 4 Balance Check
Line 4 Waste Gas Stack (SV118)

EPA Method 4 Balance Check

| | |
|--------------------------|--------|
| Class II Weight Amount = | 1000.0 |
| Balance Response= | 1000.0 |
| Difference | 0.0 |
| Pass | PASS |

Test Date 4/29/2020
Date Measured: 4/29/2020
Technician: TAK
Signature: Tom Kuchinski

U.S. Steel Corporation
Minntac
Mountain Iron, Minnesota

Barr Engineering Co.
May 26, 2020

Nozzle Calibration
Line 6 Waste Gas Stack (SV144)

Nozzle Calibration

Nozzle No.

| |
|-------|
| G-254 |
|-------|

Used for Runs:

| |
|---|
| 1 |
|---|

 -

| |
|---|
| 3 |
|---|

Point Measurement, inches

| | |
|---------|-------|
| 1 | 0.253 |
| 2 | 0.254 |
| 3 | 0.254 |
| Average | 0.254 |

Test Date 4/30/2020
Date Measured: 4/30/2020
Technician: DJK
Signature: Dan Koschak

U.S. Steel Corporation
Minntac
Mountain Iron, Minnesota

Barr Engineering Co.
May 26, 2020

Method 4 Balance Check
Line 6 Waste Gas Stack (SV144)

EPA Method 4 Balance Check

| | |
|--------------------------|--------|
| Class II Weight Amount = | 1000.0 |
| Balance Response= | 1000.0 |
| Difference | 0.0 |
| Pass | PASS |

Test Date 4/30/2020
Date Measured: 4/30/2020
Technician: TAK
Signature: Tom Kuchinski



Field Barometer Calibration

Calibration to National Weather Service at Chisholm-Hibbing Airport

Station elevation at Barr Hibbing Office 3128 14th Avenue East, Hibbing, MN 1460 ft.

| Date | Technician | NWS Observation | | Field Barometer | | | Barr Office | Condition | Remarks | Offset |
|---------|------------|-----------------|-----------|-----------------|------|---------------------|------------------|----------------|----------|--------|
| | | Time | Altimeter | ID | Time | Barometric Pressure | Station Pressure | | | |
| 4/3/20 | DJK | 8:53 | 29.98 | BA-16 | 9:40 | 28.55 | 28.52 | In Calibration | As Found | 0.03 |
| 5/26/20 | DJK | 8:53 | 29.85 | BA-16 | 9:20 | 28.42 | 28.39 | In Calibration | As Found | 0.03 |



Assay Laboratory: Red Ball TGS
555 Craig Kennedy Way
Shreveport, LA 71107
800-551-8150

CERTIFICATE OF ANALYSIS (Zero Ambient Nitrogen)

Cylinder Number: EB0099389
Product ID Number: 121026
Cylinder Pressure: 1900 PSIG
COA #: EB0099389.20181116-0
Customer PO. NO.:
Customer:

Certification Date: 11/16/2018
Expiration Date: 11/14/2026
MFG Facility: RBTGS-Shreveport-LA
Lot Number: EB0099389.20181116
Tracking Number: B1909637
Previous Certification Dates:

This mixture is for laboratory use only, not for drug, household or other use.

This mixture is certified in Mole % to be within $\pm 2\%$ of the actual number reported with a confidence of 95%.

This mixture was manufactured by scale; weights traceable to N.I.S.T. Certificate #822/266926-02.

Do Not Use This Cylinder Below 100 psig (0.7 Megapascal).

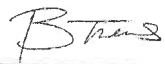
Composing Material: Zero Ambient Nitrogen, Cert., Sz152

| Component | Specification | Concentration |
|--------------------------------------|---------------|---------------|
| Nitrogen | Balance | Balance |
| Oxygen as Impurity | <1.0 PPM | <1.0 PPM |
| Carbon Dioxide as Impurity | <0.5 PPM | <0.5 PPM |
| Carbon Monoxide as Impurity | <0.5 PPM | <0.5 PPM |
| Total Oxides of Nitrogen as Impurity | <0.1 PPM | <0.1 PPM |
| Sulfur Dioxide as Impurity | <0.1 PPM | <0.1 PPM |
| Total Hydrocarbons as Impurity | <0.1 PPM | <0.1 PPM |

Red Ball Technical Gas Service
PGVP Vendor ID # G12018
Information and Ordering
800-551-8150
Fax (318-425-6309)




PJLA
Calibration and Testing
Accreditation #62754


Brandon Theus
Laboratory Supervisor

Version 02-B, Revised on 2015-05-27



Red Ball Technical Gas Service
555 Craig Kennedy Way
Shreveport, LA 71107
800-551-8150
PGVP Vendor ID # G12017

EPA PROTOCOL GAS CERTIFICATE OF ANALYSIS

Cylinder Number: EB0099404
Product ID Number: 126786
Cylinder Pressure: 1900 PSIG
COA #: EB0099404.20170726-0
Customer PO. NO.:
Customer:

Certification Date: 08/14/2017
Expiration Date: 08/12/2025
MFG Facility: - Shreveport - LA
Lot Number: EB0099404.20170726
Tracking Number: B1908074
Previous Certification Dates:

This calibration standard has been certified per the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531, using procedure G1.

Do Not Use This Cylinder Below 100 psig (0.7 Megapascal).

Certified Concentration(s)

| Component | Concentration | Uncertainty | Analytical Principle | Assayed On |
|----------------|---------------|-------------|----------------------|------------|
| Carbon Dioxide | 9.5 % | ±0.10 % | NDIR | 08/14/2017 |
| Oxygen | 9.46 % | ±0.05 % | MPA | 08/09/2017 |
| Nitrogen | Balance | | | |

Analytical Measurement Data Available Online.

Reference Standard(s)

| Serial Number | Lot | Expiration | Type | Balance | Component | Concentration | Uncertainty(%) | NIST Reference |
|---------------|--------------------|------------|------|---------|-----------|---------------|----------------|----------------|
| EB0060740 | EB0060740.20170209 | 08/05/2025 | GMIS | N2 | O2 | 24 % | 0.502 | 071001 |
| SG9916836 | SG-9916836 | 06/06/2022 | NTRM | N2 | CO2 | 19.98 % | 0.7 | 101001 |

Analytical Instrumentation

| Component | Principle | Make | Model | Serial | MPC Date |
|-----------|-----------|--------|-------|------------|------------|
| O2 | MPA | Thermo | 410i | 1162980025 | 08/09/2017 |
| CO2 | NDIR | Thermo | 410i | 1162980025 | 08/14/2017 |

SMART-CERT



This is to certify the gases referenced have been calibrated/tested, and verified to meet the defined specifications. This calibration/test was performed using Gases or Scales that are traceable through National Institute of Standards and Technology (NIST) to the International System of Units (SI). The basis of compliance stated is a comparison of the measurement parameters to the specified or required calibration/testing process. The expanded uncertainties use a coverage factor of k=2 to approximate the 95% confidence level of the measurement, unless otherwise noted. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from Red Ball Technical Gas Services. If not included, the uncertainty of calibrations are available upon request and were taken into account when determining pass or fail.

B. Theus

Brandon Theus
Analytical Chemist
Assay Laboratory: Red Ball TGS
Version 02-G, Revised on 2017-06-29



Red Ball Technical Gas Service
555 Craig Kennedy Way
Shreveport, LA 71107
800-551-8150
PGVP Vendor ID # G12018

EPA PROTOCOL GAS CERTIFICATE OF ANALYSIS

| | | | |
|--------------------|----------------------|-------------------------------|--------------------|
| Cylinder Number: | EB0098388 | Certification Date: | 04/27/2018 |
| Product ID Number: | 127199 | Expiration Date: | 04/25/2026 |
| Cylinder Pressure: | 1900 PSIG | MFG Facility: | - Shreveport - LA |
| COA # | EB0098388.20180416-0 | Lot Number: | EB0098388.20180416 |
| Customer PO. NO.: | | Tracking Number: | B1944997 |
| Customer: | | Previous Certification Dates: | |

This calibration standard has been certified per the May 2012 EPA Traceability Protocol, Document EPA-600/R-12/531, using procedure G1.

Do Not Use This Cylinder Below 100 psig (0.7 Megapascal).

Certified Concentration(s)

| Component | Concentration | Uncertainty | Analytical Principle | Assayed On |
|----------------|---------------|-------------|----------------------|------------|
| Carbon Dioxide | 4.89 % | ±0.05 % | NDIR | 04/27/2018 |
| Oxygen | 22.5 % | ±0.12 % | MPA | 04/20/2018 |
| Nitrogen | Balance | | | |

Analytical Measurement Data Available Online.

Reference Standard(s)

| Serial Number | Lot | Expiration | Type | Balance | Component | Concentration | Uncertainty(%) | NIST Reference |
|---------------|--------------------|------------|------|---------|-----------|---------------|----------------|----------------|
| EB0019964 | EB0019964.20170209 | 08/05/2025 | GMIS | N2 | O2 | 24 % | 0.502 | 071001 |
| EB0072967 | EB0072967.20170424 | 11/25/2025 | GMIS | N2 | CO2 | 9.52 % | 0.753 | C1309410.01 |

Analytical Instrumentation

| Component | Principle | Make | Model | Serial | MPC Date |
|-----------|-----------|--------|-------|------------|------------|
| O2 | MPA | Thermo | 410i | 1162980025 | 04/19/2018 |
| CO2 | NDIR | Thermo | 410i | 1162980025 | 04/27/2018 |

SMART-CERT



This is to certify the gases referenced have been calibrated/tested, and verified to meet the defined specifications. This calibration/test was performed using Gases or Scales that are traceable through National Institute of Standards and Technology (NIST) to the International System of Units (SI). The basis of compliance stated is a comparison of the measurement parameters to the specified or required calibration/testing process. The expanded uncertainties use a coverage factor of k=2 to approximate the 95% confidence level of the measurement, unless otherwise noted. This calibration certificate applies only to the item described and shall not be reproduced other than in full, without written approval from Red Ball Technical Gas Services. If not included, the uncertainty of calibrations are available upon request and were taken into account when determining pass or fail.

LaMeka Dennis

LaMeka Dennis
Laboratory Operations Manager
Assay Laboratory: Red Ball TGS
Version 02-I, Revised on 2017-09-07

Appendix E

Process Operating Data

Air Performance Test Form

Operating Data Summary for Process Sources

Facility Information (please print)

Company Name: U.S. Steel Corporation

Equipment ID No: SV103

Test date(s): 04/28/20

Equipment and Operating Data

- Process Equipment Description: Line 3 Waste Gas Stack
- Were the process and control equipment operated consistent with normal procedures? ☒ Yes ☐ No If no, explain: _____
- Include copy of production records or instrumentation which indicates rate of production or operation of the equipment, i.e. units per hour, pounds per hour, pressure, air flow, etc.
- Date(s) and procedure(s) of last maintenance/cleaning within 6 months:
☒ Remains unchanged from info. provided in test plan
- Process rate (amount of raw material or finished product per hour, wet or dry basis) while combusting (list fuel type(s) and ratios as appropriate) _____

| Process Parameter: list type and units | Run 1 | Run 2 | Run 3 | Run 4 | Average |
|--|-------|-------|-------|-------|---------|
| Greenball Feed Rate, LTPH | 301 | 300 | 301 | | 301 |
| Fired Pellete Production, LTPH | 216 | 215 | 215 | | 215 |
| Wood Input, MMBTUH | 25 | 22 | 22 | | 23 |
| Fuel Input Gas to grate, MBTUH | 49 | 49 | 49 | | 49 |
| Fuel Input Gas to Kiln, MBTUH | 84 | 85 | 83 | | 84 |
| Heat Input (MBTUH Total) | 133 | 134 | 132 | | 133 |

- Summarize control equipment operating data documented during testing. Values reported should reflect maximum, minimum, averages, or as approved in the test plan. (See test plan and approval letter)

Examples of APC equipment and parameters generally monitored. Monitor as in test plan and/or approval letter.

- Scrubber (list type of scrubber): DP (in. w.c.) and feed rate (gpm and psig)
- Baghouse, Cyclone, and Multi-clone: DP (in. w.c.)
- Catalytic Incinerator : (°F_{in} , °F_{out}) and Thermal Incinerator: (°F_{temperature})
- ESP: Number and identity of operating field(s)

| APC and parameter monitored | Run 1 | Run 2 | Run 3 | Run 4 | Average |
|--|-------|-------|-------|-------|---------|
| NA | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| List pollutant & averaging basis.--should reflect permit | Run 1 | Run 2 | Run 3 | Run 4 | Average |
| Continuous Opacity Monitor(list hourly average) | | | | | |
| Monitor (list averaging basis): | | | | | |
| Monitor (list averaging basis): | | | | | |

Abbreviations: APC=air pollution control
lbs.-pounds

gpm.=gallons per minute
psig=pressure per square inch gauge

in. w.c.=inches of water column
ΔP=pressure drop

Note: This form provides only a summary of the operating conditions during the performance test. Additional and more detailed records are required to meet the requirements of Minn. R. 7017.2035, subp. 3. This form is to be submitted as part of the performance test report

Line 3 Waste Gas Stack (SV103)

| Run # | Run Time | Average | Average | Average | Average | Average |
|-------|-----------|---------|---------|---------|---------|---------|
| 1 | 0758-1003 | 301 | 41 | 50 | 48.8 | 83.9 |
| 2 | 1016-1221 | 300 | 41 | 44 | 48.8 | 85.2 |
| 3 | 1238-1442 | 301 | 43 | 44 | 48.8 | 83.1 |

| | 030-03-0 TOTAL TONS TO 031 AL613151 | 037-01-1 ROLL FEEDER UNDERSIZE AI614065 | 000-03-0 WOOD FLOW AI617Q01 | 242-03-1 L3 PH BURNER GAS FLOW AC613006 | 252-03-1 KILN BURNER LINE GAS AC614017 |
|--------------------|--|--|-----------------------------------|--|---|
| 28-Apr-20 07:55:00 | 302 | 40 | 52 | 48.9 | 87.3 |
| 28-Apr-20 07:56:00 | 298 | 40 | 49 | 48.9 | 87.2 |
| 28-Apr-20 07:57:00 | 307 | 39 | 48 | 48.9 | 85.5 |
| 28-Apr-20 07:58:00 | 300 | 40 | 48 | 48.9 | 85.3 |
| 28-Apr-20 07:59:00 | 301 | 41 | 48 | 48.9 | 85.3 |
| 28-Apr-20 08:00:00 | 306 | 40 | 50 | 48.9 | 85.2 |
| 28-Apr-20 08:01:00 | 305 | 40 | 48 | 48.9 | 85.1 |
| 28-Apr-20 08:02:00 | 299 | 40 | 49 | 48.9 | 85.2 |
| 28-Apr-20 08:03:00 | 301 | 39 | 50 | 48.9 | 85.3 |
| 28-Apr-20 08:04:00 | 301 | 41 | 49 | 48.9 | 85.3 |
| 28-Apr-20 08:05:00 | 300 | 40 | 50 | 48.9 | 85.4 |
| 28-Apr-20 08:06:00 | 301 | 40 | 51 | 48.9 | 85.5 |
| 28-Apr-20 08:07:00 | 297 | 40 | 52 | 48.9 | 85.5 |
| 28-Apr-20 08:08:00 | 294 | 39 | 51 | 48.9 | 85.4 |
| 28-Apr-20 08:09:00 | 298 | 40 | 48 | 49.0 | 85.3 |
| 28-Apr-20 08:10:00 | 301 | 41 | 52 | 49.0 | 85.1 |
| 28-Apr-20 08:11:00 | 299 | 40 | 49 | 49.0 | 85.0 |
| 28-Apr-20 08:12:00 | 296 | 41 | 50 | 49.0 | 84.9 |
| 28-Apr-20 08:13:00 | 295 | 40 | 51 | 49.0 | 84.7 |
| 28-Apr-20 08:14:00 | 305 | 40 | 49 | 49.0 | 84.6 |
| 28-Apr-20 08:15:00 | 299 | 41 | 51 | 49.0 | 84.4 |
| 28-Apr-20 08:16:00 | 292 | 41 | 49 | 49.0 | 85.2 |
| 28-Apr-20 08:17:00 | 303 | 41 | 52 | 49.0 | 85.4 |
| 28-Apr-20 08:18:00 | 299 | 40 | 48 | 49.0 | 85.4 |
| 28-Apr-20 08:19:00 | 306 | 40 | 49 | 49.0 | 84.3 |
| 28-Apr-20 08:20:00 | 303 | 40 | 50 | 49.0 | 84.1 |
| 28-Apr-20 08:21:00 | 301 | 41 | 51 | 49.0 | 84.0 |
| 28-Apr-20 08:22:00 | 302 | 40 | 52 | 49.0 | 84.0 |
| 28-Apr-20 08:23:00 | 300 | 41 | 50 | 49.0 | 83.9 |
| 28-Apr-20 08:24:00 | 305 | 40 | 51 | 49.0 | 83.9 |
| 28-Apr-20 08:25:00 | 305 | 41 | 49 | 49.0 | 83.8 |
| 28-Apr-20 08:26:00 | 304 | 41 | 50 | 49.0 | 83.8 |
| 28-Apr-20 08:27:00 | 301 | 40 | 51 | 49.0 | 83.8 |
| 28-Apr-20 08:28:00 | 298 | 40 | 52 | 49.0 | 83.8 |
| 28-Apr-20 08:29:00 | 300 | 41 | 50 | 49.0 | 83.8 |
| 28-Apr-20 08:30:00 | 306 | 40 | 51 | 49.0 | 84.0 |
| 28-Apr-20 08:31:00 | 295 | 40 | 51 | 49.0 | 84.2 |
| 28-Apr-20 08:32:00 | 300 | 40 | 50 | 49.0 | 84.4 |
| 28-Apr-20 08:33:00 | 300 | 41 | 49 | 49.0 | 84.6 |

| | Line 3 Waste Gas Stack (SV103) | | | | |
|--------------------|--------------------------------|---------------|-----------|----------------|---------------|
| | 030-03-0 | 037-01-1 ROLL | | 242-03-1 L3 PH | 252-03-1 KILN |
| | TOTAL TONS | FEEDER | 000-03-0 | BURNER GAS | BURNER LINE |
| | TO 031 | UNDERSIZE | WOOD FLOW | FLOW | GAS |
| | AL613151 | AI614065 | AI617Q01 | AC613006 | AC614017 |
| 28-Apr-20 08:34:00 | 298 | 41 | 49 | 49.0 | 84.9 |
| 28-Apr-20 08:35:00 | 302 | 41 | 48 | 49.0 | 84.6 |
| 28-Apr-20 08:36:00 | 301 | 40 | 51 | 49.0 | 84.4 |
| 28-Apr-20 08:37:00 | 300 | 42 | 48 | 49.0 | 84.1 |
| 28-Apr-20 08:38:00 | 302 | 41 | 51 | 49.0 | 83.8 |
| 28-Apr-20 08:39:00 | 305 | 41 | 48 | 48.9 | 83.5 |
| 28-Apr-20 08:40:00 | 295 | 41 | 48 | 48.9 | 83.7 |
| 28-Apr-20 08:41:00 | 301 | 40 | 48 | 48.9 | 83.7 |
| 28-Apr-20 08:42:00 | 299 | 41 | 48 | 48.9 | 83.2 |
| 28-Apr-20 08:43:00 | 302 | 41 | 48 | 48.9 | 83.5 |
| 28-Apr-20 08:44:00 | 308 | 42 | 48 | 48.9 | 83.7 |
| 28-Apr-20 08:45:00 | 301 | 42 | 49 | 48.9 | 83.9 |
| 28-Apr-20 08:46:00 | 305 | 42 | 50 | 48.8 | 84.0 |
| 28-Apr-20 08:47:00 | 303 | 41 | 51 | 48.8 | 83.9 |
| 28-Apr-20 08:48:00 | 301 | 41 | 48 | 48.8 | 83.9 |
| 28-Apr-20 08:49:00 | 304 | 41 | 51 | 48.8 | 83.8 |
| 28-Apr-20 08:50:00 | 302 | 41 | 52 | 48.8 | 83.8 |
| 28-Apr-20 08:51:00 | 299 | 41 | 51 | 48.8 | 83.8 |
| 28-Apr-20 08:52:00 | 298 | 40 | 49 | 48.7 | 83.7 |
| 28-Apr-20 08:53:00 | 298 | 40 | 51 | 48.8 | 83.7 |
| 28-Apr-20 08:54:00 | 299 | 41 | 52 | 48.8 | 83.6 |
| 28-Apr-20 08:55:00 | 300 | 41 | 48 | 48.8 | 83.6 |
| 28-Apr-20 08:56:00 | 296 | 42 | 48 | 48.8 | 83.6 |
| 28-Apr-20 08:57:00 | 304 | 40 | 52 | 48.8 | 83.5 |
| 28-Apr-20 08:58:00 | 299 | 39 | 52 | 48.8 | 83.6 |
| 28-Apr-20 08:59:00 | 297 | 40 | 52 | 48.8 | 83.6 |
| 28-Apr-20 09:00:00 | 296 | 40 | 52 | 48.8 | 83.7 |
| 28-Apr-20 09:01:00 | 304 | 40 | 51 | 48.8 | 83.7 |
| 28-Apr-20 09:02:00 | 296 | 40 | 51 | 48.8 | 83.8 |
| 28-Apr-20 09:03:00 | 295 | 40 | 50 | 48.8 | 83.8 |
| 28-Apr-20 09:04:00 | 300 | 40 | 49 | 48.8 | 83.8 |
| 28-Apr-20 09:05:00 | 303 | 40 | 49 | 48.8 | 83.9 |
| 28-Apr-20 09:06:00 | 295 | 41 | 48 | 48.8 | 83.3 |
| 28-Apr-20 09:07:00 | 293 | 40 | 51 | 48.8 | 82.9 |
| 28-Apr-20 09:08:00 | 298 | 40 | 49 | 48.8 | 83.0 |
| 28-Apr-20 09:09:00 | 301 | 40 | 49 | 48.8 | 83.1 |
| 28-Apr-20 09:10:00 | 303 | 40 | 50 | 48.8 | 83.1 |
| 28-Apr-20 09:11:00 | 296 | 42 | 49 | 48.8 | 83.2 |
| 28-Apr-20 09:12:00 | 299 | 40 | 50 | 48.8 | 83.3 |
| 28-Apr-20 09:13:00 | 306 | 42 | 51 | 48.8 | 83.0 |
| 28-Apr-20 09:14:00 | 301 | 40 | 52 | 48.8 | 82.8 |
| 28-Apr-20 09:15:00 | 306 | 41 | 51 | 48.8 | 83.1 |
| 28-Apr-20 09:16:00 | 301 | 41 | 49 | 48.8 | 82.9 |
| 28-Apr-20 09:17:00 | 308 | 40 | 49 | 48.8 | 83.2 |
| 28-Apr-20 09:18:00 | 297 | 40 | 52 | 48.8 | 83.6 |
| 28-Apr-20 09:19:00 | 296 | 40 | 52 | 48.8 | 83.2 |
| 28-Apr-20 09:20:00 | 303 | 40 | 52 | 48.8 | 82.8 |
| 28-Apr-20 09:21:00 | 303 | 39 | 52 | 48.8 | 82.5 |

| | Line 3 Waste Gas Stack (SV103) | | | | |
|--------------------|--------------------------------|---------------|-----------|----------------|---------------|
| | 030-03-0 | 037-01-1 ROLL | | 242-03-1 L3 PH | 252-03-1 KILN |
| | TOTAL TONS | FEEDER | 000-03-0 | BURNER GAS | BURNER LINE |
| | TO 031 | UNDERSIZE | WOOD FLOW | FLOW | GAS |
| | AL613151 | AI614065 | AI617Q01 | AC613006 | AC614017 |
| 28-Apr-20 09:22:00 | 300 | 40 | 52 | 48.8 | 82.8 |
| 28-Apr-20 09:23:00 | 300 | 41 | 52 | 48.8 | 83.3 |
| 28-Apr-20 09:24:00 | 299 | 40 | 52 | 48.8 | 82.8 |
| 28-Apr-20 09:25:00 | 293 | 40 | 52 | 48.8 | 82.6 |
| 28-Apr-20 09:26:00 | 299 | 40 | 55 | 48.8 | 82.7 |
| 28-Apr-20 09:27:00 | 297 | 40 | 51 | 48.8 | 82.8 |
| 28-Apr-20 09:28:00 | 299 | 40 | 51 | 48.8 | 83.0 |
| 28-Apr-20 09:29:00 | 304 | 41 | 52 | 48.8 | 83.1 |
| 28-Apr-20 09:30:00 | 306 | 41 | 49 | 48.8 | 83.2 |
| 28-Apr-20 09:31:00 | 299 | 41 | 49 | 48.8 | 83.3 |
| 28-Apr-20 09:32:00 | 300 | 40 | 52 | 48.8 | 83.4 |
| 28-Apr-20 09:33:00 | 303 | 40 | 52 | 48.8 | 83.5 |
| 28-Apr-20 09:34:00 | 303 | 41 | 49 | 48.8 | 83.6 |
| 28-Apr-20 09:35:00 | 308 | 41 | 52 | 48.8 | 83.5 |
| 28-Apr-20 09:36:00 | 298 | 41 | 53 | 48.8 | 83.4 |
| 28-Apr-20 09:37:00 | 304 | 40 | 54 | 48.8 | 83.3 |
| 28-Apr-20 09:38:00 | 303 | 41 | 54 | 48.8 | 83.2 |
| 28-Apr-20 09:39:00 | 305 | 41 | 55 | 48.8 | 83.2 |
| 28-Apr-20 09:40:00 | 306 | 40 | 55 | 48.8 | 83.1 |
| 28-Apr-20 09:41:00 | 300 | 41 | 56 | 48.8 | 83.0 |
| 28-Apr-20 09:42:00 | 301 | 41 | 54 | 48.8 | 82.9 |
| 28-Apr-20 09:43:00 | 303 | 40 | 51 | 48.8 | 83.2 |
| 28-Apr-20 09:44:00 | 297 | 41 | 49 | 48.8 | 83.6 |
| 28-Apr-20 09:45:00 | 300 | 41 | 48 | 48.8 | 83.6 |
| 28-Apr-20 09:46:00 | 301 | 40 | 51 | 48.8 | 83.5 |
| 28-Apr-20 09:47:00 | 297 | 41 | 48 | 48.8 | 84.4 |
| 28-Apr-20 09:48:00 | 304 | 40 | 48 | 48.8 | 84.3 |
| 28-Apr-20 09:49:00 | 303 | 40 | 48 | 48.8 | 84.1 |
| 28-Apr-20 09:50:00 | 302 | 41 | 48 | 48.8 | 84.0 |
| 28-Apr-20 09:51:00 | 302 | 40 | 48 | 48.8 | 85.1 |
| 28-Apr-20 09:52:00 | 296 | 41 | 48 | 48.8 | 85.0 |
| 28-Apr-20 09:53:00 | 297 | 40 | 48 | 48.8 | 84.9 |
| 28-Apr-20 09:54:00 | 302 | 40 | 48 | 48.8 | 84.8 |
| 28-Apr-20 09:55:00 | 294 | 41 | 48 | 48.8 | 84.7 |
| 28-Apr-20 09:56:00 | 297 | 40 | 48 | 48.8 | 84.6 |
| 28-Apr-20 09:57:00 | 304 | 41 | 48 | 48.8 | 84.5 |
| 28-Apr-20 09:58:00 | 310 | 41 | 48 | 48.8 | 84.3 |
| 28-Apr-20 09:59:00 | 304 | 41 | 36 | 48.8 | 84.2 |
| 28-Apr-20 10:00:00 | 300 | 40 | 46 | 48.8 | 84.0 |
| 28-Apr-20 10:01:00 | 305 | 41 | 50 | 48.8 | 83.8 |
| 28-Apr-20 10:02:00 | 300 | 41 | 52 | 48.8 | 84.8 |
| 28-Apr-20 10:03:00 | 300 | 41 | 50 | 48.8 | 84.8 |
| 28-Apr-20 10:04:00 | 301 | 40 | 49 | 48.8 | 84.8 |
| 28-Apr-20 10:05:00 | 297 | 41 | 48 | 48.8 | 84.7 |
| 28-Apr-20 10:06:00 | 301 | 40 | 48 | 48.8 | 84.7 |
| 28-Apr-20 10:07:00 | 298 | 41 | 48 | 48.8 | 84.7 |
| 28-Apr-20 10:08:00 | 304 | 41 | 50 | 48.8 | 84.7 |
| 28-Apr-20 10:09:00 | 301 | 41 | 48 | 48.8 | 84.7 |

| Line 3 Waste Gas Stack (SV103) | | | | | |
|--------------------------------|------------|---------------|-----------|----------------|---------------|
| | 030-03-0 | 037-01-1 ROLL | | 242-03-1 L3 PH | 252-03-1 KILN |
| | TOTAL TONS | FEEDER | 000-03-0 | BURNER GAS | BURNER LINE |
| | TO 031 | UNDERSIZE | WOOD FLOW | FLOW | GAS |
| | AL613151 | AI614065 | AI617Q01 | AC613006 | AC614017 |
| 28-Apr-20 10:10:00 | 302 | 40 | 50 | 48.8 | 84.7 |
| 28-Apr-20 10:11:00 | 304 | 40 | 51 | 48.8 | 85.9 |
| 28-Apr-20 10:12:00 | 287 | 41 | 50 | 48.8 | 85.6 |
| 28-Apr-20 10:13:00 | 301 | 41 | 50 | 48.8 | 85.3 |
| 28-Apr-20 10:14:00 | 300 | 42 | 49 | 48.8 | 85.1 |
| 28-Apr-20 10:15:00 | 307 | 41 | 50 | 48.8 | 84.9 |
| 28-Apr-20 10:16:00 | 305 | 42 | 50 | 48.8 | 84.8 |
| 28-Apr-20 10:17:00 | 301 | 42 | 52 | 48.8 | 84.7 |
| 28-Apr-20 10:18:00 | 294 | 42 | 48 | 48.8 | 84.6 |
| 28-Apr-20 10:19:00 | 296 | 41 | 49 | 48.8 | 84.5 |
| 28-Apr-20 10:20:00 | 295 | 41 | 50 | 48.8 | 84.4 |
| 28-Apr-20 10:21:00 | 296 | 40 | 51 | 48.8 | 84.3 |
| 28-Apr-20 10:22:00 | 298 | 40 | 52 | 48.8 | 84.8 |
| 28-Apr-20 10:23:00 | 302 | 40 | 48 | 48.8 | 84.8 |
| 28-Apr-20 10:24:00 | 296 | 40 | 46 | 48.8 | 84.1 |
| 28-Apr-20 10:25:00 | 299 | 40 | 40 | 48.8 | 83.3 |
| 28-Apr-20 10:26:00 | 304 | 40 | 50 | 48.8 | 84.3 |
| 28-Apr-20 10:27:00 | 304 | 40 | 51 | 48.8 | 84.6 |
| 28-Apr-20 10:28:00 | 298 | 41 | 50 | 48.8 | 84.6 |
| 28-Apr-20 10:29:00 | 296 | 41 | 49 | 48.8 | 84.6 |
| 28-Apr-20 10:30:00 | 298 | 40 | 48 | 48.8 | 84.6 |
| 28-Apr-20 10:31:00 | 298 | 41 | 52 | 48.8 | 84.6 |
| 28-Apr-20 10:32:00 | 297 | 40 | 52 | 48.8 | 84.6 |
| 28-Apr-20 10:33:00 | 297 | 40 | 51 | 48.8 | 84.7 |
| 28-Apr-20 10:34:00 | 298 | 40 | 50 | 48.8 | 84.8 |
| 28-Apr-20 10:35:00 | 296 | 41 | 50 | 48.8 | 84.8 |
| 28-Apr-20 10:36:00 | 295 | 40 | 49 | 48.8 | 84.9 |
| 28-Apr-20 10:37:00 | 296 | 42 | 48 | 48.8 | 84.9 |
| 28-Apr-20 10:38:00 | 299 | 40 | 51 | 48.8 | 85.0 |
| 28-Apr-20 10:39:00 | 303 | 41 | 50 | 48.8 | 85.0 |
| 28-Apr-20 10:40:00 | 300 | 41 | 48 | 48.8 | 85.1 |
| 28-Apr-20 10:41:00 | 300 | 40 | 50 | 48.8 | 85.2 |
| 28-Apr-20 10:42:00 | 294 | 40 | 48 | 48.8 | 85.2 |
| 28-Apr-20 10:43:00 | 300 | 40 | 47 | 48.8 | 85.3 |
| 28-Apr-20 10:44:00 | 301 | 41 | 45 | 48.8 | 85.3 |
| 28-Apr-20 10:45:00 | 297 | 41 | 44 | 48.8 | 85.0 |
| 28-Apr-20 10:46:00 | 296 | 41 | 42 | 48.8 | 84.6 |
| 28-Apr-20 10:47:00 | 304 | 41 | 41 | 48.8 | 84.7 |
| 28-Apr-20 10:48:00 | 303 | 41 | 48 | 48.8 | 84.8 |
| 28-Apr-20 10:49:00 | 306 | 41 | 52 | 48.8 | 85.0 |
| 28-Apr-20 10:50:00 | 298 | 41 | 51 | 48.8 | 85.1 |
| 28-Apr-20 10:51:00 | 294 | 41 | 50 | 48.8 | 85.3 |
| 28-Apr-20 10:52:00 | 301 | 40 | 48 | 48.8 | 85.4 |
| 28-Apr-20 10:53:00 | 300 | 41 | 52 | 48.8 | 85.6 |
| 28-Apr-20 10:54:00 | 299 | 40 | 49 | 48.8 | 85.7 |
| 28-Apr-20 10:55:00 | 295 | 40 | 48 | 48.8 | 85.7 |
| 28-Apr-20 10:56:00 | 299 | 40 | 51 | 48.8 | 85.8 |
| 28-Apr-20 10:57:00 | 304 | 40 | 51 | 48.8 | 85.8 |

| | Line 3 Waste Gas Stack (SV103) | | | | |
|--------------------|--------------------------------|---------------|-----------|----------------|---------------|
| | 030-03-0 | 037-01-1 ROLL | | 242-03-1 L3 PH | 252-03-1 KILN |
| | TOTAL TONS | FEEDER | 000-03-0 | BURNER GAS | BURNER LINE |
| | TO 031 | UNDERSIZE | WOOD FLOW | FLOW | GAS |
| | AL613151 | AI614065 | AI617Q01 | AC613006 | AC614017 |
| 28-Apr-20 10:58:00 | 298 | 41 | 47 | 48.8 | 85.9 |
| 28-Apr-20 10:59:00 | 299 | 42 | 40 | 48.8 | 85.9 |
| 28-Apr-20 11:00:00 | 306 | 41 | 48 | 48.8 | 86.0 |
| 28-Apr-20 11:01:00 | 308 | 39 | 51 | 48.8 | 86.0 |
| 28-Apr-20 11:02:00 | 300 | 41 | 51 | 48.8 | 86.1 |
| 28-Apr-20 11:03:00 | 297 | 42 | 50 | 48.8 | 86.1 |
| 28-Apr-20 11:04:00 | 298 | 41 | 49 | 48.8 | 86.2 |
| 28-Apr-20 11:05:00 | 299 | 42 | 48 | 48.8 | 86.2 |
| 28-Apr-20 11:06:00 | 299 | 41 | 48 | 48.8 | 86.3 |
| 28-Apr-20 11:07:00 | 305 | 42 | 48 | 48.8 | 86.0 |
| 28-Apr-20 11:08:00 | 302 | 42 | 48 | 48.8 | 85.2 |
| 28-Apr-20 11:09:00 | 293 | 41 | 48 | 48.8 | 85.3 |
| 28-Apr-20 11:10:00 | 301 | 40 | 48 | 48.8 | 85.4 |
| 28-Apr-20 11:11:00 | 294 | 41 | 48 | 48.8 | 85.6 |
| 28-Apr-20 11:12:00 | 294 | 40 | 48 | 48.8 | 85.7 |
| 28-Apr-20 11:13:00 | 298 | 40 | 48 | 48.8 | 85.8 |
| 28-Apr-20 11:14:00 | 299 | 40 | 48 | 48.8 | 86.0 |
| 28-Apr-20 11:15:00 | 301 | 40 | 47 | 48.8 | 86.1 |
| 28-Apr-20 11:16:00 | 307 | 40 | 46 | 48.8 | 86.0 |
| 28-Apr-20 11:17:00 | 304 | 41 | 45 | 48.8 | 86.0 |
| 28-Apr-20 11:18:00 | 294 | 41 | 44 | 48.8 | 85.9 |
| 28-Apr-20 11:19:00 | 294 | 41 | 43 | 48.8 | 85.9 |
| 28-Apr-20 11:20:00 | 303 | 40 | 42 | 48.8 | 85.8 |
| 28-Apr-20 11:21:00 | 300 | 41 | 41 | 48.8 | 85.8 |
| 28-Apr-20 11:22:00 | 296 | 40 | 43 | 48.8 | 85.7 |
| 28-Apr-20 11:23:00 | 296 | 39 | 51 | 48.8 | 85.7 |
| 28-Apr-20 11:24:00 | 303 | 39 | 53 | 48.8 | 85.6 |
| 28-Apr-20 11:25:00 | 299 | 40 | 56 | 48.8 | 85.4 |
| 28-Apr-20 11:26:00 | 304 | 40 | 51 | 48.8 | 85.2 |
| 28-Apr-20 11:27:00 | 293 | 40 | 50 | 48.8 | 84.9 |
| 28-Apr-20 11:28:00 | 297 | 39 | 48 | 48.8 | 85.1 |
| 28-Apr-20 11:29:00 | 283 | 40 | 51 | 48.8 | 85.2 |
| 28-Apr-20 11:30:00 | 293 | 38 | 51 | 48.8 | 85.4 |
| 28-Apr-20 11:31:00 | 288 | 39 | 42 | 48.8 | 85.4 |
| 28-Apr-20 11:32:00 | 302 | 40 | 34 | 48.8 | 85.3 |
| 28-Apr-20 11:33:00 | 302 | 42 | 46 | 48.8 | 85.1 |
| 28-Apr-20 11:34:00 | 298 | 41 | 51 | 48.8 | 85.0 |
| 28-Apr-20 11:35:00 | 294 | 41 | 51 | 48.8 | 85.0 |
| 28-Apr-20 11:36:00 | 293 | 42 | 49 | 48.8 | 85.1 |
| 28-Apr-20 11:37:00 | 294 | 42 | 48 | 48.8 | 85.2 |
| 28-Apr-20 11:38:00 | 302 | 43 | 48 | 48.8 | 85.3 |
| 28-Apr-20 11:39:00 | 293 | 41 | 47 | 48.8 | 85.3 |
| 28-Apr-20 11:40:00 | 300 | 41 | 45 | 48.8 | 85.3 |
| 28-Apr-20 11:41:00 | 305 | 43 | 44 | 48.8 | 85.1 |
| 28-Apr-20 11:42:00 | 304 | 42 | 42 | 48.8 | 84.9 |
| 28-Apr-20 11:43:00 | 300 | 43 | 40 | 48.8 | 84.6 |
| 28-Apr-20 11:44:00 | 308 | 42 | 38 | 48.8 | 84.7 |
| 28-Apr-20 11:45:00 | 316 | 43 | 36 | 48.8 | 84.8 |

| Line 3 Waste Gas Stack (SV103) | | | | | |
|--------------------------------|------------|---------------|-----------|----------------|---------------|
| | 030-03-0 | 037-01-1 ROLL | | 242-03-1 L3 PH | 252-03-1 KILN |
| | TOTAL TONS | FEEDER | 000-03-0 | BURNER GAS | BURNER LINE |
| | TO 031 | UNDERSIZE | WOOD FLOW | FLOW | GAS |
| | AL613151 | AI614065 | AI617Q01 | AC613006 | AC614017 |
| 28-Apr-20 11:46:00 | 307 | 43 | 36 | 48.8 | 84.9 |
| 28-Apr-20 11:47:00 | 304 | 42 | 36 | 48.8 | 85.0 |
| 28-Apr-20 11:48:00 | 300 | 40 | 36 | 48.8 | 85.2 |
| 28-Apr-20 11:49:00 | 291 | 40 | 36 | 48.8 | 85.2 |
| 28-Apr-20 11:50:00 | 302 | 40 | 36 | 48.8 | 85.2 |
| 28-Apr-20 11:51:00 | 299 | 41 | 36 | 48.8 | 85.1 |
| 28-Apr-20 11:52:00 | 303 | 42 | 36 | 48.8 | 85.1 |
| 28-Apr-20 11:53:00 | 307 | 42 | 36 | 48.8 | 85.0 |
| 28-Apr-20 11:54:00 | 302 | 42 | 36 | 48.8 | 85.0 |
| 28-Apr-20 11:55:00 | 297 | 41 | 36 | 48.8 | 85.0 |
| 28-Apr-20 11:56:00 | 298 | 41 | 36 | 48.8 | 86.4 |
| 28-Apr-20 11:57:00 | 292 | 42 | 36 | 48.8 | 86.9 |
| 28-Apr-20 11:58:00 | 310 | 42 | 36 | 48.8 | 87.3 |
| 28-Apr-20 11:59:00 | 296 | 43 | 36 | 48.8 | 86.0 |
| 28-Apr-20 12:00:00 | 308 | 42 | 36 | 48.8 | 85.8 |
| 28-Apr-20 12:01:00 | 304 | 42 | 36 | 48.8 | 85.6 |
| 28-Apr-20 12:02:00 | 297 | 42 | 36 | 48.8 | 85.4 |
| 28-Apr-20 12:03:00 | 296 | 41 | 36 | 48.8 | 85.2 |
| 28-Apr-20 12:04:00 | 303 | 41 | 36 | 48.8 | 85.0 |
| 28-Apr-20 12:05:00 | 303 | 42 | 36 | 48.8 | 84.8 |
| 28-Apr-20 12:06:00 | 299 | 42 | 36 | 48.8 | 84.6 |
| 28-Apr-20 12:07:00 | 301 | 42 | 36 | 48.8 | 85.6 |
| 28-Apr-20 12:08:00 | 314 | 43 | 36 | 48.8 | 85.2 |
| 28-Apr-20 12:09:00 | 302 | 44 | 36 | 48.8 | 84.8 |
| 28-Apr-20 12:10:00 | 294 | 43 | 36 | 48.8 | 84.8 |
| 28-Apr-20 12:11:00 | 302 | 43 | 36 | 48.8 | 84.8 |
| 28-Apr-20 12:12:00 | 302 | 43 | 36 | 48.8 | 84.9 |
| 28-Apr-20 12:13:00 | 305 | 43 | 36 | 48.8 | 85.5 |
| 28-Apr-20 12:14:00 | 298 | 43 | 36 | 48.8 | 85.0 |
| 28-Apr-20 12:15:00 | 302 | 42 | 36 | 48.8 | 85.0 |
| 28-Apr-20 12:16:00 | 299 | 43 | 36 | 48.8 | 85.0 |
| 28-Apr-20 12:17:00 | 298 | 42 | 36 | 48.8 | 85.0 |
| 28-Apr-20 12:18:00 | 305 | 42 | 36 | 48.8 | 85.0 |
| 28-Apr-20 12:19:00 | 305 | 43 | 36 | 48.8 | 85.0 |
| 28-Apr-20 12:20:00 | 303 | 44 | 36 | 48.8 | 84.6 |
| 28-Apr-20 12:21:00 | 299 | 44 | 36 | 48.8 | 85.0 |
| 28-Apr-20 12:22:00 | 301 | 44 | 36 | 48.8 | 85.2 |
| 28-Apr-20 12:23:00 | 296 | 43 | 36 | 48.8 | 84.7 |
| 28-Apr-20 12:24:00 | 297 | 42 | 36 | 48.8 | 84.1 |
| 28-Apr-20 12:25:00 | 298 | 44 | 36 | 48.8 | 84.2 |
| 28-Apr-20 12:26:00 | 306 | 44 | 36 | 48.8 | 84.2 |
| 28-Apr-20 12:27:00 | 299 | 44 | 36 | 48.8 | 84.0 |
| 28-Apr-20 12:28:00 | 302 | 45 | 36 | 48.8 | 83.8 |
| 28-Apr-20 12:29:00 | 297 | 44 | 36 | 48.8 | 83.7 |
| 28-Apr-20 12:30:00 | 296 | 43 | 36 | 48.8 | 84.2 |
| 28-Apr-20 12:31:00 | 304 | 44 | 36 | 48.8 | 84.3 |
| 28-Apr-20 12:32:00 | 310 | 44 | 36 | 48.8 | 84.1 |
| 28-Apr-20 12:33:00 | 303 | 45 | 36 | 48.8 | 83.9 |

| | Line 3 Waste Gas Stack (SV103) | | | | |
|--------------------|--------------------------------|---------------|-----------|----------------|---------------|
| | 030-03-0 | 037-01-1 ROLL | | 242-03-1 L3 PH | 252-03-1 KILN |
| | TOTAL TONS | FEEDER | 000-03-0 | BURNER GAS | BURNER LINE |
| | TO 031 | UNDERSIZE | WOOD FLOW | FLOW | GAS |
| | AL613151 | AI614065 | AI617Q01 | AC613006 | AC614017 |
| 28-Apr-20 12:34:00 | 305 | 43 | 36 | 48.8 | 83.7 |
| 28-Apr-20 12:35:00 | 305 | 42 | 36 | 48.8 | 83.5 |
| 28-Apr-20 12:36:00 | 297 | 43 | 36 | 48.8 | 83.7 |
| 28-Apr-20 12:37:00 | 298 | 43 | 32 | 48.8 | 83.9 |
| 28-Apr-20 12:38:00 | 302 | 42 | 44 | 48.8 | 83.7 |
| 28-Apr-20 12:39:00 | 301 | 43 | 44 | 48.8 | 83.4 |
| 28-Apr-20 12:40:00 | 304 | 42 | 44 | 48.8 | 83.3 |
| 28-Apr-20 12:41:00 | 300 | 42 | 44 | 48.8 | 83.1 |
| 28-Apr-20 12:42:00 | 297 | 41 | 44 | 48.8 | 82.9 |
| 28-Apr-20 12:43:00 | 299 | 42 | 44 | 48.8 | 83.8 |
| 28-Apr-20 12:44:00 | 300 | 44 | 44 | 48.8 | 84.4 |
| 28-Apr-20 12:45:00 | 302 | 42 | 44 | 48.8 | 84.6 |
| 28-Apr-20 12:46:00 | 302 | 42 | 44 | 48.8 | 84.7 |
| 28-Apr-20 12:47:00 | 297 | 43 | 44 | 48.8 | 84.7 |
| 28-Apr-20 12:48:00 | 294 | 43 | 44 | 48.8 | 84.6 |
| 28-Apr-20 12:49:00 | 294 | 42 | 44 | 48.8 | 84.2 |
| 28-Apr-20 12:50:00 | 295 | 42 | 44 | 48.8 | 83.8 |
| 28-Apr-20 12:51:00 | 301 | 43 | 44 | 48.8 | 83.7 |
| 28-Apr-20 12:52:00 | 296 | 43 | 44 | 48.8 | 83.6 |
| 28-Apr-20 12:53:00 | 307 | 44 | 44 | 48.8 | 83.5 |
| 28-Apr-20 12:54:00 | 305 | 45 | 44 | 48.8 | 83.4 |
| 28-Apr-20 12:55:00 | 301 | 45 | 44 | 48.8 | 83.3 |
| 28-Apr-20 12:56:00 | 301 | 44 | 44 | 48.8 | 83.6 |
| 28-Apr-20 12:57:00 | 297 | 44 | 44 | 48.8 | 83.9 |
| 28-Apr-20 12:58:00 | 303 | 43 | 44 | 48.8 | 83.9 |
| 28-Apr-20 12:59:00 | 307 | 43 | 44 | 48.8 | 83.7 |
| 28-Apr-20 13:00:00 | 297 | 43 | 44 | 48.8 | 83.6 |
| 28-Apr-20 13:01:00 | 301 | 43 | 44 | 48.8 | 83.5 |
| 28-Apr-20 13:02:00 | 297 | 43 | 44 | 48.8 | 83.4 |
| 28-Apr-20 13:03:00 | 308 | 43 | 44 | 48.8 | 83.2 |
| 28-Apr-20 13:04:00 | 308 | 43 | 44 | 48.8 | 83.1 |
| 28-Apr-20 13:05:00 | 315 | 43 | 44 | 48.8 | 84.1 |
| 28-Apr-20 13:06:00 | 299 | 45 | 44 | 48.8 | 83.5 |
| 28-Apr-20 13:07:00 | 301 | 42 | 44 | 48.8 | 83.0 |
| 28-Apr-20 13:08:00 | 304 | 42 | 44 | 48.8 | 83.1 |
| 28-Apr-20 13:09:00 | 308 | 43 | 44 | 48.8 | 83.2 |
| 28-Apr-20 13:10:00 | 304 | 44 | 44 | 48.8 | 83.3 |
| 28-Apr-20 13:11:00 | 303 | 43 | 44 | 48.8 | 83.4 |
| 28-Apr-20 13:12:00 | 304 | 43 | 44 | 48.8 | 83.4 |
| 28-Apr-20 13:13:00 | 304 | 42 | 44 | 48.8 | 83.4 |
| 28-Apr-20 13:14:00 | 303 | 41 | 44 | 48.8 | 83.3 |
| 28-Apr-20 13:15:00 | 296 | 42 | 44 | 48.8 | 83.3 |
| 28-Apr-20 13:16:00 | 295 | 42 | 44 | 48.8 | 83.3 |
| 28-Apr-20 13:17:00 | 305 | 42 | 44 | 48.8 | 83.3 |
| 28-Apr-20 13:18:00 | 299 | 43 | 44 | 48.8 | 83.2 |
| 28-Apr-20 13:19:00 | 301 | 42 | 44 | 48.8 | 83.2 |
| 28-Apr-20 13:20:00 | 300 | 42 | 44 | 48.8 | 83.2 |
| 28-Apr-20 13:21:00 | 304 | 43 | 44 | 48.8 | 83.2 |

| | Line 3 Waste Gas Stack (SV103) | | | | |
|--------------------|--------------------------------|---------------|-----------|----------------|---------------|
| | 030-03-0 | 037-01-1 ROLL | | 242-03-1 L3 PH | 252-03-1 KILN |
| | TOTAL TONS | FEEDER | 000-03-0 | BURNER GAS | BURNER LINE |
| | TO 031 | UNDERSIZE | WOOD FLOW | FLOW | GAS |
| | AL613151 | AI614065 | AI617Q01 | AC613006 | AC614017 |
| 28-Apr-20 13:22:00 | 298 | 43 | 44 | 48.8 | 83.1 |
| 28-Apr-20 13:23:00 | 301 | 43 | 44 | 48.8 | 83.1 |
| 28-Apr-20 13:24:00 | 296 | 42 | 44 | 48.8 | 83.1 |
| 28-Apr-20 13:25:00 | 303 | 42 | 44 | 48.8 | 83.0 |
| 28-Apr-20 13:26:00 | 291 | 43 | 44 | 48.8 | 83.0 |
| 28-Apr-20 13:27:00 | 298 | 42 | 44 | 48.8 | 83.0 |
| 28-Apr-20 13:28:00 | 300 | 43 | 44 | 48.8 | 82.6 |
| 28-Apr-20 13:29:00 | 306 | 44 | 44 | 48.8 | 83.4 |
| 28-Apr-20 13:30:00 | 318 | 44 | 44 | 48.8 | 83.1 |
| 28-Apr-20 13:31:00 | 306 | 44 | 44 | 48.8 | 83.2 |
| 28-Apr-20 13:32:00 | 302 | 44 | 44 | 48.8 | 83.2 |
| 28-Apr-20 13:33:00 | 302 | 44 | 44 | 48.8 | 83.2 |
| 28-Apr-20 13:34:00 | 295 | 43 | 44 | 48.8 | 83.3 |
| 28-Apr-20 13:35:00 | 297 | 43 | 44 | 48.8 | 82.2 |
| 28-Apr-20 13:36:00 | 298 | 42 | 44 | 48.8 | 82.2 |
| 28-Apr-20 13:37:00 | 303 | 43 | 44 | 48.8 | 82.2 |
| 28-Apr-20 13:38:00 | 310 | 43 | 44 | 48.8 | 82.2 |
| 28-Apr-20 13:39:00 | 297 | 44 | 44 | 48.8 | 82.1 |
| 28-Apr-20 13:40:00 | 301 | 43 | 44 | 48.8 | 81.8 |
| 28-Apr-20 13:41:00 | 299 | 43 | 44 | 48.8 | 82.9 |
| 28-Apr-20 13:42:00 | 308 | 42 | 44 | 48.8 | 83.0 |
| 28-Apr-20 13:43:00 | 311 | 44 | 44 | 48.8 | 83.0 |
| 28-Apr-20 13:44:00 | 305 | 43 | 44 | 48.8 | 83.1 |
| 28-Apr-20 13:45:00 | 301 | 43 | 44 | 48.8 | 83.1 |
| 28-Apr-20 13:46:00 | 297 | 42 | 44 | 48.8 | 83.2 |
| 28-Apr-20 13:47:00 | 297 | 42 | 44 | 48.8 | 82.9 |
| 28-Apr-20 13:48:00 | 298 | 42 | 44 | 48.8 | 82.7 |
| 28-Apr-20 13:49:00 | 307 | 42 | 44 | 48.8 | 82.4 |
| 28-Apr-20 13:50:00 | 302 | 43 | 44 | 48.8 | 82.2 |
| 28-Apr-20 13:51:00 | 300 | 43 | 44 | 48.8 | 82.1 |
| 28-Apr-20 13:52:00 | 297 | 43 | 44 | 48.8 | 82.4 |
| 28-Apr-20 13:53:00 | 302 | 42 | 44 | 48.8 | 82.7 |
| 28-Apr-20 13:54:00 | 302 | 43 | 44 | 48.8 | 83.0 |
| 28-Apr-20 13:55:00 | 304 | 43 | 44 | 48.8 | 83.6 |
| 28-Apr-20 13:56:00 | 306 | 44 | 44 | 48.8 | 83.0 |
| 28-Apr-20 13:57:00 | 305 | 43 | 44 | 48.8 | 83.1 |
| 28-Apr-20 13:58:00 | 296 | 43 | 44 | 48.8 | 82.7 |
| 28-Apr-20 13:59:00 | 301 | 43 | 44 | 48.8 | 82.5 |
| 28-Apr-20 14:00:00 | 306 | 44 | 44 | 48.8 | 82.8 |
| 28-Apr-20 14:01:00 | 298 | 44 | 44 | 48.8 | 83.0 |
| 28-Apr-20 14:02:00 | 302 | 43 | 44 | 48.8 | 83.2 |
| 28-Apr-20 14:03:00 | 298 | 43 | 44 | 48.8 | 83.4 |
| 28-Apr-20 14:04:00 | 300 | 43 | 44 | 48.8 | 83.1 |
| 28-Apr-20 14:05:00 | 301 | 43 | 44 | 48.8 | 82.7 |
| 28-Apr-20 14:06:00 | 302 | 43 | 44 | 48.8 | 82.6 |
| 28-Apr-20 14:07:00 | 299 | 43 | 44 | 48.8 | 82.6 |
| 28-Apr-20 14:08:00 | 304 | 44 | 44 | 48.8 | 82.6 |
| 28-Apr-20 14:09:00 | 293 | 44 | 44 | 48.8 | 82.7 |

| | Line 3 Waste Gas Stack (SV103) | | | | |
|--------------------|--------------------------------|---------------|-----------|----------------|---------------|
| | 030-03-0 | 037-01-1 ROLL | | 242-03-1 L3 PH | 252-03-1 KILN |
| | TOTAL TONS | FEEDER | 000-03-0 | BURNER GAS | BURNER LINE |
| | TO 031 | UNDERSIZE | WOOD FLOW | FLOW | GAS |
| | AL613151 | AI614065 | AI617Q01 | AC613006 | AC614017 |
| 28-Apr-20 14:10:00 | 292 | 43 | 44 | 48.8 | 82.7 |
| 28-Apr-20 14:11:00 | 300 | 43 | 44 | 48.8 | 82.7 |
| 28-Apr-20 14:12:00 | 303 | 44 | 44 | 48.8 | 82.7 |
| 28-Apr-20 14:13:00 | 310 | 44 | 44 | 48.8 | 82.7 |
| 28-Apr-20 14:14:00 | 303 | 44 | 44 | 48.8 | 82.7 |
| 28-Apr-20 14:15:00 | 306 | 43 | 44 | 48.8 | 82.7 |
| 28-Apr-20 14:16:00 | 300 | 44 | 44 | 48.8 | 82.7 |
| 28-Apr-20 14:17:00 | 300 | 43 | 44 | 48.8 | 82.7 |
| 28-Apr-20 14:18:00 | 297 | 42 | 44 | 48.8 | 82.6 |
| 28-Apr-20 14:19:00 | 299 | 43 | 44 | 48.8 | 82.6 |
| 28-Apr-20 14:20:00 | 300 | 42 | 44 | 48.8 | 82.6 |
| 28-Apr-20 14:21:00 | 299 | 42 | 44 | 48.8 | 82.4 |
| 28-Apr-20 14:22:00 | 305 | 43 | 44 | 48.8 | 83.1 |
| 28-Apr-20 14:23:00 | 308 | 43 | 44 | 48.8 | 82.2 |
| 28-Apr-20 14:24:00 | 303 | 42 | 44 | 48.8 | 82.1 |
| 28-Apr-20 14:25:00 | 297 | 42 | 44 | 48.8 | 82.2 |
| 28-Apr-20 14:26:00 | 297 | 42 | 44 | 48.8 | 82.3 |
| 28-Apr-20 14:27:00 | 306 | 42 | 44 | 48.8 | 82.4 |
| 28-Apr-20 14:28:00 | 307 | 42 | 44 | 48.8 | 83.5 |
| 28-Apr-20 14:29:00 | 302 | 42 | 44 | 48.8 | 83.2 |
| 28-Apr-20 14:30:00 | 303 | 41 | 44 | 48.8 | 82.9 |
| 28-Apr-20 14:31:00 | 297 | 40 | 44 | 48.8 | 82.6 |
| 28-Apr-20 14:32:00 | 298 | 40 | 44 | 48.8 | 82.2 |
| 28-Apr-20 14:33:00 | 299 | 41 | 44 | 48.8 | 82.2 |
| 28-Apr-20 14:34:00 | 300 | 41 | 44 | 48.8 | 83.1 |
| 28-Apr-20 14:35:00 | 305 | 42 | 44 | 48.8 | 83.4 |
| 28-Apr-20 14:36:00 | 303 | 42 | 44 | 48.8 | 83.3 |
| 28-Apr-20 14:37:00 | 296 | 41 | 44 | 48.8 | 83.3 |
| 28-Apr-20 14:38:00 | 304 | 42 | 44 | 48.8 | 83.2 |
| 28-Apr-20 14:39:00 | 306 | 42 | 44 | 48.8 | 83.2 |
| 28-Apr-20 14:40:00 | 301 | 42 | 44 | 48.8 | 83.1 |
| 28-Apr-20 14:41:00 | 300 | 42 | 44 | 48.8 | 83.1 |
| 28-Apr-20 14:42:00 | 300 | 42 | 44 | 48.8 | 83.1 |
| 28-Apr-20 14:43:00 | 298 | 42 | 44 | 48.8 | 83.0 |
| 28-Apr-20 14:44:00 | 303 | 42 | 44 | 48.8 | 83.0 |
| 28-Apr-20 14:45:00 | 296 | 42 | 44 | 48.8 | 82.9 |

Air Performance Test Form

Operating Data Summary for Process Sources

Facility Information (please print)

Company Name: U.S. Steel Corporation

Equipment ID No: SV118

Test date(s): 04/29/20

Equipment and Operating Data

- Process Equipment Description: Line 4 Waste Gas Stack
- Were the process and control equipment operated consistent with normal procedures? ☒ Yes ☐ No If no, explain: _____
- Include copy of production records or instrumentation which indicates rate of production or operation of the equipment, i.e. units per hour, pounds per hour, pressure, air flow, etc.
- Date(s) and procedure(s) of last maintenance/cleaning within 6 months:
☒ Remains unchanged from info. provided in test plan
- Process rate (amount of raw material or finished product per hour, wet or dry basis) while combusting (list fuel type(s) and ratios as appropriate) _____

| Process Parameter: list type and units | Run 1 | Run 2 | Run 3 | Run 4 | Average |
|--|-------|-------|-------|-------|---------|
| Greenball Feed Rate, LTPH | 544 | 544 | 545 | | 544 |
| Fired Pellet Production, LTPH | 395 | 397 | 402 | | 398 |
| Fuel Input Gas to grate, MBTUH | 87 | 87 | 86 | | 87 |
| Fuel Input Gas to Kiln, MBTUH | 184 | 180 | 194 | | 186 |
| Heat Input (MBTUH Total) | 271 | 267 | 280 | | 273 |

- Summarize control equipment operating data documented during testing. Values reported should reflect maximum, minimum, averages, or as approved in the test plan. (See test plan and approval letter)

Examples of APC equipment and parameters generally monitored. Monitor as in test plan and/or approval letter.

- Scrubber (list type of scrubber): DP (in. w.c.) and feed rate (gpm and psig)
- Baghouse, Cyclone, and Multi-clone: DP (in. w.c.)
- Catalytic Incinerator :($^{\circ}\text{F}_{\text{in}}$, $^{\circ}\text{F}_{\text{out}}$) and Thermal Incinerator: ($^{\circ}\text{F}_{\text{temperature}}$)
- ESP: Number and identity of operating field(s)

| APC and parameter monitored | Run 1 | Run 2 | Run 3 | Run 4 | Average |
|--|-------|-------|-------|-------|---------|
| NA | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| List pollutant & averaging basis.--should reflect permit | Run 1 | Run 2 | Run 3 | Run 4 | Average |
| Continuous Opacity Monitor(list hourly average) | | | | | |
| Monitor (list averaging basis): | | | | | |
| Monitor (list averaging basis): | | | | | |

Abbreviations: APC=air pollution control
lbs.-pounds

gpm.=gallons per minute
psig=pressure per square inch gauge

in. w.c.=inches of water column
 ΔP =pressure drop

Note: This form provides only a summary of the operating conditions during the performance test. Additional and more detailed records are required to meet the requirements of Minn. R. 7017.2035, subp. 3. This form is to be submitted as part of the performance test report

Line 4 Waste Gas Stack (SV118)

| Run # | Run Time | Average | Average | Average | Average | Average | Average |
|-------|-----------|---------|---------|---------|---------|---------|---------|
| 1 | 0756-1005 | 544 | 68 | 0 | 184.4 | 86.8 | 476 |
| 2 | 1022-1226 | 544 | 66 | 0 | 180.0 | 86.8 | 478 |
| 3 | 1240-1446 | 545 | 61 | 0 | 193.8 | 86.4 | 484 |

| | 030-04-0 TOTAL TONS TO 031 AL601152 | 037-04-1 REJECT TONS AI604048 | 000-04-0 WOOD FLOW AI617Q03 | 252-04-1 KILN BURNER LINE GAS AC604017 | 242-04-1 PH BURNER GAS FLOW AI604024 | 242-04-1 TOT GRN BALL TO GRATE AL601150 |
|--------------------|---|-------------------------------------|-----------------------------------|--|---|--|
| 29-Apr-20 07:55:00 | 534 | 67 | 0 | 182.2 | 86.6 | 468 |
| 29-Apr-20 07:56:00 | 554 | 66 | 0 | 182.2 | 87.1 | 487 |
| 29-Apr-20 07:57:00 | 548 | 66 | 0 | 181.2 | 87.2 | 482 |
| 29-Apr-20 07:58:00 | 547 | 69 | 0 | 179.8 | 86.0 | 475 |
| 29-Apr-20 07:59:00 | 541 | 68 | 0 | 181.2 | 86.9 | 471 |
| 29-Apr-20 08:00:00 | 549 | 68 | 0 | 183.3 | 86.5 | 479 |
| 29-Apr-20 08:01:00 | 547 | 67 | 0 | 183.4 | 86.5 | 478 |
| 29-Apr-20 08:02:00 | 543 | 67 | 0 | 182.8 | 87.7 | 478 |
| 29-Apr-20 08:03:00 | 534 | 67 | 0 | 182.1 | 86.8 | 466 |
| 29-Apr-20 08:04:00 | 540 | 68 | 0 | 181.6 | 87.2 | 472 |
| 29-Apr-20 08:05:00 | 534 | 66 | 0 | 181.5 | 87.4 | 468 |
| 29-Apr-20 08:06:00 | 542 | 66 | 0 | 180.4 | 86.7 | 476 |
| 29-Apr-20 08:07:00 | 540 | 65 | 0 | 179.6 | 86.7 | 475 |
| 29-Apr-20 08:08:00 | 543 | 66 | 0 | 179.9 | 87.1 | 477 |
| 29-Apr-20 08:09:00 | 537 | 66 | 0 | 180.1 | 86.9 | 477 |
| 29-Apr-20 08:10:00 | 540 | 66 | 0 | 180.9 | 87.5 | 471 |
| 29-Apr-20 08:11:00 | 541 | 67 | 0 | 182.7 | 87.0 | 473 |
| 29-Apr-20 08:12:00 | 540 | 66 | 0 | 183.4 | 86.3 | 473 |
| 29-Apr-20 08:13:00 | 540 | 66 | 0 | 182.3 | 87.4 | 480 |
| 29-Apr-20 08:14:00 | 549 | 66 | 0 | 180.2 | 87.0 | 477 |
| 29-Apr-20 08:15:00 | 548 | 67 | 0 | 180.9 | 87.4 | 481 |
| 29-Apr-20 08:16:00 | 543 | 69 | 0 | 182.2 | 86.8 | 477 |
| 29-Apr-20 08:17:00 | 542 | 69 | 0 | 184.0 | 87.4 | 473 |
| 29-Apr-20 08:18:00 | 549 | 68 | 0 | 183.8 | 86.7 | 479 |
| 29-Apr-20 08:19:00 | 544 | 68 | 0 | 183.4 | 87.4 | 476 |
| 29-Apr-20 08:20:00 | 553 | 68 | 0 | 182.9 | 86.8 | 483 |
| 29-Apr-20 08:21:00 | 550 | 68 | 0 | 183.2 | 87.2 | 480 |
| 29-Apr-20 08:22:00 | 542 | 69 | 0 | 183.9 | 86.9 | 469 |
| 29-Apr-20 08:23:00 | 550 | 69 | 0 | 184.6 | 87.2 | 481 |
| 29-Apr-20 08:24:00 | 552 | 68 | 0 | 185.5 | 86.8 | 484 |
| 29-Apr-20 08:25:00 | 552 | 69 | 0 | 184.2 | 87.1 | 481 |
| 29-Apr-20 08:26:00 | 548 | 69 | 0 | 182.5 | 86.4 | 479 |
| 29-Apr-20 08:27:00 | 534 | 70 | 0 | 183.9 | 87.4 | 469 |
| 29-Apr-20 08:28:00 | 542 | 70 | 0 | 187.4 | 87.5 | 475 |
| 29-Apr-20 08:29:00 | 541 | 69 | 0 | 185.5 | 86.5 | 471 |
| 29-Apr-20 08:30:00 | 550 | 69 | 0 | 181.6 | 87.3 | 480 |
| 29-Apr-20 08:31:00 | 551 | 69 | 0 | 181.2 | 86.8 | 482 |
| 29-Apr-20 08:32:00 | 536 | 70 | 0 | 181.5 | 86.9 | 469 |
| 29-Apr-20 08:33:00 | 548 | 70 | 0 | 182.9 | 87.1 | 477 |
| 29-Apr-20 08:34:00 | 550 | 69 | 0 | 183.1 | 86.7 | 478 |
| 29-Apr-20 08:35:00 | 540 | 69 | 0 | 182.8 | 87.5 | 470 |
| 29-Apr-20 08:36:00 | 540 | 69 | 0 | 182.6 | 87.6 | 473 |
| 29-Apr-20 08:37:00 | 542 | 68 | 0 | 182.3 | 87.0 | 471 |
| 29-Apr-20 08:38:00 | 537 | 68 | 0 | 182.0 | 87.0 | 470 |
| 29-Apr-20 08:39:00 | 530 | 68 | 0 | 181.7 | 86.5 | 466 |
| 29-Apr-20 08:40:00 | 545 | 68 | 0 | 181.4 | 87.0 | 475 |
| 29-Apr-20 08:41:00 | 545 | 68 | 0 | 183.3 | 86.6 | 474 |
| 29-Apr-20 08:42:00 | 544 | 69 | 0 | 184.6 | 86.7 | 479 |
| 29-Apr-20 08:43:00 | 547 | 69 | 0 | 184.4 | 87.2 | 475 |
| 29-Apr-20 08:44:00 | 553 | 69 | 0 | 184.1 | 86.4 | 479 |
| 29-Apr-20 08:45:00 | 546 | 70 | 0 | 183.9 | 86.8 | 476 |
| 29-Apr-20 08:46:00 | 538 | 70 | 0 | 183.6 | 86.6 | 474 |

Line 4 Waste Gas Stack (SV118)

| | 030-04-0 TOTAL TONS TO 031 AL601152 | 037-04-1 REJECT TONS AI604048 | 000-04-0 WOOD FLOW AI617Q03 | 252-04-1 KILN BURNER LINE GAS AC604017 | 242-04-1 PH BURNER GAS FLOW AI604024 | 242-04-1 TOT GRN BALL TO GRATE AL601150 |
|--------------------|---|-------------------------------------|-----------------------------------|--|---|--|
| 29-Apr-20 08:47:00 | 539 | 69 | 0 | 184.1 | 87.3 | 469 |
| 29-Apr-20 08:48:00 | 537 | 68 | 0 | 184.7 | 86.6 | 472 |
| 29-Apr-20 08:49:00 | 541 | 68 | 0 | 184.8 | 86.8 | 471 |
| 29-Apr-20 08:50:00 | 536 | 68 | 0 | 184.8 | 87.1 | 470 |
| 29-Apr-20 08:51:00 | 543 | 68 | 0 | 184.8 | 87.6 | 471 |
| 29-Apr-20 08:52:00 | 544 | 69 | 0 | 185.1 | 87.0 | 479 |
| 29-Apr-20 08:53:00 | 544 | 70 | 0 | 186.2 | 86.8 | 474 |
| 29-Apr-20 08:54:00 | 544 | 71 | 0 | 185.3 | 86.7 | 473 |
| 29-Apr-20 08:55:00 | 545 | 71 | 0 | 185.3 | 86.7 | 474 |
| 29-Apr-20 08:56:00 | 533 | 71 | 0 | 185.3 | 86.7 | 468 |
| 29-Apr-20 08:57:00 | 546 | 71 | 0 | 185.2 | 86.3 | 474 |
| 29-Apr-20 08:58:00 | 550 | 70 | 0 | 185.2 | 86.8 | 480 |
| 29-Apr-20 08:59:00 | 539 | 72 | 0 | 185.0 | 87.3 | 473 |
| 29-Apr-20 09:00:00 | 540 | 71 | 0 | 185.1 | 86.5 | 477 |
| 29-Apr-20 09:01:00 | 542 | 70 | 0 | 185.4 | 86.1 | 469 |
| 29-Apr-20 09:02:00 | 546 | 70 | 0 | 185.7 | 86.4 | 476 |
| 29-Apr-20 09:03:00 | 536 | 70 | 0 | 185.9 | 86.1 | 472 |
| 29-Apr-20 09:04:00 | 540 | 70 | 0 | 186.2 | 87.0 | 469 |
| 29-Apr-20 09:05:00 | 545 | 69 | 0 | 186.1 | 87.0 | 475 |
| 29-Apr-20 09:06:00 | 543 | 69 | 0 | 185.4 | 86.6 | 477 |
| 29-Apr-20 09:07:00 | 545 | 70 | 0 | 185.5 | 86.3 | 474 |
| 29-Apr-20 09:08:00 | 544 | 69 | 0 | 185.8 | 86.7 | 474 |
| 29-Apr-20 09:09:00 | 545 | 69 | 0 | 186.1 | 86.4 | 474 |
| 29-Apr-20 09:10:00 | 543 | 69 | 0 | 186.4 | 87.1 | 471 |
| 29-Apr-20 09:11:00 | 539 | 69 | 0 | 187.4 | 87.0 | 472 |
| 29-Apr-20 09:12:00 | 536 | 69 | 0 | 187.4 | 86.5 | 473 |
| 29-Apr-20 09:13:00 | 542 | 68 | 0 | 187.1 | 86.6 | 472 |
| 29-Apr-20 09:14:00 | 544 | 67 | 0 | 186.9 | 86.9 | 474 |
| 29-Apr-20 09:15:00 | 543 | 67 | 0 | 186.6 | 87.2 | 480 |
| 29-Apr-20 09:16:00 | 543 | 68 | 0 | 186.3 | 86.4 | 472 |
| 29-Apr-20 09:17:00 | 547 | 67 | 0 | 186.0 | 86.4 | 475 |
| 29-Apr-20 09:18:00 | 546 | 67 | 0 | 186.1 | 86.8 | 481 |
| 29-Apr-20 09:19:00 | 544 | 68 | 0 | 186.6 | 86.2 | 478 |
| 29-Apr-20 09:20:00 | 533 | 67 | 0 | 186.4 | 87.2 | 470 |
| 29-Apr-20 09:21:00 | 541 | 68 | 0 | 184.7 | 86.7 | 472 |
| 29-Apr-20 09:22:00 | 540 | 67 | 0 | 182.8 | 86.1 | 474 |
| 29-Apr-20 09:23:00 | 546 | 67 | 0 | 183.4 | 86.9 | 481 |
| 29-Apr-20 09:24:00 | 552 | 68 | 0 | 184.0 | 87.1 | 482 |
| 29-Apr-20 09:25:00 | 550 | 69 | 0 | 184.6 | 87.1 | 478 |
| 29-Apr-20 09:26:00 | 552 | 69 | 0 | 185.3 | 86.6 | 483 |
| 29-Apr-20 09:27:00 | 541 | 68 | 0 | 187.1 | 86.2 | 477 |
| 29-Apr-20 09:28:00 | 550 | 68 | 0 | 186.6 | 86.6 | 485 |
| 29-Apr-20 09:29:00 | 539 | 68 | 0 | 186.1 | 86.8 | 478 |
| 29-Apr-20 09:30:00 | 546 | 68 | 0 | 184.7 | 86.8 | 478 |
| 29-Apr-20 09:31:00 | 540 | 68 | 0 | 181.7 | 86.3 | 473 |
| 29-Apr-20 09:32:00 | 542 | 68 | 0 | 181.9 | 86.3 | 478 |
| 29-Apr-20 09:33:00 | 547 | 67 | 0 | 182.6 | 86.2 | 483 |
| 29-Apr-20 09:34:00 | 545 | 68 | 0 | 182.5 | 87.5 | 475 |
| 29-Apr-20 09:35:00 | 536 | 68 | 0 | 183.9 | 86.1 | 477 |
| 29-Apr-20 09:36:00 | 544 | 68 | 0 | 183.8 | 87.0 | 476 |
| 29-Apr-20 09:37:00 | 543 | 66 | 0 | 183.4 | 86.1 | 470 |
| 29-Apr-20 09:38:00 | 543 | 67 | 0 | 183.0 | 86.4 | 481 |
| 29-Apr-20 09:39:00 | 542 | 67 | 0 | 182.7 | 86.3 | 480 |
| 29-Apr-20 09:40:00 | 550 | 67 | 0 | 182.3 | 87.5 | 477 |
| 29-Apr-20 09:41:00 | 546 | 68 | 0 | 183.6 | 86.2 | 480 |
| 29-Apr-20 09:42:00 | 546 | 68 | 0 | 185.2 | 87.4 | 478 |
| 29-Apr-20 09:43:00 | 535 | 67 | 0 | 186.0 | 86.1 | 468 |
| 29-Apr-20 09:44:00 | 542 | 67 | 0 | 185.8 | 87.0 | 476 |

Line 4 Waste Gas Stack (SV118)

| | 030-04-0 TOTAL TONS TO 031 AL601152 | 037-04-1 REJECT TONS AI604048 | 000-04-0 WOOD FLOW AI617Q03 | 252-04-1 KILN BURNER LINE GAS AC604017 | 242-04-1 PH BURNER GAS FLOW AI604024 | 242-04-1 TOT GRN BALL TO GRATE AL601150 |
|--------------------|---|-------------------------------------|-----------------------------------|--|---|--|
| 29-Apr-20 09:45:00 | 545 | 67 | 0 | 185.5 | 86.7 | 483 |
| 29-Apr-20 09:46:00 | 545 | 66 | 0 | 185.3 | 86.3 | 474 |
| 29-Apr-20 09:47:00 | 543 | 67 | 0 | 185.1 | 86.9 | 476 |
| 29-Apr-20 09:48:00 | 547 | 66 | 0 | 184.9 | 86.0 | 486 |
| 29-Apr-20 09:49:00 | 554 | 67 | 0 | 184.7 | 86.3 | 487 |
| 29-Apr-20 09:50:00 | 546 | 67 | 0 | 185.3 | 86.0 | 478 |
| 29-Apr-20 09:51:00 | 549 | 68 | 0 | 186.9 | 86.5 | 486 |
| 29-Apr-20 09:52:00 | 542 | 67 | 0 | 188.5 | 87.1 | 474 |
| 29-Apr-20 09:53:00 | 546 | 68 | 0 | 188.4 | 86.6 | 480 |
| 29-Apr-20 09:54:00 | 549 | 67 | 0 | 188.2 | 87.0 | 485 |
| 29-Apr-20 09:55:00 | 543 | 67 | 0 | 187.9 | 87.1 | 476 |
| 29-Apr-20 09:56:00 | 551 | 67 | 0 | 187.7 | 86.7 | 480 |
| 29-Apr-20 09:57:00 | 539 | 67 | 0 | 187.5 | 86.9 | 478 |
| 29-Apr-20 09:58:00 | 542 | 67 | 0 | 187.2 | 86.8 | 479 |
| 29-Apr-20 09:59:00 | 540 | 67 | 0 | 187.0 | 86.8 | 475 |
| 29-Apr-20 10:00:00 | 531 | 67 | 0 | 186.8 | 85.8 | 471 |
| 29-Apr-20 10:01:00 | 539 | 66 | 0 | 187.0 | 86.3 | 476 |
| 29-Apr-20 10:02:00 | 540 | 65 | 0 | 187.5 | 86.0 | 474 |
| 29-Apr-20 10:03:00 | 541 | 69 | 0 | 186.8 | 86.3 | 471 |
| 29-Apr-20 10:04:00 | 550 | 69 | 0 | 186.0 | 86.9 | 478 |
| 29-Apr-20 10:05:00 | 540 | 67 | 0 | 185.2 | 87.0 | 475 |
| 29-Apr-20 10:06:00 | 542 | 68 | 0 | 184.4 | 86.7 | 473 |
| 29-Apr-20 10:07:00 | 543 | 69 | 0 | 184.7 | 86.0 | 473 |
| 29-Apr-20 10:08:00 | 542 | 68 | 0 | 185.1 | 86.4 | 478 |
| 29-Apr-20 10:09:00 | 532 | 68 | 0 | 185.5 | 86.4 | 465 |
| 29-Apr-20 10:10:00 | 543 | 67 | 0 | 185.9 | 86.6 | 475 |
| 29-Apr-20 10:11:00 | 543 | 67 | 0 | 186.3 | 86.9 | 480 |
| 29-Apr-20 10:12:00 | 544 | 67 | 0 | 186.5 | 86.7 | 477 |
| 29-Apr-20 10:13:00 | 549 | 67 | 0 | 186.4 | 87.2 | 482 |
| 29-Apr-20 10:14:00 | 546 | 67 | 0 | 186.3 | 86.5 | 484 |
| 29-Apr-20 10:15:00 | 555 | 67 | 0 | 186.1 | 86.8 | 485 |
| 29-Apr-20 10:16:00 | 552 | 66 | 0 | 186.8 | 87.0 | 484 |
| 29-Apr-20 10:17:00 | 545 | 68 | 0 | 188.8 | 86.2 | 482 |
| 29-Apr-20 10:18:00 | 539 | 66 | 0 | 189.7 | 87.2 | 475 |
| 29-Apr-20 10:19:00 | 537 | 65 | 0 | 189.6 | 87.3 | 471 |
| 29-Apr-20 10:20:00 | 538 | 64 | 0 | 186.6 | 86.8 | 477 |
| 29-Apr-20 10:21:00 | 534 | 64 | 0 | 182.7 | 86.7 | 473 |
| 29-Apr-20 10:22:00 | 540 | 64 | 0 | 182.8 | 86.3 | 473 |
| 29-Apr-20 10:23:00 | 535 | 65 | 0 | 184.5 | 87.2 | 473 |
| 29-Apr-20 10:24:00 | 544 | 65 | 0 | 184.5 | 86.4 | 476 |
| 29-Apr-20 10:25:00 | 537 | 65 | 0 | 184.3 | 86.3 | 473 |
| 29-Apr-20 10:26:00 | 542 | 65 | 0 | 184.1 | 87.0 | 476 |
| 29-Apr-20 10:27:00 | 542 | 64 | 0 | 184.0 | 86.7 | 477 |
| 29-Apr-20 10:28:00 | 552 | 65 | 0 | 183.8 | 87.4 | 484 |
| 29-Apr-20 10:29:00 | 548 | 65 | 0 | 183.7 | 87.2 | 479 |
| 29-Apr-20 10:30:00 | 548 | 67 | 0 | 183.5 | 86.5 | 483 |
| 29-Apr-20 10:31:00 | 542 | 66 | 0 | 185.2 | 87.5 | 476 |
| 29-Apr-20 10:32:00 | 550 | 67 | 0 | 187.4 | 86.1 | 482 |
| 29-Apr-20 10:33:00 | 548 | 66 | 0 | 187.1 | 87.0 | 479 |
| 29-Apr-20 10:34:00 | 538 | 67 | 0 | 186.8 | 87.1 | 471 |
| 29-Apr-20 10:35:00 | 547 | 67 | 0 | 186.4 | 86.6 | 481 |
| 29-Apr-20 10:36:00 | 545 | 67 | 0 | 186.1 | 86.8 | 475 |
| 29-Apr-20 10:37:00 | 537 | 67 | 0 | 185.7 | 86.6 | 472 |
| 29-Apr-20 10:38:00 | 530 | 67 | 0 | 185.4 | 87.1 | 469 |
| 29-Apr-20 10:39:00 | 547 | 67 | 0 | 185.0 | 87.0 | 478 |
| 29-Apr-20 10:40:00 | 556 | 68 | 0 | 182.5 | 87.0 | 482 |
| 29-Apr-20 10:41:00 | 545 | 69 | 0 | 180.0 | 86.8 | 477 |
| 29-Apr-20 10:42:00 | 549 | 69 | 0 | 181.8 | 86.6 | 480 |

Line 4 Waste Gas Stack (SV118)

| | 030-04-0 TOTAL TONS TO 031 AL601152 | 037-04-1 REJECT TONS AI604048 | 000-04-0 WOOD FLOW AI617Q03 | 252-04-1 KILN BURNER LINE GAS AC604017 | 242-04-1 PH BURNER GAS FLOW AI604024 | 242-04-1 TOT GRN BALL TO GRATE AL601150 |
|--------------------|---|-------------------------------------|-----------------------------------|--|---|--|
| 29-Apr-20 10:43:00 | 535 | 69 | 0 | 185.0 | 86.5 | 469 |
| 29-Apr-20 10:44:00 | 546 | 69 | 0 | 183.9 | 86.3 | 481 |
| 29-Apr-20 10:45:00 | 549 | 68 | 0 | 183.0 | 86.5 | 479 |
| 29-Apr-20 10:46:00 | 555 | 68 | 0 | 182.8 | 86.4 | 484 |
| 29-Apr-20 10:47:00 | 542 | 69 | 0 | 182.3 | 87.3 | 476 |
| 29-Apr-20 10:48:00 | 542 | 67 | 0 | 182.5 | 86.0 | 472 |
| 29-Apr-20 10:49:00 | 540 | 66 | 0 | 183.5 | 86.1 | 473 |
| 29-Apr-20 10:50:00 | 544 | 66 | 0 | 183.5 | 86.6 | 479 |
| 29-Apr-20 10:51:00 | 537 | 65 | 0 | 183.5 | 86.5 | 470 |
| 29-Apr-20 10:52:00 | 548 | 66 | 0 | 183.5 | 86.6 | 479 |
| 29-Apr-20 10:53:00 | 540 | 65 | 0 | 184.7 | 86.3 | 476 |
| 29-Apr-20 10:54:00 | 534 | 65 | 0 | 184.2 | 86.5 | 470 |
| 29-Apr-20 10:55:00 | 546 | 66 | 0 | 183.8 | 87.0 | 480 |
| 29-Apr-20 10:56:00 | 538 | 66 | 0 | 183.5 | 86.0 | 478 |
| 29-Apr-20 10:57:00 | 537 | 66 | 0 | 183.4 | 87.2 | 471 |
| 29-Apr-20 10:58:00 | 545 | 66 | 0 | 183.3 | 86.8 | 480 |
| 29-Apr-20 10:59:00 | 543 | 65 | 0 | 183.2 | 87.5 | 477 |
| 29-Apr-20 11:00:00 | 547 | 65 | 0 | 181.1 | 86.7 | 481 |
| 29-Apr-20 11:01:00 | 551 | 66 | 0 | 177.5 | 86.1 | 483 |
| 29-Apr-20 11:02:00 | 534 | 66 | 0 | 179.9 | 87.1 | 470 |
| 29-Apr-20 11:03:00 | 548 | 65 | 0 | 182.8 | 86.9 | 481 |
| 29-Apr-20 11:04:00 | 549 | 65 | 0 | 181.8 | 87.3 | 478 |
| 29-Apr-20 11:05:00 | 539 | 67 | 0 | 181.0 | 87.6 | 476 |
| 29-Apr-20 11:06:00 | 541 | 67 | 0 | 180.9 | 87.2 | 474 |
| 29-Apr-20 11:07:00 | 548 | 67 | 0 | 180.7 | 86.1 | 480 |
| 29-Apr-20 11:08:00 | 547 | 66 | 0 | 180.5 | 87.0 | 479 |
| 29-Apr-20 11:09:00 | 553 | 67 | 0 | 180.2 | 87.9 | 485 |
| 29-Apr-20 11:10:00 | 547 | 67 | 0 | 177.8 | 87.2 | 480 |
| 29-Apr-20 11:11:00 | 551 | 68 | 0 | 176.2 | 86.9 | 481 |
| 29-Apr-20 11:12:00 | 539 | 67 | 0 | 179.0 | 86.8 | 475 |
| 29-Apr-20 11:13:00 | 543 | 67 | 0 | 180.1 | 87.3 | 481 |
| 29-Apr-20 11:14:00 | 548 | 66 | 0 | 178.9 | 86.2 | 481 |
| 29-Apr-20 11:15:00 | 535 | 67 | 0 | 177.7 | 86.8 | 467 |
| 29-Apr-20 11:16:00 | 547 | 67 | 0 | 177.4 | 87.0 | 474 |
| 29-Apr-20 11:17:00 | 537 | 65 | 0 | 177.1 | 86.8 | 472 |
| 29-Apr-20 11:18:00 | 545 | 66 | 0 | 176.9 | 86.8 | 480 |
| 29-Apr-20 11:19:00 | 541 | 65 | 0 | 176.6 | 87.7 | 476 |
| 29-Apr-20 11:20:00 | 541 | 65 | 0 | 176.6 | 86.8 | 478 |
| 29-Apr-20 11:21:00 | 540 | 66 | 0 | 176.5 | 86.3 | 478 |
| 29-Apr-20 11:22:00 | 549 | 65 | 0 | 176.5 | 86.4 | 485 |
| 29-Apr-20 11:23:00 | 545 | 66 | 0 | 176.4 | 86.1 | 476 |
| 29-Apr-20 11:24:00 | 547 | 66 | 0 | 176.5 | 86.7 | 484 |
| 29-Apr-20 11:25:00 | 538 | 65 | 0 | 176.6 | 87.1 | 471 |
| 29-Apr-20 11:26:00 | 543 | 65 | 0 | 176.8 | 86.8 | 476 |
| 29-Apr-20 11:27:00 | 543 | 65 | 0 | 177.0 | 86.4 | 484 |
| 29-Apr-20 11:28:00 | 531 | 66 | 0 | 177.1 | 87.3 | 467 |
| 29-Apr-20 11:29:00 | 542 | 66 | 0 | 177.3 | 86.5 | 476 |
| 29-Apr-20 11:30:00 | 545 | 65 | 0 | 176.8 | 87.0 | 481 |
| 29-Apr-20 11:31:00 | 539 | 66 | 0 | 176.3 | 87.8 | 473 |
| 29-Apr-20 11:32:00 | 539 | 66 | 0 | 175.8 | 85.8 | 477 |
| 29-Apr-20 11:33:00 | 538 | 67 | 0 | 175.9 | 87.4 | 474 |
| 29-Apr-20 11:34:00 | 549 | 66 | 0 | 176.0 | 87.7 | 482 |
| 29-Apr-20 11:35:00 | 549 | 66 | 0 | 176.2 | 86.7 | 483 |
| 29-Apr-20 11:36:00 | 545 | 66 | 0 | 176.3 | 86.2 | 482 |
| 29-Apr-20 11:37:00 | 533 | 66 | 0 | 176.5 | 87.1 | 471 |
| 29-Apr-20 11:38:00 | 530 | 66 | 0 | 176.6 | 87.5 | 470 |
| 29-Apr-20 11:39:00 | 547 | 65 | 0 | 176.8 | 87.6 | 481 |
| 29-Apr-20 11:40:00 | 538 | 65 | 0 | 176.3 | 86.7 | 471 |

Line 4 Waste Gas Stack (SV118)

| | 030-04-0 TOTAL TONS TO 031 AL601152 | 037-04-1 REJECT TONS AI604048 | 000-04-0 WOOD FLOW AI617Q03 | 252-04-1 KILN BURNER LINE GAS AC604017 | 242-04-1 PH BURNER GAS FLOW AI604024 | 242-04-1 TOT GRN BALL TO GRATE AL601150 |
|--------------------|---|-------------------------------------|-----------------------------------|--|---|--|
| 29-Apr-20 11:41:00 | 546 | 66 | 0 | 172.7 | 86.7 | 481 |
| 29-Apr-20 11:42:00 | 538 | 66 | 0 | 172.8 | 87.7 | 477 |
| 29-Apr-20 11:43:00 | 549 | 67 | 0 | 174.7 | 87.2 | 479 |
| 29-Apr-20 11:44:00 | 544 | 65 | 0 | 174.7 | 86.9 | 479 |
| 29-Apr-20 11:45:00 | 552 | 66 | 0 | 174.7 | 87.2 | 482 |
| 29-Apr-20 11:46:00 | 553 | 66 | 0 | 174.6 | 87.8 | 483 |
| 29-Apr-20 11:47:00 | 543 | 66 | 0 | 174.5 | 86.3 | 483 |
| 29-Apr-20 11:48:00 | 543 | 67 | 0 | 174.4 | 86.2 | 478 |
| 29-Apr-20 11:49:00 | 556 | 66 | 0 | 175.4 | 87.1 | 489 |
| 29-Apr-20 11:50:00 | 554 | 66 | 0 | 177.1 | 87.1 | 490 |
| 29-Apr-20 11:51:00 | 545 | 66 | 0 | 178.5 | 86.9 | 477 |
| 29-Apr-20 11:52:00 | 541 | 67 | 0 | 178.4 | 86.4 | 475 |
| 29-Apr-20 11:53:00 | 539 | 65 | 0 | 178.4 | 87.0 | 470 |
| 29-Apr-20 11:54:00 | 543 | 66 | 0 | 178.3 | 86.4 | 473 |
| 29-Apr-20 11:55:00 | 541 | 66 | 0 | 178.2 | 86.4 | 471 |
| 29-Apr-20 11:56:00 | 539 | 66 | 0 | 177.7 | 87.0 | 474 |
| 29-Apr-20 11:57:00 | 544 | 66 | 0 | 176.8 | 87.2 | 478 |
| 29-Apr-20 11:58:00 | 549 | 65 | 0 | 175.8 | 86.7 | 489 |
| 29-Apr-20 11:59:00 | 555 | 66 | 0 | 175.8 | 86.5 | 488 |
| 29-Apr-20 12:00:00 | 553 | 66 | 0 | 177.0 | 87.4 | 481 |
| 29-Apr-20 12:01:00 | 540 | 66 | 0 | 179.4 | 86.1 | 475 |
| 29-Apr-20 12:02:00 | 549 | 66 | 0 | 179.5 | 87.3 | 483 |
| 29-Apr-20 12:03:00 | 545 | 66 | 0 | 179.3 | 86.7 | 478 |
| 29-Apr-20 12:04:00 | 543 | 66 | 0 | 179.1 | 87.4 | 476 |
| 29-Apr-20 12:05:00 | 537 | 67 | 0 | 178.8 | 86.9 | 475 |
| 29-Apr-20 12:06:00 | 551 | 65 | 0 | 178.6 | 86.8 | 483 |
| 29-Apr-20 12:07:00 | 541 | 65 | 0 | 178.4 | 86.2 | 481 |
| 29-Apr-20 12:08:00 | 558 | 66 | 0 | 178.2 | 87.6 | 490 |
| 29-Apr-20 12:09:00 | 550 | 65 | 0 | 178.0 | 86.4 | 483 |
| 29-Apr-20 12:10:00 | 552 | 66 | 0 | 179.7 | 87.2 | 489 |
| 29-Apr-20 12:11:00 | 549 | 66 | 0 | 183.8 | 85.8 | 481 |
| 29-Apr-20 12:12:00 | 542 | 66 | 0 | 183.7 | 87.3 | 476 |
| 29-Apr-20 12:13:00 | 539 | 67 | 0 | 183.2 | 86.5 | 471 |
| 29-Apr-20 12:14:00 | 544 | 66 | 0 | 182.7 | 87.1 | 478 |
| 29-Apr-20 12:15:00 | 545 | 66 | 0 | 180.0 | 86.3 | 477 |
| 29-Apr-20 12:16:00 | 549 | 67 | 0 | 179.8 | 87.0 | 478 |
| 29-Apr-20 12:17:00 | 543 | 66 | 0 | 180.0 | 87.1 | 474 |
| 29-Apr-20 12:18:00 | 545 | 67 | 0 | 180.5 | 86.6 | 477 |
| 29-Apr-20 12:19:00 | 547 | 67 | 0 | 181.0 | 86.4 | 480 |
| 29-Apr-20 12:20:00 | 549 | 67 | 0 | 181.5 | 87.5 | 480 |
| 29-Apr-20 12:21:00 | 547 | 67 | 0 | 183.4 | 85.7 | 478 |
| 29-Apr-20 12:22:00 | 540 | 67 | 0 | 183.1 | 86.5 | 478 |
| 29-Apr-20 12:23:00 | 539 | 65 | 0 | 182.3 | 86.9 | 475 |
| 29-Apr-20 12:24:00 | 541 | 64 | 0 | 181.9 | 86.9 | 475 |
| 29-Apr-20 12:25:00 | 540 | 64 | 0 | 182.0 | 87.2 | 482 |
| 29-Apr-20 12:26:00 | 547 | 64 | 0 | 181.2 | 87.5 | 481 |
| 29-Apr-20 12:27:00 | 543 | 65 | 0 | 180.5 | 86.5 | 479 |
| 29-Apr-20 12:28:00 | 539 | 65 | 0 | 181.4 | 86.3 | 477 |
| 29-Apr-20 12:29:00 | 546 | 64 | 0 | 182.3 | 87.1 | 480 |
| 29-Apr-20 12:30:00 | 546 | 65 | 0 | 183.2 | 87.2 | 483 |
| 29-Apr-20 12:31:00 | 542 | 66 | 0 | 185.9 | 86.1 | 480 |
| 29-Apr-20 12:32:00 | 549 | 65 | 0 | 185.6 | 86.2 | 482 |
| 29-Apr-20 12:33:00 | 541 | 65 | 0 | 185.3 | 87.1 | 478 |
| 29-Apr-20 12:34:00 | 538 | 65 | 0 | 185.0 | 87.0 | 474 |
| 29-Apr-20 12:35:00 | 543 | 64 | 0 | 184.7 | 87.0 | 479 |
| 29-Apr-20 12:36:00 | 536 | 63 | 0 | 184.4 | 87.8 | 475 |
| 29-Apr-20 12:37:00 | 538 | 63 | 0 | 184.1 | 86.5 | 477 |
| 29-Apr-20 12:38:00 | 541 | 63 | 0 | 183.8 | 86.3 | 481 |

Line 4 Waste Gas Stack (SV118)

| | 030-04-0 TOTAL TONS TO 031 AL601152 | 037-04-1 REJECT TONS AI604048 | 000-04-0 WOOD FLOW AI617Q03 | 252-04-1 KILN BURNER LINE GAS AC604017 | 242-04-1 PH BURNER GAS FLOW AI604024 | 242-04-1 TOT GRN BALL TO GRATE AL601150 |
|--------------------|---|-------------------------------------|-----------------------------------|--|---|--|
| 29-Apr-20 12:39:00 | 539 | 64 | 0 | 183.8 | 86.2 | 476 |
| 29-Apr-20 12:40:00 | 537 | 65 | 0 | 183.9 | 87.3 | 475 |
| 29-Apr-20 12:41:00 | 543 | 64 | 0 | 184.0 | 87.4 | 478 |
| 29-Apr-20 12:42:00 | 540 | 64 | 0 | 184.0 | 87.3 | 477 |
| 29-Apr-20 12:43:00 | 545 | 65 | 0 | 184.1 | 86.7 | 479 |
| 29-Apr-20 12:44:00 | 540 | 65 | 0 | 184.2 | 87.7 | 475 |
| 29-Apr-20 12:45:00 | 551 | 64 | 0 | 184.2 | 85.9 | 483 |
| 29-Apr-20 12:46:00 | 549 | 64 | 0 | 184.3 | 87.4 | 488 |
| 29-Apr-20 12:47:00 | 542 | 65 | 0 | 184.3 | 87.2 | 483 |
| 29-Apr-20 12:48:00 | 543 | 65 | 0 | 184.2 | 86.6 | 476 |
| 29-Apr-20 12:49:00 | 541 | 66 | 0 | 184.1 | 86.8 | 474 |
| 29-Apr-20 12:50:00 | 542 | 64 | 0 | 183.9 | 87.2 | 477 |
| 29-Apr-20 12:51:00 | 551 | 63 | 0 | 179.6 | 87.2 | 489 |
| 29-Apr-20 12:52:00 | 550 | 65 | 0 | 179.1 | 87.2 | 481 |
| 29-Apr-20 12:53:00 | 549 | 65 | 0 | 179.5 | 86.8 | 485 |
| 29-Apr-20 12:54:00 | 556 | 64 | 0 | 180.5 | 87.1 | 493 |
| 29-Apr-20 12:55:00 | 555 | 64 | 0 | 181.6 | 87.4 | 496 |
| 29-Apr-20 12:56:00 | 550 | 64 | 0 | 182.3 | 86.4 | 483 |
| 29-Apr-20 12:57:00 | 547 | 65 | 0 | 182.7 | 86.1 | 480 |
| 29-Apr-20 12:58:00 | 541 | 63 | 0 | 185.2 | 86.8 | 480 |
| 29-Apr-20 12:59:00 | 545 | 62 | 0 | 183.6 | 86.5 | 483 |
| 29-Apr-20 13:00:00 | 548 | 62 | 0 | 180.4 | 86.5 | 487 |
| 29-Apr-20 13:01:00 | 547 | 63 | 0 | 183.5 | 86.9 | 488 |
| 29-Apr-20 13:02:00 | 543 | 62 | 0 | 185.4 | 87.5 | 482 |
| 29-Apr-20 13:03:00 | 543 | 63 | 0 | 184.6 | 87.1 | 485 |
| 29-Apr-20 13:04:00 | 541 | 61 | 0 | 183.9 | 86.6 | 477 |
| 29-Apr-20 13:05:00 | 547 | 62 | 0 | 183.1 | 86.1 | 484 |
| 29-Apr-20 13:06:00 | 555 | 61 | 0 | 182.4 | 86.5 | 491 |
| 29-Apr-20 13:07:00 | 561 | 62 | 0 | 183.1 | 86.2 | 496 |
| 29-Apr-20 13:08:00 | 550 | 63 | 0 | 183.7 | 86.0 | 486 |
| 29-Apr-20 13:09:00 | 549 | 63 | 0 | 184.8 | 86.4 | 485 |
| 29-Apr-20 13:10:00 | 548 | 62 | 0 | 187.6 | 86.0 | 487 |
| 29-Apr-20 13:11:00 | 545 | 61 | 0 | 188.0 | 86.9 | 483 |
| 29-Apr-20 13:12:00 | 551 | 60 | 0 | 187.8 | 87.1 | 491 |
| 29-Apr-20 13:13:00 | 545 | 61 | 0 | 187.6 | 86.0 | 487 |
| 29-Apr-20 13:14:00 | 549 | 62 | 0 | 187.4 | 86.8 | 486 |
| 29-Apr-20 13:15:00 | 552 | 61 | 0 | 187.1 | 87.0 | 487 |
| 29-Apr-20 13:16:00 | 540 | 61 | 0 | 187.0 | 86.5 | 481 |
| 29-Apr-20 13:17:00 | 545 | 60 | 0 | 187.1 | 86.9 | 484 |
| 29-Apr-20 13:18:00 | 541 | 60 | 0 | 187.1 | 86.4 | 483 |
| 29-Apr-20 13:19:00 | 548 | 59 | 0 | 187.2 | 86.2 | 489 |
| 29-Apr-20 13:20:00 | 543 | 59 | 0 | 187.3 | 86.8 | 480 |
| 29-Apr-20 13:21:00 | 549 | 61 | 0 | 188.3 | 87.2 | 488 |
| 29-Apr-20 13:22:00 | 547 | 61 | 0 | 188.3 | 86.6 | 487 |
| 29-Apr-20 13:23:00 | 549 | 60 | 0 | 188.3 | 86.3 | 485 |
| 29-Apr-20 13:24:00 | 544 | 60 | 0 | 188.2 | 87.0 | 488 |
| 29-Apr-20 13:25:00 | 576 | 60 | 0 | 188.3 | 85.3 | 512 |
| 29-Apr-20 13:26:00 | 541 | 62 | 0 | 188.4 | 86.2 | 483 |
| 29-Apr-20 13:27:00 | 549 | 62 | 0 | 190.6 | 86.6 | 488 |
| 29-Apr-20 13:28:00 | 539 | 61 | 0 | 192.7 | 86.1 | 478 |
| 29-Apr-20 13:29:00 | 544 | 61 | 0 | 190.5 | 86.4 | 486 |
| 29-Apr-20 13:30:00 | 543 | 60 | 0 | 190.1 | 86.8 | 485 |
| 29-Apr-20 13:31:00 | 549 | 60 | 0 | 193.6 | 85.5 | 488 |
| 29-Apr-20 13:32:00 | 549 | 60 | 0 | 195.0 | 86.8 | 492 |
| 29-Apr-20 13:33:00 | 548 | 61 | 0 | 193.4 | 86.2 | 486 |
| 29-Apr-20 13:34:00 | 548 | 60 | 0 | 193.0 | 85.8 | 488 |
| 29-Apr-20 13:35:00 | 550 | 61 | 0 | 193.7 | 86.1 | 489 |
| 29-Apr-20 13:36:00 | 537 | 61 | 0 | 193.5 | 85.9 | 479 |

Line 4 Waste Gas Stack (SV118)

| | 030-04-0 TOTAL TONS TO 031 AL601152 | 037-04-1 REJECT TONS AI604048 | 000-04-0 WOOD FLOW AI617Q03 | 252-04-1 KILN BURNER LINE GAS AC604017 | 242-04-1 PH BURNER GAS FLOW AI604024 | 242-04-1 TOT GRN BALL TO GRATE AL601150 |
|--------------------|---|-------------------------------------|-----------------------------------|--|---|--|
| 29-Apr-20 13:37:00 | 545 | 61 | 0 | 193.2 | 86.4 | 483 |
| 29-Apr-20 13:38:00 | 542 | 61 | 0 | 193.6 | 85.9 | 483 |
| 29-Apr-20 13:39:00 | 549 | 61 | 0 | 194.0 | 85.7 | 488 |
| 29-Apr-20 13:40:00 | 547 | 61 | 0 | 194.3 | 85.6 | 482 |
| 29-Apr-20 13:41:00 | 536 | 61 | 0 | 197.4 | 85.9 | 478 |
| 29-Apr-20 13:42:00 | 546 | 61 | 0 | 197.3 | 86.2 | 484 |
| 29-Apr-20 13:43:00 | 556 | 60 | 0 | 196.9 | 85.6 | 494 |
| 29-Apr-20 13:44:00 | 547 | 60 | 0 | 195.9 | 85.7 | 488 |
| 29-Apr-20 13:45:00 | 540 | 62 | 0 | 194.8 | 86.0 | 480 |
| 29-Apr-20 13:46:00 | 539 | 60 | 0 | 195.8 | 85.6 | 483 |
| 29-Apr-20 13:47:00 | 546 | 59 | 0 | 196.9 | 85.9 | 490 |
| 29-Apr-20 13:48:00 | 528 | 60 | 0 | 196.8 | 86.6 | 472 |
| 29-Apr-20 13:49:00 | 535 | 60 | 0 | 196.7 | 85.7 | 474 |
| 29-Apr-20 13:50:00 | 547 | 58 | 0 | 196.6 | 86.7 | 487 |
| 29-Apr-20 13:51:00 | 550 | 59 | 0 | 199.0 | 85.5 | 491 |
| 29-Apr-20 13:52:00 | 548 | 60 | 0 | 200.2 | 86.7 | 489 |
| 29-Apr-20 13:53:00 | 541 | 60 | 0 | 199.4 | 86.7 | 482 |
| 29-Apr-20 13:54:00 | 538 | 60 | 0 | 199.0 | 86.4 | 478 |
| 29-Apr-20 13:55:00 | 556 | 59 | 0 | 199.2 | 86.3 | 496 |
| 29-Apr-20 13:56:00 | 546 | 60 | 0 | 199.4 | 86.6 | 486 |
| 29-Apr-20 13:57:00 | 545 | 61 | 0 | 199.6 | 86.7 | 479 |
| 29-Apr-20 13:58:00 | 543 | 60 | 0 | 200.2 | 85.7 | 483 |
| 29-Apr-20 13:59:00 | 548 | 60 | 0 | 201.3 | 86.5 | 490 |
| 29-Apr-20 14:00:00 | 552 | 60 | 0 | 202.5 | 86.6 | 486 |
| 29-Apr-20 14:01:00 | 538 | 61 | 0 | 206.9 | 86.2 | 479 |
| 29-Apr-20 14:02:00 | 544 | 61 | 0 | 206.6 | 86.7 | 483 |
| 29-Apr-20 14:03:00 | 545 | 61 | 0 | 204.8 | 86.3 | 480 |
| 29-Apr-20 14:04:00 | 546 | 60 | 0 | 203.4 | 85.7 | 487 |
| 29-Apr-20 14:05:00 | 536 | 59 | 0 | 203.3 | 85.8 | 482 |
| 29-Apr-20 14:06:00 | 540 | 61 | 0 | 203.3 | 86.0 | 477 |
| 29-Apr-20 14:07:00 | 544 | 61 | 0 | 203.2 | 86.4 | 485 |
| 29-Apr-20 14:08:00 | 540 | 61 | 0 | 203.2 | 86.7 | 478 |
| 29-Apr-20 14:09:00 | 545 | 62 | 0 | 203.2 | 85.6 | 482 |
| 29-Apr-20 14:10:00 | 541 | 61 | 0 | 203.1 | 86.0 | 484 |
| 29-Apr-20 14:11:00 | 539 | 60 | 0 | 203.4 | 86.8 | 480 |
| 29-Apr-20 14:12:00 | 546 | 60 | 0 | 204.0 | 85.8 | 488 |
| 29-Apr-20 14:13:00 | 545 | 61 | 0 | 204.2 | 86.7 | 489 |
| 29-Apr-20 14:14:00 | 539 | 61 | 0 | 204.4 | 86.1 | 479 |
| 29-Apr-20 14:15:00 | 543 | 61 | 0 | 204.6 | 87.3 | 477 |
| 29-Apr-20 14:16:00 | 542 | 60 | 0 | 205.2 | 87.6 | 485 |
| 29-Apr-20 14:17:00 | 540 | 61 | 0 | 205.3 | 86.6 | 477 |
| 29-Apr-20 14:18:00 | 545 | 61 | 0 | 203.7 | 86.1 | 480 |
| 29-Apr-20 14:19:00 | 545 | 61 | 0 | 204.0 | 87.1 | 487 |
| 29-Apr-20 14:20:00 | 554 | 61 | 0 | 200.6 | 86.5 | 492 |
| 29-Apr-20 14:21:00 | 548 | 61 | 0 | 200.6 | 86.6 | 486 |
| 29-Apr-20 14:22:00 | 546 | 62 | 0 | 200.9 | 86.9 | 482 |
| 29-Apr-20 14:23:00 | 548 | 63 | 0 | 201.3 | 85.8 | 483 |
| 29-Apr-20 14:24:00 | 546 | 64 | 0 | 201.8 | 86.3 | 483 |
| 29-Apr-20 14:25:00 | 545 | 63 | 0 | 202.3 | 85.8 | 485 |
| 29-Apr-20 14:26:00 | 532 | 62 | 0 | 202.6 | 86.0 | 472 |
| 29-Apr-20 14:27:00 | 543 | 62 | 0 | 203.4 | 86.3 | 479 |
| 29-Apr-20 14:28:00 | 546 | 60 | 0 | 202.4 | 86.1 | 489 |
| 29-Apr-20 14:29:00 | 552 | 61 | 0 | 201.2 | 86.4 | 488 |
| 29-Apr-20 14:30:00 | 543 | 62 | 0 | 198.2 | 85.9 | 479 |
| 29-Apr-20 14:31:00 | 543 | 62 | 0 | 198.1 | 86.6 | 486 |
| 29-Apr-20 14:32:00 | 538 | 61 | 0 | 198.3 | 86.2 | 479 |
| 29-Apr-20 14:33:00 | 540 | 60 | 0 | 198.6 | 86.0 | 477 |
| 29-Apr-20 14:34:00 | 545 | 60 | 0 | 198.8 | 86.2 | 487 |

Line 4 Waste Gas Stack (SV118)

| | 030-04-0 TOTAL TONS TO 031 AL601152 | 037-04-1 REJECT TONS AI604048 | 000-04-0 WOOD FLOW AI617Q03 | 252-04-1 KILN BURNER LINE GAS AC604017 | 242-04-1 PH BURNER GAS FLOW AI604024 | 242-04-1 TOT GRN BALL TO GRATE AL601150 |
|--------------------|---|-------------------------------------|-----------------------------------|--|---|--|
| 29-Apr-20 14:35:00 | 542 | 60 | 0 | 198.9 | 86.8 | 480 |
| 29-Apr-20 14:36:00 | 547 | 60 | 0 | 198.9 | 87.0 | 482 |
| 29-Apr-20 14:37:00 | 539 | 59 | 0 | 197.7 | 87.1 | 482 |
| 29-Apr-20 14:38:00 | 542 | 59 | 0 | 197.6 | 85.7 | 484 |
| 29-Apr-20 14:39:00 | 542 | 59 | 0 | 197.4 | 86.8 | 479 |
| 29-Apr-20 14:40:00 | 549 | 60 | 0 | 197.3 | 87.3 | 487 |
| 29-Apr-20 14:41:00 | 542 | 59 | 0 | 196.7 | 86.9 | 483 |
| 29-Apr-20 14:42:00 | 550 | 60 | 0 | 195.6 | 87.2 | 484 |
| 29-Apr-20 14:43:00 | 546 | 60 | 0 | 196.3 | 86.2 | 486 |
| 29-Apr-20 14:44:00 | 538 | 60 | 0 | 197.1 | 85.6 | 485 |
| 29-Apr-20 14:45:00 | 538 | 60 | 0 | 197.1 | 86.1 | 478 |
| 29-Apr-20 14:46:00 | 552 | 60 | 0 | 197.3 | 86.1 | 489 |
| 29-Apr-20 14:47:00 | 549 | 60 | 0 | 197.4 | 86.0 | 490 |
| 29-Apr-20 14:48:00 | 548 | 60 | 0 | 197.5 | 86.9 | 487 |
| 29-Apr-20 14:49:00 | 546 | 61 | 0 | 196.4 | 86.3 | 484 |
| 29-Apr-20 14:50:00 | 548 | 61 | 0 | 196.4 | 86.9 | 490 |

Air Performance Test Form

Operating Data Summary for Process Sources

Facility Information (please print)

Company Name: U.S. Steel Corporation

Equipment ID No: SV144

Test date(s): 04/30/20

Equipment and Operating Data

- Process Equipment Description: Line 6 Waste Gas Stack
- Were the process and control equipment operated consistent with normal procedures? ☒ Yes ☐ No If no, explain: _____
- Include copy of production records or instrumentation which indicates rate of production or operation of the equipment, i.e. units per hour, pounds per hour, pressure, air flow, etc.
- Date(s) and procedure(s) of last maintenance/cleaning within 6 months:
☒ Remains unchanged from info. provided in test plan
- Process rate (amount of raw material or finished product per hour, wet or dry basis) while combusting (list fuel type(s) and ratios as appropriate) _____

| Process Parameter: list type and units | Run 1 | Run 2 | Run 3 | Run 4 | Average |
|--|-------|-------|-------|-------|---------|
| Greenball Feed Rate, LTPH | 519 | 519 | 519 | | 519 |
| Fired Pellet Production, LTPH | 392 | 395 | 396 | | 394 |
| Fuel Input Gas to grate, MBTUH | 87 | 87 | 87 | | 87 |
| Fuel Input Gas to Kiln, MBTUH | 170 | 175 | 169 | | 171 |
| Heat Input (MBTUH Total) | 257 | 262 | 256 | | 258 |

- Summarize control equipment operating data documented during testing. Values reported should reflect maximum, minimum, averages, or as approved in the test plan. (See test plan and approval letter)

Examples of APC equipment and parameters generally monitored. Monitor as in test plan and/or approval letter.

- Scrubber (list type of scrubber): DP (in. w.c.) and feed rate (gpm and psig)
- Baghouse, Cyclone, and Multi-clone: DP (in. w.c.)
- Catalytic Incinerator :($^{\circ}\text{F}_{\text{in}}$, $^{\circ}\text{F}_{\text{out}}$) and Thermal Incinerator: ($^{\circ}\text{F}_{\text{temperature}}$)
- ESP: Number and identity of operating field(s)

| APC and parameter monitored | Run 1 | Run 2 | Run 3 | Run 4 | Average |
|--|-------|-------|-------|-------|---------|
| NA | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| List pollutant & averaging basis.--should reflect permit | Run 1 | Run 2 | Run 3 | Run 4 | Average |
| Continuous Opacity Monitor(list hourly average) | | | | | |
| Monitor (list averaging basis): | | | | | |
| Monitor (list averaging basis): | | | | | |

Abbreviations: APC=air pollution control
lbs.-pounds

gpm.=gallons per minute
psig=pressure per square inch gauge

in. w.c.=inches of water column
 ΔP =pressure drop

Note: This form provides only a summary of the operating conditions during the performance test. Additional and more detailed records are required to meet the requirements of Minn. R. 7017.2035, subp. 3. This form is to be submitted as part of the performance test report

Line 6 Waste Gas Stack (SV144)

| Run # | Run Time | Average | Average | Average | Average |
|-------|-----------|---------|---------|---------|---------|
| 1 | 0744-0950 | 519 | 68 | 169.9 | 87.3 |
| 2 | 1002-1209 | 519 | 65 | 174.7 | 87.1 |
| 3 | 1221-1429 | 519 | 64 | 169.0 | 87.1 |

| | 030-06 GREEN BALL TOTAL AL811100 | 037-06-2 REJECT SCALE LINE-6 AI811005 | 252-06-1 Kiln Gas MMBTU/HR AC811200 | 242-06-2 PH Gas MMBTU/HR AC811201 |
|--------------------|--|---|---|---|
| 30-Apr-20 07:40:00 | 521 | 69 | 168.4 | 88.6 |
| 30-Apr-20 07:41:00 | 525 | 68 | 165.3 | 88.5 |
| 30-Apr-20 07:42:00 | 516 | 68 | 166.8 | 87.8 |
| 30-Apr-20 07:43:00 | 517 | 70 | 166.1 | 86.9 |
| 30-Apr-20 07:44:00 | 520 | 68 | 167.3 | 87.5 |
| 30-Apr-20 07:45:00 | 521 | 74 | 168.3 | 87.3 |
| 30-Apr-20 07:46:00 | 524 | 74 | 169.4 | 86.9 |
| 30-Apr-20 07:47:00 | 514 | 71 | 169.6 | 86.3 |
| 30-Apr-20 07:48:00 | 521 | 71 | 167.1 | 87.3 |
| 30-Apr-20 07:49:00 | 521 | 70 | 170.2 | 87.3 |
| 30-Apr-20 07:50:00 | 516 | 71 | 169.5 | 87.7 |
| 30-Apr-20 07:51:00 | 522 | 70 | 169.7 | 87.2 |
| 30-Apr-20 07:52:00 | 521 | 71 | 169.7 | 88.0 |
| 30-Apr-20 07:53:00 | 524 | 69 | 169.3 | 87.8 |
| 30-Apr-20 07:54:00 | 524 | 70 | 170.6 | 88.1 |
| 30-Apr-20 07:55:00 | 524 | 68 | 168.9 | 88.2 |
| 30-Apr-20 07:56:00 | 525 | 72 | 170.4 | 89.2 |
| 30-Apr-20 07:57:00 | 521 | 71 | 171.5 | 88.2 |
| 30-Apr-20 07:58:00 | 513 | 74 | 170.1 | 87.2 |
| 30-Apr-20 07:59:00 | 512 | 69 | 169.4 | 86.1 |
| 30-Apr-20 08:00:00 | 510 | 71 | 170.5 | 84.8 |
| 30-Apr-20 08:01:00 | 507 | 67 | 171.2 | 84.5 |
| 30-Apr-20 08:02:00 | 511 | 66 | 168.4 | 84.6 |
| 30-Apr-20 08:03:00 | 514 | 66 | 169.1 | 85.6 |
| 30-Apr-20 08:04:00 | 514 | 68 | 170.9 | 85.6 |
| 30-Apr-20 08:05:00 | 516 | 71 | 170.5 | 87.5 |
| 30-Apr-20 08:06:00 | 521 | 71 | 171.5 | 87.0 |
| 30-Apr-20 08:07:00 | 522 | 69 | 170.0 | 87.2 |
| 30-Apr-20 08:08:00 | 520 | 69 | 169.2 | 87.4 |
| 30-Apr-20 08:09:00 | 520 | 67 | 168.5 | 88.5 |
| 30-Apr-20 08:10:00 | 515 | 67 | 170.2 | 87.9 |
| 30-Apr-20 08:11:00 | 516 | 66 | 169.9 | 86.4 |
| 30-Apr-20 08:12:00 | 513 | 66 | 170.4 | 86.1 |
| 30-Apr-20 08:13:00 | 514 | 71 | 170.6 | 85.2 |
| 30-Apr-20 08:14:00 | 520 | 70 | 169.3 | 86.7 |
| 30-Apr-20 08:15:00 | 522 | 70 | 169.8 | 87.0 |
| 30-Apr-20 08:16:00 | 521 | 68 | 169.7 | 87.4 |
| 30-Apr-20 08:17:00 | 520 | 68 | 169.7 | 87.6 |
| 30-Apr-20 08:18:00 | 525 | 68 | 172.0 | 88.6 |
| 30-Apr-20 08:19:00 | 525 | 69 | 170.5 | 88.5 |

Line 6 Waste Gas Stack (SV144)

| | 030-06 GREEN BALL TOTAL AL811100 | 037-06-2 REJECT SCALE LINE-6 AI811005 | 252-06-1 Kiln Gas MMBTU/HR AC811200 | 242-06-2 PH Gas MMBTU/HR AC811201 |
|--------------------|--|---|---|---|
| 30-Apr-20 08:20:00 | 524 | 68 | 168.4 | 88.2 |
| 30-Apr-20 08:21:00 | 513 | 67 | 168.7 | 88.3 |
| 30-Apr-20 08:22:00 | 520 | 69 | 169.0 | 86.8 |
| 30-Apr-20 08:23:00 | 521 | 67 | 170.7 | 86.5 |
| 30-Apr-20 08:24:00 | 515 | 65 | 170.2 | 86.4 |
| 30-Apr-20 08:25:00 | 520 | 68 | 171.6 | 86.5 |
| 30-Apr-20 08:26:00 | 514 | 67 | 168.2 | 86.4 |
| 30-Apr-20 08:27:00 | 516 | 67 | 168.9 | 86.0 |
| 30-Apr-20 08:28:00 | 513 | 65 | 169.4 | 85.9 |
| 30-Apr-20 08:29:00 | 517 | 65 | 170.7 | 86.7 |
| 30-Apr-20 08:30:00 | 514 | 66 | 169.9 | 86.5 |
| 30-Apr-20 08:31:00 | 520 | 67 | 169.0 | 87.1 |
| 30-Apr-20 08:32:00 | 518 | 65 | 168.7 | 86.9 |
| 30-Apr-20 08:33:00 | 518 | 66 | 170.1 | 87.4 |
| 30-Apr-20 08:34:00 | 518 | 65 | 170.0 | 87.8 |
| 30-Apr-20 08:35:00 | 522 | 65 | 170.2 | 87.4 |
| 30-Apr-20 08:36:00 | 516 | 69 | 170.5 | 88.1 |
| 30-Apr-20 08:37:00 | 516 | 68 | 168.2 | 86.8 |
| 30-Apr-20 08:38:00 | 514 | 65 | 169.4 | 87.0 |
| 30-Apr-20 08:39:00 | 514 | 65 | 168.6 | 86.5 |
| 30-Apr-20 08:40:00 | 516 | 68 | 170.4 | 86.6 |
| 30-Apr-20 08:41:00 | 521 | 68 | 171.8 | 86.5 |
| 30-Apr-20 08:42:00 | 523 | 66 | 170.2 | 87.8 |
| 30-Apr-20 08:43:00 | 520 | 67 | 171.0 | 86.1 |
| 30-Apr-20 08:44:00 | 522 | 68 | 168.7 | 87.6 |
| 30-Apr-20 08:45:00 | 522 | 68 | 168.9 | 87.9 |
| 30-Apr-20 08:46:00 | 529 | 69 | 169.9 | 88.1 |
| 30-Apr-20 08:47:00 | 519 | 68 | 171.4 | 88.4 |
| 30-Apr-20 08:48:00 | 520 | 65 | 171.4 | 88.3 |
| 30-Apr-20 08:49:00 | 514 | 68 | 169.2 | 88.1 |
| 30-Apr-20 08:50:00 | 515 | 66 | 168.5 | 88.1 |
| 30-Apr-20 08:51:00 | 509 | 65 | 167.8 | 87.2 |
| 30-Apr-20 08:52:00 | 517 | 64 | 170.7 | 85.6 |
| 30-Apr-20 08:53:00 | 521 | 66 | 169.8 | 87.3 |
| 30-Apr-20 08:54:00 | 527 | 66 | 167.9 | 88.0 |
| 30-Apr-20 08:55:00 | 526 | 65 | 170.3 | 88.1 |
| 30-Apr-20 08:56:00 | 522 | 66 | 169.5 | 89.3 |
| 30-Apr-20 08:57:00 | 521 | 66 | 167.2 | 89.0 |
| 30-Apr-20 08:58:00 | 522 | 66 | 168.8 | 87.9 |
| 30-Apr-20 08:59:00 | 525 | 67 | 169.5 | 89.2 |
| 30-Apr-20 09:00:00 | 519 | 70 | 168.7 | 88.0 |
| 30-Apr-20 09:01:00 | 517 | 67 | 169.8 | 89.3 |
| 30-Apr-20 09:02:00 | 514 | 68 | 168.3 | 86.4 |
| 30-Apr-20 09:03:00 | 513 | 68 | 168.5 | 87.0 |
| 30-Apr-20 09:04:00 | 506 | 70 | 167.0 | 85.6 |
| 30-Apr-20 09:05:00 | 509 | 67 | 169.0 | 84.4 |
| 30-Apr-20 09:06:00 | 518 | 64 | 169.6 | 84.7 |

Line 6 Waste Gas Stack (SV144)

| | 030-06 GREEN BALL TOTAL AL811100 | 037-06-2 REJECT SCALE LINE-6 AI811005 | 252-06-1 Kiln Gas MMBTU/HR AC811200 | 242-06-2 PH Gas MMBTU/HR AC811201 |
|--------------------|--|---|---|---|
| 30-Apr-20 09:07:00 | 524 | 65 | 169.3 | 87.2 |
| 30-Apr-20 09:08:00 | 522 | 67 | 168.9 | 87.2 |
| 30-Apr-20 09:09:00 | 524 | 74 | 169.7 | 88.0 |
| 30-Apr-20 09:10:00 | 523 | 71 | 170.0 | 88.4 |
| 30-Apr-20 09:11:00 | 518 | 67 | 168.9 | 87.1 |
| 30-Apr-20 09:12:00 | 512 | 68 | 168.0 | 86.8 |
| 30-Apr-20 09:13:00 | 524 | 67 | 168.8 | 87.2 |
| 30-Apr-20 09:14:00 | 518 | 67 | 168.9 | 87.5 |
| 30-Apr-20 09:15:00 | 521 | 67 | 169.9 | 88.3 |
| 30-Apr-20 09:16:00 | 521 | 70 | 168.3 | 88.7 |
| 30-Apr-20 09:17:00 | 525 | 68 | 169.1 | 87.9 |
| 30-Apr-20 09:18:00 | 519 | 72 | 168.8 | 87.1 |
| 30-Apr-20 09:19:00 | 520 | 70 | 170.4 | 87.8 |
| 30-Apr-20 09:20:00 | 523 | 69 | 171.2 | 88.3 |
| 30-Apr-20 09:21:00 | 524 | 70 | 170.8 | 87.3 |
| 30-Apr-20 09:22:00 | 522 | 69 | 171.1 | 86.9 |
| 30-Apr-20 09:23:00 | 523 | 73 | 171.1 | 87.9 |
| 30-Apr-20 09:24:00 | 516 | 73 | 171.8 | 87.3 |
| 30-Apr-20 09:25:00 | 518 | 74 | 172.7 | 87.5 |
| 30-Apr-20 09:26:00 | 516 | 74 | 170.4 | 87.8 |
| 30-Apr-20 09:27:00 | 511 | 67 | 172.1 | 86.4 |
| 30-Apr-20 09:28:00 | 512 | 70 | 171.6 | 87.1 |
| 30-Apr-20 09:29:00 | 514 | 68 | 173.2 | 85.2 |
| 30-Apr-20 09:30:00 | 518 | 67 | 172.1 | 86.7 |
| 30-Apr-20 09:31:00 | 518 | 66 | 172.6 | 86.2 |
| 30-Apr-20 09:32:00 | 521 | 67 | 170.9 | 87.2 |
| 30-Apr-20 09:33:00 | 527 | 69 | 173.8 | 87.6 |
| 30-Apr-20 09:34:00 | 524 | 71 | 170.8 | 88.6 |
| 30-Apr-20 09:35:00 | 514 | 69 | 172.6 | 88.8 |
| 30-Apr-20 09:36:00 | 518 | 68 | 173.2 | 88.1 |
| 30-Apr-20 09:37:00 | 518 | 68 | 174.0 | 88.1 |
| 30-Apr-20 09:38:00 | 517 | 69 | 170.6 | 87.8 |
| 30-Apr-20 09:39:00 | 518 | 68 | 172.0 | 87.6 |
| 30-Apr-20 09:40:00 | 519 | 67 | 170.8 | 88.5 |
| 30-Apr-20 09:41:00 | 520 | 66 | 170.7 | 88.6 |
| 30-Apr-20 09:42:00 | 520 | 66 | 170.6 | 88.3 |
| 30-Apr-20 09:43:00 | 521 | 69 | 170.4 | 88.1 |
| 30-Apr-20 09:44:00 | 524 | 74 | 169.8 | 88.4 |
| 30-Apr-20 09:45:00 | 516 | 66 | 168.9 | 88.4 |
| 30-Apr-20 09:46:00 | 512 | 67 | 170.4 | 86.8 |
| 30-Apr-20 09:47:00 | 520 | 67 | 168.9 | 86.9 |
| 30-Apr-20 09:48:00 | 517 | 66 | 168.2 | 86.4 |
| 30-Apr-20 09:49:00 | 519 | 66 | 170.5 | 85.8 |
| 30-Apr-20 09:50:00 | 522 | 67 | 169.1 | 86.5 |
| 30-Apr-20 09:51:00 | 523 | 65 | 168.5 | 87.4 |
| 30-Apr-20 09:52:00 | 522 | 66 | 168.9 | 87.3 |
| 30-Apr-20 09:53:00 | 520 | 68 | 168.1 | 88.4 |

Line 6 Waste Gas Stack (SV144)

| | 030-06 GREEN BALL TOTAL AL811100 | 037-06-2 REJECT SCALE LINE-6 AI811005 | 252-06-1 Kiln Gas MMBTU/HR AC811200 | 242-06-2 PH Gas MMBTU/HR AC811201 |
|--------------------|--|---|---|---|
| 30-Apr-20 09:54:00 | 514 | 67 | 168.5 | 87.6 |
| 30-Apr-20 09:55:00 | 516 | 67 | 169.3 | 86.1 |
| 30-Apr-20 09:56:00 | 516 | 64 | 168.2 | 86.8 |
| 30-Apr-20 09:57:00 | 514 | 65 | 168.3 | 85.3 |
| 30-Apr-20 09:58:00 | 513 | 67 | 170.5 | 86.7 |
| 30-Apr-20 09:59:00 | 520 | 65 | 170.2 | 87.7 |
| 30-Apr-20 10:00:00 | 521 | 65 | 168.1 | 86.9 |
| 30-Apr-20 10:01:00 | 515 | 64 | 169.1 | 86.5 |
| 30-Apr-20 10:02:00 | 523 | 65 | 171.6 | 86.7 |
| 30-Apr-20 10:03:00 | 516 | 65 | 171.3 | 87.4 |
| 30-Apr-20 10:04:00 | 516 | 66 | 170.4 | 87.0 |
| 30-Apr-20 10:05:00 | 514 | 67 | 172.3 | 87.2 |
| 30-Apr-20 10:06:00 | 518 | 66 | 170.7 | 86.3 |
| 30-Apr-20 10:07:00 | 524 | 66 | 173.1 | 87.1 |
| 30-Apr-20 10:08:00 | 522 | 66 | 173.1 | 87.2 |
| 30-Apr-20 10:09:00 | 518 | 66 | 173.2 | 88.2 |
| 30-Apr-20 10:10:00 | 523 | 68 | 171.0 | 87.6 |
| 30-Apr-20 10:11:00 | 523 | 65 | 172.0 | 88.4 |
| 30-Apr-20 10:12:00 | 522 | 65 | 171.9 | 87.5 |
| 30-Apr-20 10:13:00 | 517 | 71 | 172.3 | 88.7 |
| 30-Apr-20 10:14:00 | 517 | 67 | 173.7 | 88.4 |
| 30-Apr-20 10:15:00 | 522 | 67 | 173.2 | 89.4 |
| 30-Apr-20 10:16:00 | 519 | 67 | 173.0 | 87.9 |
| 30-Apr-20 10:17:00 | 520 | 65 | 174.5 | 87.7 |
| 30-Apr-20 10:18:00 | 524 | 64 | 175.7 | 88.3 |
| 30-Apr-20 10:19:00 | 523 | 64 | 174.7 | 87.7 |
| 30-Apr-20 10:20:00 | 524 | 64 | 175.8 | 88.6 |
| 30-Apr-20 10:21:00 | 526 | 66 | 175.6 | 87.8 |
| 30-Apr-20 10:22:00 | 523 | 65 | 175.4 | 88.3 |
| 30-Apr-20 10:23:00 | 517 | 67 | 175.4 | 87.7 |
| 30-Apr-20 10:24:00 | 512 | 69 | 177.4 | 87.2 |
| 30-Apr-20 10:25:00 | 525 | 68 | 176.4 | 86.3 |
| 30-Apr-20 10:26:00 | 521 | 66 | 177.6 | 87.3 |
| 30-Apr-20 10:27:00 | 522 | 64 | 175.5 | 88.4 |
| 30-Apr-20 10:28:00 | 521 | 66 | 176.6 | 87.9 |
| 30-Apr-20 10:29:00 | 522 | 65 | 176.3 | 87.1 |
| 30-Apr-20 10:30:00 | 521 | 65 | 177.9 | 87.2 |
| 30-Apr-20 10:31:00 | 518 | 64 | 176.8 | 87.2 |
| 30-Apr-20 10:32:00 | 513 | 66 | 178.9 | 86.8 |
| 30-Apr-20 10:33:00 | 516 | 65 | 177.3 | 85.7 |
| 30-Apr-20 10:34:00 | 521 | 65 | 176.9 | 86.4 |
| 30-Apr-20 10:35:00 | 520 | 65 | 177.1 | 85.6 |
| 30-Apr-20 10:36:00 | 513 | 65 | 177.4 | 86.8 |
| 30-Apr-20 10:37:00 | 516 | 68 | 179.6 | 86.5 |
| 30-Apr-20 10:38:00 | 514 | 65 | 178.4 | 86.2 |
| 30-Apr-20 10:39:00 | 518 | 66 | 179.8 | 86.8 |
| 30-Apr-20 10:40:00 | 516 | 65 | 178.5 | 86.3 |

Line 6 Waste Gas Stack (SV144)

| | 030-06 GREEN BALL TOTAL AL811100 | 037-06-2 REJECT SCALE LINE-6 AI811005 | 252-06-1 Kiln Gas MMBTU/HR AC811200 | 242-06-2 PH Gas MMBTU/HR AC811201 |
|--------------------|--|---|---|---|
| 30-Apr-20 10:41:00 | 520 | 66 | 179.1 | 86.2 |
| 30-Apr-20 10:42:00 | 528 | 67 | 178.1 | 87.6 |
| 30-Apr-20 10:43:00 | 526 | 68 | 176.8 | 89.2 |
| 30-Apr-20 10:44:00 | 522 | 67 | 177.9 | 88.6 |
| 30-Apr-20 10:45:00 | 522 | 70 | 177.5 | 88.8 |
| 30-Apr-20 10:46:00 | 524 | 66 | 178.7 | 88.4 |
| 30-Apr-20 10:47:00 | 521 | 65 | 177.3 | 87.2 |
| 30-Apr-20 10:48:00 | 515 | 69 | 177.5 | 86.2 |
| 30-Apr-20 10:49:00 | 516 | 65 | 177.7 | 86.2 |
| 30-Apr-20 10:50:00 | 518 | 64 | 177.9 | 87.3 |
| 30-Apr-20 10:51:00 | 514 | 66 | 178.0 | 87.3 |
| 30-Apr-20 10:52:00 | 515 | 64 | 176.1 | 85.9 |
| 30-Apr-20 10:53:00 | 520 | 66 | 177.4 | 86.4 |
| 30-Apr-20 10:54:00 | 515 | 64 | 179.5 | 86.7 |
| 30-Apr-20 10:55:00 | 518 | 68 | 178.4 | 86.7 |
| 30-Apr-20 10:56:00 | 524 | 64 | 177.3 | 86.5 |
| 30-Apr-20 10:57:00 | 523 | 64 | 176.5 | 88.1 |
| 30-Apr-20 10:58:00 | 523 | 65 | 177.5 | 87.1 |
| 30-Apr-20 10:59:00 | 521 | 65 | 177.3 | 87.7 |
| 30-Apr-20 11:00:00 | 518 | 65 | 176.9 | 87.6 |
| 30-Apr-20 11:01:00 | 524 | 65 | 178.7 | 86.7 |
| 30-Apr-20 11:02:00 | 520 | 64 | 178.1 | 87.1 |
| 30-Apr-20 11:03:00 | 516 | 64 | 177.0 | 86.4 |
| 30-Apr-20 11:04:00 | 517 | 67 | 179.0 | 86.6 |
| 30-Apr-20 11:05:00 | 518 | 65 | 178.7 | 86.2 |
| 30-Apr-20 11:06:00 | 517 | 65 | 176.7 | 86.4 |
| 30-Apr-20 11:07:00 | 513 | 65 | 177.8 | 86.5 |
| 30-Apr-20 11:08:00 | 526 | 65 | 177.0 | 86.7 |
| 30-Apr-20 11:09:00 | 529 | 64 | 178.2 | 87.1 |
| 30-Apr-20 11:10:00 | 528 | 65 | 177.2 | 88.4 |
| 30-Apr-20 11:11:00 | 520 | 64 | 178.3 | 87.5 |
| 30-Apr-20 11:12:00 | 523 | 67 | 179.3 | 88.3 |
| 30-Apr-20 11:13:00 | 520 | 72 | 178.9 | 87.8 |
| 30-Apr-20 11:14:00 | 518 | 68 | 177.6 | 86.9 |
| 30-Apr-20 11:15:00 | 523 | 64 | 178.7 | 87.3 |
| 30-Apr-20 11:16:00 | 526 | 64 | 177.8 | 88.2 |
| 30-Apr-20 11:17:00 | 525 | 64 | 178.2 | 88.5 |
| 30-Apr-20 11:18:00 | 517 | 64 | 178.8 | 87.5 |
| 30-Apr-20 11:19:00 | 516 | 64 | 177.4 | 87.9 |
| 30-Apr-20 11:20:00 | 518 | 63 | 179.3 | 87.2 |
| 30-Apr-20 11:21:00 | 520 | 66 | 176.4 | 88.0 |
| 30-Apr-20 11:22:00 | 524 | 65 | 179.2 | 87.6 |
| 30-Apr-20 11:23:00 | 520 | 64 | 179.5 | 87.6 |
| 30-Apr-20 11:24:00 | 517 | 68 | 179.3 | 87.5 |
| 30-Apr-20 11:25:00 | 515 | 65 | 178.4 | 87.0 |
| 30-Apr-20 11:26:00 | 513 | 63 | 179.5 | 86.5 |
| 30-Apr-20 11:27:00 | 516 | 64 | 179.2 | 85.7 |

Line 6 Waste Gas Stack (SV144)

| | 030-06 GREEN BALL TOTAL AL811100 | 037-06-2 REJECT SCALE LINE-6 AI811005 | 252-06-1 Kiln Gas MMBTU/HR AC811200 | 242-06-2 PH Gas MMBTU/HR AC811201 |
|--------------------|--|---|---|---|
| 30-Apr-20 11:28:00 | 518 | 63 | 178.2 | 85.2 |
| 30-Apr-20 11:29:00 | 520 | 62 | 178.9 | 86.5 |
| 30-Apr-20 11:30:00 | 515 | 63 | 175.9 | 86.6 |
| 30-Apr-20 11:31:00 | 516 | 69 | 177.7 | 87.8 |
| 30-Apr-20 11:32:00 | 517 | 63 | 179.3 | 85.8 |
| 30-Apr-20 11:33:00 | 515 | 66 | 178.3 | 85.8 |
| 30-Apr-20 11:34:00 | 512 | 63 | 177.3 | 86.0 |
| 30-Apr-20 11:35:00 | 522 | 62 | 176.3 | 87.2 |
| 30-Apr-20 11:36:00 | 518 | 62 | 175.3 | 87.2 |
| 30-Apr-20 11:37:00 | 515 | 63 | 174.7 | 86.9 |
| 30-Apr-20 11:38:00 | 516 | 63 | 175.7 | 86.5 |
| 30-Apr-20 11:39:00 | 513 | 64 | 175.2 | 85.7 |
| 30-Apr-20 11:40:00 | 513 | 65 | 174.2 | 85.4 |
| 30-Apr-20 11:41:00 | 513 | 64 | 172.5 | 86.3 |
| 30-Apr-20 11:42:00 | 513 | 63 | 173.8 | 85.2 |
| 30-Apr-20 11:43:00 | 515 | 63 | 173.8 | 85.3 |
| 30-Apr-20 11:44:00 | 511 | 63 | 173.8 | 86.3 |
| 30-Apr-20 11:45:00 | 516 | 65 | 172.0 | 85.2 |
| 30-Apr-20 11:46:00 | 517 | 66 | 171.2 | 85.1 |
| 30-Apr-20 11:47:00 | 523 | 65 | 170.3 | 86.1 |
| 30-Apr-20 11:48:00 | 521 | 64 | 168.1 | 87.1 |
| 30-Apr-20 11:49:00 | 525 | 66 | 170.0 | 87.0 |
| 30-Apr-20 11:50:00 | 528 | 71 | 171.5 | 88.3 |
| 30-Apr-20 11:51:00 | 526 | 67 | 168.9 | 89.8 |
| 30-Apr-20 11:52:00 | 525 | 66 | 166.9 | 88.4 |
| 30-Apr-20 11:53:00 | 524 | 68 | 168.4 | 90.4 |
| 30-Apr-20 11:54:00 | 521 | 67 | 168.2 | 89.1 |
| 30-Apr-20 11:55:00 | 518 | 65 | 167.9 | 88.1 |
| 30-Apr-20 11:56:00 | 517 | 63 | 169.2 | 87.7 |
| 30-Apr-20 11:57:00 | 512 | 63 | 168.5 | 86.7 |
| 30-Apr-20 11:58:00 | 508 | 65 | 166.3 | 84.9 |
| 30-Apr-20 11:59:00 | 512 | 64 | 165.8 | 84.2 |
| 30-Apr-20 12:00:00 | 516 | 63 | 166.4 | 84.6 |
| 30-Apr-20 12:01:00 | 515 | 65 | 166.0 | 85.5 |
| 30-Apr-20 12:02:00 | 514 | 65 | 165.9 | 85.7 |
| 30-Apr-20 12:03:00 | 514 | 64 | 164.3 | 85.3 |
| 30-Apr-20 12:04:00 | 517 | 63 | 164.1 | 87.0 |
| 30-Apr-20 12:05:00 | 514 | 63 | 162.7 | 87.5 |
| 30-Apr-20 12:06:00 | 518 | 62 | 164.2 | 86.6 |
| 30-Apr-20 12:07:00 | 522 | 62 | 161.9 | 87.7 |
| 30-Apr-20 12:08:00 | 519 | 62 | 163.4 | 87.8 |
| 30-Apr-20 12:09:00 | 514 | 70 | 163.3 | 87.2 |
| 30-Apr-20 12:10:00 | 516 | 64 | 162.3 | 86.0 |
| 30-Apr-20 12:11:00 | 519 | 68 | 163.5 | 85.8 |
| 30-Apr-20 12:12:00 | 518 | 63 | 161.4 | 86.4 |
| 30-Apr-20 12:13:00 | 519 | 64 | 162.7 | 87.3 |
| 30-Apr-20 12:14:00 | 522 | 64 | 160.8 | 86.2 |

Line 6 Waste Gas Stack (SV144)

| | 030-06 GREEN BALL TOTAL AL811100 | 037-06-2 REJECT SCALE LINE-6 AI811005 | 252-06-1 Kiln Gas MMBTU/HR AC811200 | 242-06-2 PH Gas MMBTU/HR AC811201 |
|--------------------|--|---|---|---|
| 30-Apr-20 12:15:00 | 523 | 65 | 161.9 | 87.2 |
| 30-Apr-20 12:16:00 | 521 | 64 | 162.0 | 87.4 |
| 30-Apr-20 12:17:00 | 515 | 65 | 160.6 | 87.2 |
| 30-Apr-20 12:18:00 | 516 | 63 | 162.3 | 86.4 |
| 30-Apr-20 12:19:00 | 517 | 66 | 160.1 | 87.9 |
| 30-Apr-20 12:20:00 | 519 | 64 | 160.3 | 87.5 |
| 30-Apr-20 12:21:00 | 516 | 64 | 162.6 | 87.5 |
| 30-Apr-20 12:22:00 | 520 | 63 | 162.1 | 86.0 |
| 30-Apr-20 12:23:00 | 522 | 65 | 160.0 | 87.0 |
| 30-Apr-20 12:24:00 | 521 | 64 | 162.5 | 87.1 |
| 30-Apr-20 12:25:00 | 515 | 64 | 162.8 | 86.5 |
| 30-Apr-20 12:26:00 | 517 | 65 | 161.6 | 87.5 |
| 30-Apr-20 12:27:00 | 523 | 64 | 162.0 | 85.8 |
| 30-Apr-20 12:28:00 | 522 | 63 | 162.5 | 86.5 |
| 30-Apr-20 12:29:00 | 519 | 64 | 160.9 | 86.6 |
| 30-Apr-20 12:30:00 | 517 | 63 | 163.1 | 87.8 |
| 30-Apr-20 12:31:00 | 520 | 64 | 162.7 | 87.1 |
| 30-Apr-20 12:32:00 | 518 | 63 | 161.4 | 86.5 |
| 30-Apr-20 12:33:00 | 517 | 63 | 162.3 | 86.2 |
| 30-Apr-20 12:34:00 | 515 | 68 | 161.6 | 87.5 |
| 30-Apr-20 12:35:00 | 516 | 63 | 161.9 | 85.8 |
| 30-Apr-20 12:36:00 | 517 | 65 | 163.3 | 85.5 |
| 30-Apr-20 12:37:00 | 516 | 64 | 163.6 | 86.7 |
| 30-Apr-20 12:38:00 | 517 | 62 | 161.8 | 86.5 |
| 30-Apr-20 12:39:00 | 523 | 62 | 162.1 | 86.7 |
| 30-Apr-20 12:40:00 | 523 | 62 | 163.0 | 87.4 |
| 30-Apr-20 12:41:00 | 521 | 63 | 162.8 | 88.2 |
| 30-Apr-20 12:42:00 | 521 | 64 | 161.9 | 89.5 |
| 30-Apr-20 12:43:00 | 520 | 65 | 161.9 | 87.7 |
| 30-Apr-20 12:44:00 | 519 | 65 | 162.0 | 87.8 |
| 30-Apr-20 12:45:00 | 517 | 68 | 163.3 | 87.1 |
| 30-Apr-20 12:46:00 | 518 | 63 | 163.7 | 86.4 |
| 30-Apr-20 12:47:00 | 511 | 62 | 164.5 | 86.8 |
| 30-Apr-20 12:48:00 | 517 | 63 | 164.2 | 86.7 |
| 30-Apr-20 12:49:00 | 518 | 64 | 165.0 | 86.8 |
| 30-Apr-20 12:50:00 | 518 | 64 | 166.0 | 87.2 |
| 30-Apr-20 12:51:00 | 518 | 63 | 166.7 | 87.4 |
| 30-Apr-20 12:52:00 | 515 | 65 | 164.9 | 87.3 |
| 30-Apr-20 12:53:00 | 515 | 64 | 166.9 | 86.3 |
| 30-Apr-20 12:54:00 | 518 | 69 | 166.3 | 86.8 |
| 30-Apr-20 12:55:00 | 523 | 70 | 165.9 | 87.2 |
| 30-Apr-20 12:56:00 | 522 | 64 | 166.3 | 88.3 |
| 30-Apr-20 12:57:00 | 522 | 64 | 167.6 | 86.6 |
| 30-Apr-20 12:58:00 | 522 | 66 | 167.0 | 88.0 |
| 30-Apr-20 12:59:00 | 515 | 64 | 166.7 | 88.5 |
| 30-Apr-20 13:00:00 | 515 | 63 | 168.9 | 85.8 |
| 30-Apr-20 13:01:00 | 517 | 64 | 169.6 | 85.8 |

Line 6 Waste Gas Stack (SV144)

| | 030-06 GREEN BALL TOTAL AL811100 | 037-06-2 REJECT SCALE LINE-6 AI811005 | 252-06-1 Kiln Gas MMBTU/HR AC811200 | 242-06-2 PH Gas MMBTU/HR AC811201 |
|--------------------|--|---|---|---|
| 30-Apr-20 13:02:00 | 510 | 63 | 167.7 | 85.8 |
| 30-Apr-20 13:03:00 | 516 | 63 | 166.5 | 84.3 |
| 30-Apr-20 13:04:00 | 517 | 64 | 166.5 | 85.6 |
| 30-Apr-20 13:05:00 | 517 | 67 | 167.3 | 86.0 |
| 30-Apr-20 13:06:00 | 515 | 63 | 168.5 | 87.1 |
| 30-Apr-20 13:07:00 | 515 | 64 | 167.6 | 86.4 |
| 30-Apr-20 13:08:00 | 517 | 63 | 165.7 | 86.9 |
| 30-Apr-20 13:09:00 | 517 | 64 | 168.3 | 87.4 |
| 30-Apr-20 13:10:00 | 524 | 62 | 167.7 | 86.9 |
| 30-Apr-20 13:11:00 | 527 | 64 | 168.2 | 88.4 |
| 30-Apr-20 13:12:00 | 528 | 63 | 168.6 | 88.2 |
| 30-Apr-20 13:13:00 | 521 | 64 | 171.0 | 87.8 |
| 30-Apr-20 13:14:00 | 523 | 64 | 169.8 | 88.4 |
| 30-Apr-20 13:15:00 | 520 | 65 | 170.1 | 88.3 |
| 30-Apr-20 13:16:00 | 520 | 67 | 171.4 | 87.9 |
| 30-Apr-20 13:17:00 | 521 | 65 | 170.5 | 88.0 |
| 30-Apr-20 13:18:00 | 519 | 64 | 172.6 | 88.9 |
| 30-Apr-20 13:19:00 | 515 | 64 | 170.8 | 86.0 |
| 30-Apr-20 13:20:00 | 513 | 63 | 173.3 | 86.1 |
| 30-Apr-20 13:21:00 | 510 | 62 | 172.7 | 85.3 |
| 30-Apr-20 13:22:00 | 512 | 62 | 172.2 | 85.3 |
| 30-Apr-20 13:23:00 | 517 | 62 | 171.8 | 86.2 |
| 30-Apr-20 13:24:00 | 522 | 63 | 172.8 | 88.2 |
| 30-Apr-20 13:25:00 | 522 | 68 | 171.9 | 86.8 |
| 30-Apr-20 13:26:00 | 519 | 65 | 173.2 | 88.5 |
| 30-Apr-20 13:27:00 | 517 | 67 | 172.8 | 86.5 |
| 30-Apr-20 13:28:00 | 517 | 63 | 171.4 | 87.0 |
| 30-Apr-20 13:29:00 | 519 | 62 | 172.8 | 86.6 |
| 30-Apr-20 13:30:00 | 517 | 62 | 172.1 | 87.6 |
| 30-Apr-20 13:31:00 | 515 | 63 | 171.9 | 86.6 |
| 30-Apr-20 13:32:00 | 515 | 62 | 173.3 | 85.2 |
| 30-Apr-20 13:33:00 | 510 | 63 | 171.7 | 85.8 |
| 30-Apr-20 13:34:00 | 517 | 60 | 170.7 | 85.1 |
| 30-Apr-20 13:35:00 | 523 | 65 | 172.4 | 86.5 |
| 30-Apr-20 13:36:00 | 527 | 61 | 172.0 | 87.8 |
| 30-Apr-20 13:37:00 | 523 | 63 | 171.0 | 88.7 |
| 30-Apr-20 13:38:00 | 523 | 64 | 171.3 | 88.7 |
| 30-Apr-20 13:39:00 | 530 | 63 | 170.5 | 89.6 |
| 30-Apr-20 13:40:00 | 529 | 63 | 171.5 | 88.7 |
| 30-Apr-20 13:41:00 | 525 | 63 | 172.3 | 88.8 |
| 30-Apr-20 13:42:00 | 517 | 62 | 170.4 | 88.3 |
| 30-Apr-20 13:43:00 | 512 | 61 | 172.6 | 87.0 |
| 30-Apr-20 13:44:00 | 514 | 61 | 170.2 | 86.2 |
| 30-Apr-20 13:45:00 | 513 | 61 | 170.4 | 86.0 |
| 30-Apr-20 13:46:00 | 513 | 62 | 170.8 | 86.9 |
| 30-Apr-20 13:47:00 | 512 | 64 | 170.3 | 86.1 |
| 30-Apr-20 13:48:00 | 513 | 63 | 170.4 | 85.9 |

Line 6 Waste Gas Stack (SV144)

| | 030-06 GREEN | 037-06-2 REJECT | 252-06-1 Kiln | 242-06-2 PH Gas |
|--------------------|--------------|-----------------|---------------|-----------------|
| | BALL TOTAL | SCALE LINE-6 | Gas MMBTU/HR | MMBTU/HR |
| | AL811100 | AI811005 | AC811200 | AC811201 |
| 30-Apr-20 13:49:00 | 519 | 63 | 169.6 | 86.4 |
| 30-Apr-20 13:50:00 | 521 | 63 | 169.9 | 86.0 |
| 30-Apr-20 13:51:00 | 520 | 62 | 170.9 | 87.6 |
| 30-Apr-20 13:52:00 | 521 | 68 | 170.7 | 86.8 |
| 30-Apr-20 13:53:00 | 526 | 64 | 170.3 | 88.8 |
| 30-Apr-20 13:54:00 | 522 | 65 | 170.0 | 87.2 |
| 30-Apr-20 13:55:00 | 520 | 64 | 170.5 | 88.1 |
| 30-Apr-20 13:56:00 | 515 | 64 | 170.5 | 87.6 |
| 30-Apr-20 13:57:00 | 515 | 64 | 170.4 | 87.4 |
| 30-Apr-20 13:58:00 | 517 | 61 | 171.7 | 85.9 |
| 30-Apr-20 13:59:00 | 514 | 63 | 171.0 | 86.7 |
| 30-Apr-20 14:00:00 | 518 | 62 | 171.3 | 86.6 |
| 30-Apr-20 14:01:00 | 522 | 63 | 171.3 | 87.9 |
| 30-Apr-20 14:02:00 | 524 | 63 | 173.3 | 88.3 |
| 30-Apr-20 14:03:00 | 522 | 68 | 172.5 | 87.4 |
| 30-Apr-20 14:04:00 | 522 | 65 | 170.3 | 86.9 |
| 30-Apr-20 14:05:00 | 522 | 63 | 171.3 | 88.2 |
| 30-Apr-20 14:06:00 | 522 | 67 | 171.6 | 88.5 |
| 30-Apr-20 14:07:00 | 518 | 64 | 171.8 | 87.5 |
| 30-Apr-20 14:08:00 | 525 | 63 | 172.0 | 88.8 |
| 30-Apr-20 14:09:00 | 521 | 61 | 172.2 | 87.9 |
| 30-Apr-20 14:10:00 | 522 | 66 | 172.2 | 87.4 |
| 30-Apr-20 14:11:00 | 524 | 66 | 172.6 | 88.4 |
| 30-Apr-20 14:12:00 | 521 | 64 | 173.1 | 88.8 |
| 30-Apr-20 14:13:00 | 518 | 65 | 173.3 | 88.3 |
| 30-Apr-20 14:14:00 | 512 | 62 | 174.4 | 86.1 |
| 30-Apr-20 14:15:00 | 508 | 62 | 173.4 | 85.1 |
| 30-Apr-20 14:16:00 | 510 | 62 | 173.9 | 84.8 |
| 30-Apr-20 14:17:00 | 515 | 63 | 173.3 | 84.1 |
| 30-Apr-20 14:18:00 | 510 | 65 | 173.4 | 83.9 |
| 30-Apr-20 14:19:00 | 513 | 64 | 173.4 | 85.5 |
| 30-Apr-20 14:20:00 | 518 | 64 | 175.1 | 86.2 |
| 30-Apr-20 14:21:00 | 518 | 64 | 175.3 | 86.6 |
| 30-Apr-20 14:22:00 | 513 | 65 | 174.3 | 87.4 |
| 30-Apr-20 14:23:00 | 518 | 63 | 172.1 | 86.8 |
| 30-Apr-20 14:24:00 | 526 | 64 | 172.7 | 87.8 |
| 30-Apr-20 14:25:00 | 527 | 64 | 173.4 | 87.6 |
| 30-Apr-20 14:26:00 | 524 | 64 | 173.7 | 88.7 |
| 30-Apr-20 14:27:00 | 523 | 65 | 172.8 | 87.9 |
| 30-Apr-20 14:28:00 | 524 | 66 | 172.7 | 88.9 |
| 30-Apr-20 14:29:00 | 521 | 65 | 173.2 | 88.2 |
| 30-Apr-20 14:30:00 | 526 | 64 | 173.7 | 87.2 |

Appendix F

Stack Test Plan

Ryan Pantzke

From: Place, Andrew (MPCA) <andrew.place@state.mn.us>
Sent: Monday, April 6, 2020 10:54 AM
To: Campbell, Stephani L
Cc: Tom Kuchinski; Palzkill, Steven (MPCA)
Subject: Test Plan Approval - Multiple Units

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Include a copy of the Test Plan and this Test Plan Approval Email in the Final Report

Test Plan Approval Letter

Facility: U.S. Steel – Minntac Plant

Address: PO Box 417, 8819 Old Highway 169, Mountain Iron, MN 55768

Contact Person/Phone: Stephani Campbell, Environmental Control Engineer, 218-778-8684

Test Date: April 5 – May 25, 2020

Test Plan Submittal Date: February 14, 2020

Pretest Meeting Date: email

Units to be Tested:

- Group 21 (COMG 15) Line 3 Conveyor Transfer (SV109/STRU 204; CE092/TREA 177) for Title V and MACT PM and Opacity
- Line 3 Cooler Vent Stack (SV104/STRU 121), Group 22 (COMG 16) Lines 4 and 5 Cooler Vent Stacks (SV119 & SV128/STRU 129 & STRU 133) for Title V PM and Opacity
- Group 22 (COMG 16) Line 6 & 7 Cooler Vent Stacks (STRU 254/SV196 & STRU 255/SV197) for Title V PM and Opacity
- Group 9 (COMG 30) Agglomerator Line 3 Waste Gas Stack (SV103/STRU 225) and Group 10 Agglomerator Line 4 (SV118/STRU 208; CE103/TREA 37) or Line 5 (SV127/STRU 60; CE113/TREA 38) for Mercury
- Group 29 (COMG 28) Line 6 & 7 Waste Gas Stack (SV144/STRU 155 & SV151/STRU 69 ; CE126/TREA 143 & CE103/TREA 37) for Title V PM, Opacity, and Mercury
- Group 25 (COMG 19) Line 7 Grate Feed (SV149/STRU 157) for Title V PM and Opacity

Agency Interest ID: 2476

Your test plan has been approved by the Minnesota Pollution Control Agency (MPCA) as follows:

Test plan approved with the following provisions:

1. The testing schedule for units listed in the test plan may be adjusted based on operations, weather, etc.
2. Include in the executive summary of the test report an updated calculation of the affected source groups' flow weighted averages based on the results of this test.
3. US Steel does not intend to adjust MACT operating limits based on the rates of this test. Operating limits will not be adjusted for units operated within 20% of the current operating limit. If operations fall outside this range, contact the MPCA to discuss the situation. If after testing, US Steel decides to adjust a limit based on test conditions, communicate this intention as part of the executive summary and make necessary adjustment to the summary requested below.
4. Within the test report, supply a summary of the tested units current MACT operating limits either based on previous testing or as a result of this test
5. Include in the final test report all process and pollution control equipment operating data collected at 15 minute intervals (minimum) and averaged for each test run and test. This information must be clear easily understood

by individuals not familiar with the process. All information needed to show process operating rate and pollution control equipment compliant operation must be included. A link to reporting forms can be found below.

6. An acceptable report must comply with Minn. Rule 7017.2035 PERFORMANCE TEST REPORTING REQUIREMENTS. Use of the PTRCC form will help assure that a complete test report is submitted to the MPCA.

In the event of a failure:

Please be aware that enforcement action will be taken for performance test failures, indicating emissions above applicable limits, which can include a monetary penalty. Upon discovery of the test failure, the Regulated Party must take immediate action to reduce emissions to remain in compliance with its permitted limits. The actions taken should be documented, as they will become part of the record of corrective actions. If a monetary penalty is required, the amount of time from the date of the failed test to the date of the passed test, or other compliance demonstration, will be taken into consideration. It is in the Regulated Party's best interest to demonstrate compliance with its permitted emissions limits through a passed retest or other compliance demonstration as soon as possible after a failed test.

All periods of noncompliance with emission limits must be reported to the MPCA, this includes any periods of engineering tests. The requirements outlined under the Notification of Deviations Endangering Human Health or the Environment, Minn. R. 7019.1000, subp. 1., shall be followed. This information should also be clearly stated and readily available in the executive summary of the test report.

The following forms are available at <http://www.pca.state.mn.us/jsrid16>

Operating Data Summary – Combustion Sources

Operating Data Summary – Process Sources

Operating Data Summary – Asphalt Plants

Report Certifications Form

Performance Test Report Completeness Criteria (PTRCC)

(Preferred) Electronic copies of the test report submitted to SubmitStackTest.PCA@state.mn.us

If an electronic copy of the complete test report is submitted the paper and CD copies are not required. Please follow requirements outlined in Method 1 of the document found at this link:

<https://www.pca.state.mn.us/sites/default/files/aq1-39.pdf>

Hard Copy Performance Test Reports and Microfiche or CD Copy submittals will be addressed to:

Air Quality Compliance Tracking Coordinator

Industrial Division

Minnesota Pollution Control Agency

520 Lafayette Road North

St. Paul, Minnesota 55155-4194

Andy Place | State Program Administrator Principal

Minnesota Pollution Control Agency (MPCA)

Industrial Division

520 Lafayette Road No. | St. Paul, Minnesota | 55155-4194

651-757-2652

Email | andrew.place@state.mn.us

Our mission is to protect and improve the environment and human health.

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Ryan Pantzke

From: Campbell, Stephani L <SCampbell@uss.com>
Sent: Thursday, February 13, 2020 3:04 PM
To: Andy Place (Andrew.Place@state.mn.us)
Cc: Tom Kuchinski
Subject: Test Plan Notification - Minntac
Attachments: Agglomerator Sources 2020.pdf

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Andy

Attached is a test plan for some Agglomerator sources. A hard copy was also placed in the mail today.

Stephani Campbell
Minnesota Ore Operations
218-778-8684

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U. S. Steel Corporation
Minnesota Ore Operations
P.O. Box 417
Mt. Iron, MN 55768

CERTIFIED MAIL #7018 3090 0001 9999 0412

February 13, 2020

Andy Place
North District, Major Facilities
Minnesota Pollution Control Agency
520 Lafayette Road
St. Paul, Minnesota 55155-4194

**Re: U. S. Steel - Minntac
Notification of Testing and Test Plan**

Dear Mr. Place,

This document is the Notification of Testing and Test Plan for performance tests on:

- Line 3 Conveyor Transfer 041-042 (SV109)
- Line 3 Cooler Vent Stack (SV104)
- Line 4 Cooler Vent Stack (SV119)
- Line 5 Cooler Vent Stack (SV128)
- Line 6 Cooler Vent Stack (SV196)
- Line 7 Cooler Vent Stack (SV197)
- Line 3 Waste Gas Stack (SV103)
- Step 2 Waste Gas Stack (SV118 or SV127)
- Line 6 Waste Gas Stack (SV144)
- Line 7 Waste Gas Stack (SV151)
- Line 7 Grate Feed (SV149)

Performance tests are related to Air Emission Permit No. 13700005-006 (Title V permit) and 40 CFR Part 63 Subpart RRRRR. Testing will also be performed on each Step for mercury pursuant to MN Rules 7019.3050.

TEST PLAN

Part 1. General Information

(1) Name and address of the emission facility.

U. S. Steel – Minntac
P.O. Box 417
8771 Park Ridge Dr.
Mountain Iron, Minnesota 55768

(2) Name, title and telephone number of contact person at the emission facility.

Stephani Campbell
Environmental Control Engineer
Voice (218) 778-8684 Fax (218) 749-7360
Electronic mail: scampbell@uss.com

(3) Permit number or name of other applicable document.

Title V Air Emissions Permit 13700005-006

40 CFR Part 63 Subpart RRRRR – National Emission Standards for Hazardous Air Pollutants: Taconite Iron Ore Processing

(4) Reason for testing.

Determination of PM and opacity for Title V Permit.

Determination of PM for 40 CFR Part 63 Subpart RRRRR.

Determination of Hg for MN Rule 7019.3050

(5) Schematic drawing of the stacks and sample ports.

Enclosed herein.

a) Location of Plant

Within the corporate limits of the city of Mountain Iron, MN.

b) Name, contact person, and telephone number for testing company

Barr Engineering, Minneapolis, MN.

Tom Kuchinski (952) 832-2787

Part 2. Testing Requirements

(1) List of pollutants to be tested, the emission limit for each pollutant and the applicable rule or regulation for the emission limit.

Line 3 041/042 Product Belts (SV109)

Particulate Matter

Emission limit Minn. R 7011.0710 subp. 1(A)

0.3 grains/dscf or the less stringent of 7011.0730 or 7011.0735

40 CFR Part 63 Subpart RRRRR Table 1

Filterable portion PM limit of 0.008 gr/dscf flow weighted average

Opacity

Less than or equal to 20% except for one six-minute period per hour of not more than 60%.

Line 3 Cooler Vent Stack (SV104)

Particulate Matter

Emission limit Minn. R 7011.0710 subp. 1(A)

0.3 grains/dscf or the less stringent of 7011.0730 or 7011.0735

Opacity

Emission limit Minn. R 7011.0710 subp. 1(B)

Less than or equal to 20% except for one six-minute period per hour of not more than 60%.

Group 022 Cooler Vent Stack for Steps II and III
Line 4 (SV119), Line 5 (SV128), Line 6 (SV196), and Line 7 (SV197)

Particulate Matter

Emission limit Minn. R 7011.0715 subp. 1(A)

0.3 grains/dscf or the less stringent of 7011.0730 or 7011.0735

Opacity

Emission limit Minn. R 7011.0715 subp. 1(B)

Less than or equal to 20%.

Group 09 Agglomerator Lines 3 (SV103) Waste Gas Stack

Mercury Minn R.7019.3050

Group 10 Agglomerator Line 4 (SV118) or Line 5 (SV127) Waste Gas Stack

Mercury** Minn. R.7019.3050

** Performed on either Line 4 or Line 5

Group 11 Agglomerator Line 6 (SV144) and Line 7 (SV151) Waste Gas Stacks

Particulate Matter

Filterable portion PM limit of 0.01 gr/dscf
40 CFR Part 63 Subpart RRRRR Table 1

Emission limit Minn. R 7011.0715 subp. 1(A)

0.3 grains/dscf or the less stringent of 7011.0730 or 7011.0735

Opacity

Emission limit Minn. R 7011.0715 subp. 1(B)

Mercury** Minn. R.7019.3050

** Performed on either Line 6 or Line 7

Line 7 Grate Feed (SV149)

Particulate Matter

Emission limit Minn. R 7011.0715 subp. 1(A)

0.3 grains/dscf or the less stringent of 7011.0730 or 7011.0735

(2) Description of procedure for fuel sampling and analysis, where applicable.

Not applicable.

Part 3. Operating Conditions

- (1) List the process or operating rate and conditions of the process equipment and the air pollution control equipment for the test.

All tests will be performed while the associated process equipment is operating at greater than 90% of maximum capacity. Green ball feed rate range is approximately 280-350 for Line 3. Green ball feed rate range is approximately 500 to 600 for Lines 4 and 5. The fuel will likely be a blend of natural gas and biomass on these lines. Green ball feed rate range is approximately 500 to 600 for Lines 6 and 7. The fuel will likely be natural gas.

- (2) Explanation of why the proposed conditions are considered to be in accordance with Part 7017.2025, Subpart 2, for required testing conditions.

For the Title V tests, the statement about the assumption of worst-case conditions in the cited subpart applies. For MACT, 40 CFR 63.9621 (a) requires performance test to be conducted according to the requirements in 40 CFR 63.7(e)(1) which states that tests should be based on representative performance (i.e., performance based on normal operating conditions) of the affected source.

- (3) List the range of process or operating rates for this emission unit.

The minimum process rate is zero. The maximum green ball feed process rate is approximately 350 LTPH for Line 3 and 600 LTPH for Lines 4, 5, 6 and 7.

- (4) Descriptions of how air pollution control and process equipment will be monitored.

- There are no control devices on the cooler vent stacks (SV104, SV119, SV128, SV196, and SV 197).
- Water flow and pressure drop will be monitored during each run on the waste gas stacks SV 144, SV151 and SV149 and water flow and fan amps on SV109.
- Process rates will be monitored during all tests.

Part 4. Test Methods

- (1) List of the methods to be used to determine the emission rate of each pollutant.

| | |
|---|-----------------|
| Test Port Location | EPA Method 1 |
| Determination of velocity and volumetric flow | EPA Method 2 |
| Determination of gas molecular weight | EPA Method 3 |
| Determination of moisture content | EPA Method 4 |
| Determination of PM | EPA Method 5 |
| Determination of Condensable PM | EPA Method 202* |
| Opacity | EPA Method 9 |
| *original method (pre January 2011) | |

- (2) Number of test runs, length of the test runs, and sampling rate for each method.

In accordance with the EPA Methods given above.

- Cooler Vent Stacks (SV104, SV119, SV128, SV196, and SV 197):
 - Three one-hour runs will be performed and a minimum of 32 dry standard cubic feet of sample will be collected for the determination of filterable and condensable particulate matter. One one-hour observation for opacity weather permitting.
- Waste Gas Stack (SV144 and SV151):
 - Three two-hour runs will be performed for filterable particulate matter only.
- Conveyor Transfer (SV 109):
 - Three two-hour runs will be performed for the determination of filterable and condensable particulate matter. One one-hour observation for opacity weather permitting.

- Grate Feed (SV 149):
 - Three one-hour runs will be performed for the determination of filterable and condensable particulate matter.

- (3) Reference to any compliance document, federal regulation, or Minnesota rule or statute requiring use of specific methods or procedures.

Not applicable

- (4) Summary of reasons for proposing to use alternative or equivalent method.

For EPA Method 202, propose using original method (pre January 2011), with the exception of using hexane instead of the methylene chloride.

For EPA Method 5, the posttest meter calibration check will be performed using the alternative method.

An inconel probe liner will be utilized due to high gas temperatures of the cooler vent stacks.

- (5) For test methods other than reference methods, statement of the detection limit and the degree of accuracy of that method at the expected emission rate and under the conditions of the performance test.

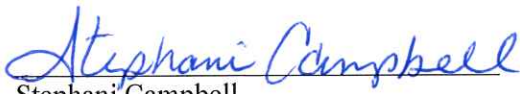
None applicable

Test Schedule and Pretest Meeting

Testing will occur the weeks of April 6th, 13th, 27th, and May 25th. At the preference of the MPCA, we would suggest the pretest meeting should occur the week prior to testing via telephone.

Closing Remarks

If there are any questions or comments on the information given in this document, please contact me at the telephone numbers listed above.

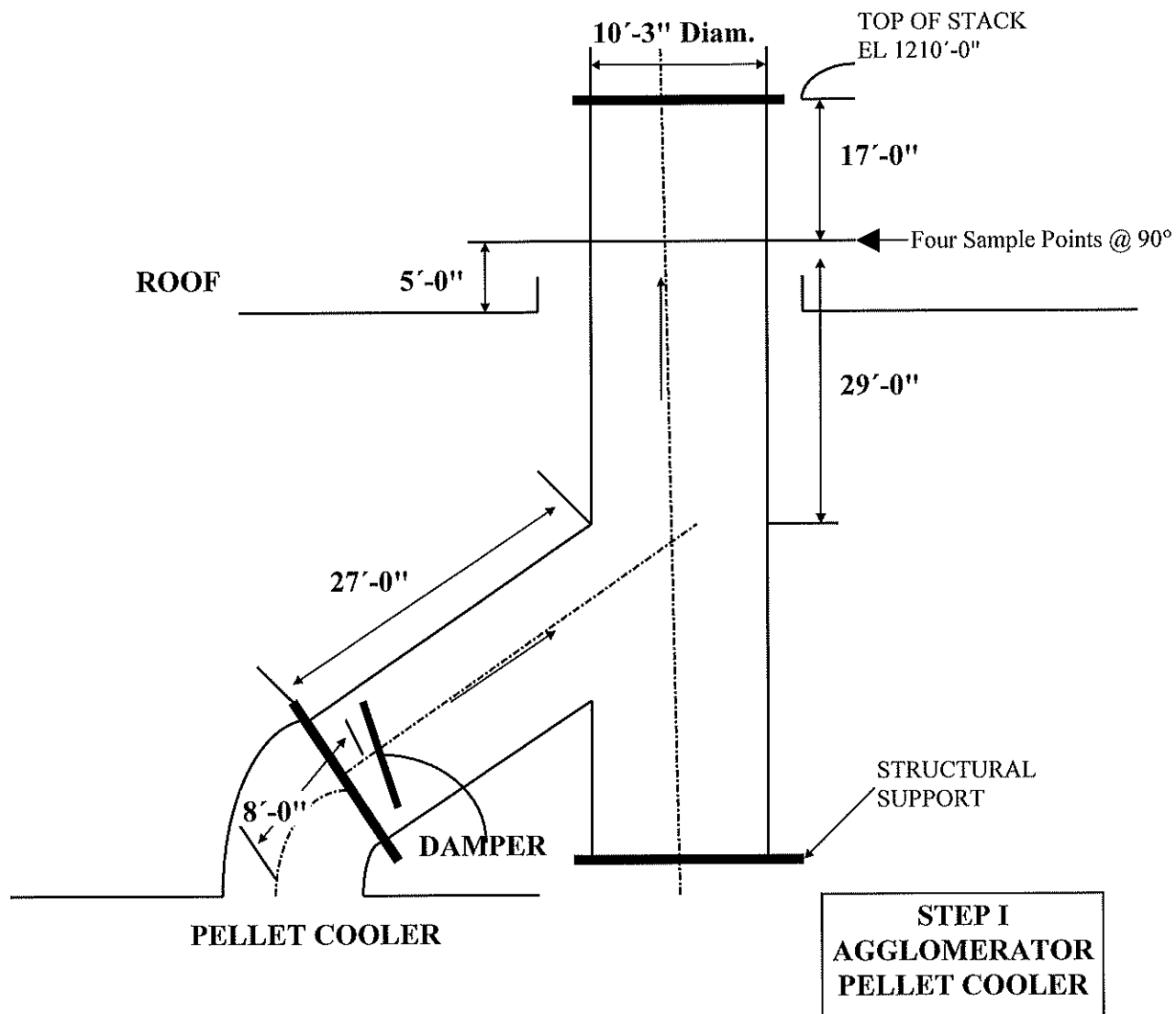


Stephani Campbell
Environmental Control Engineer

Enclosures:

041/042 Conveyor Transfer
STEP 1 AGG CVS drawing
STEP 2 AGG CVS drawing
STEP 3 AGG CVS drawing
STEP 1 AGG WG drawing
STEP 2 AGG WG drawing
STEP 3 AGG WG drawing
Line 7 Grate Feed

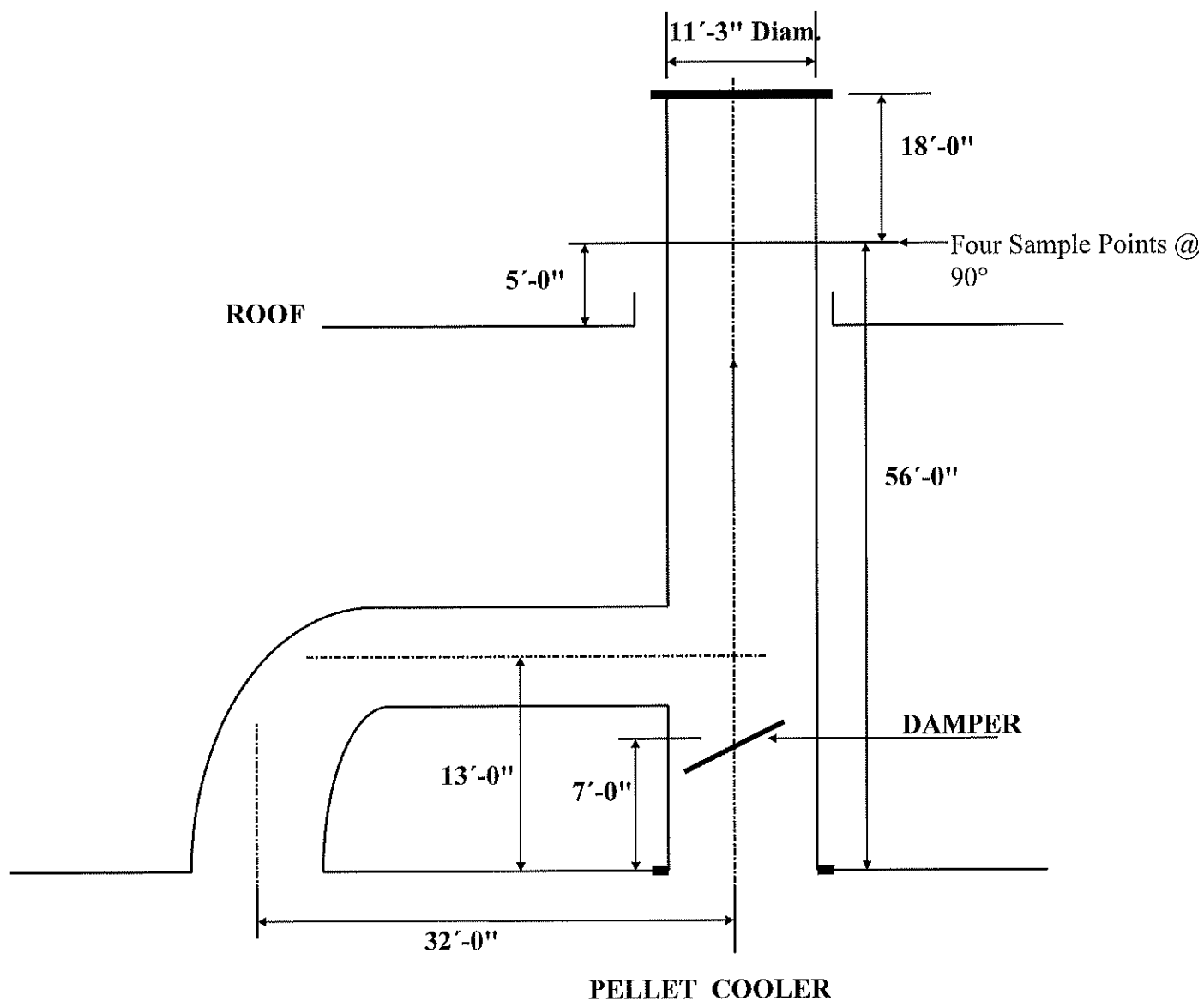
cc: Steve Palzkill, MPCA – Duluth Regional Office
Tom Kuchinski – Barr Engineering



Elevation View

1. Emission Source Number- SV 104
2. Emission Unit Number-227
3. Plant Equipment Number- 262-03-1
4. Stack Diameter-10'-3"

Step I Agglomerator
Minnesota Ore Operations
Minntac, Mt. Iron, MN

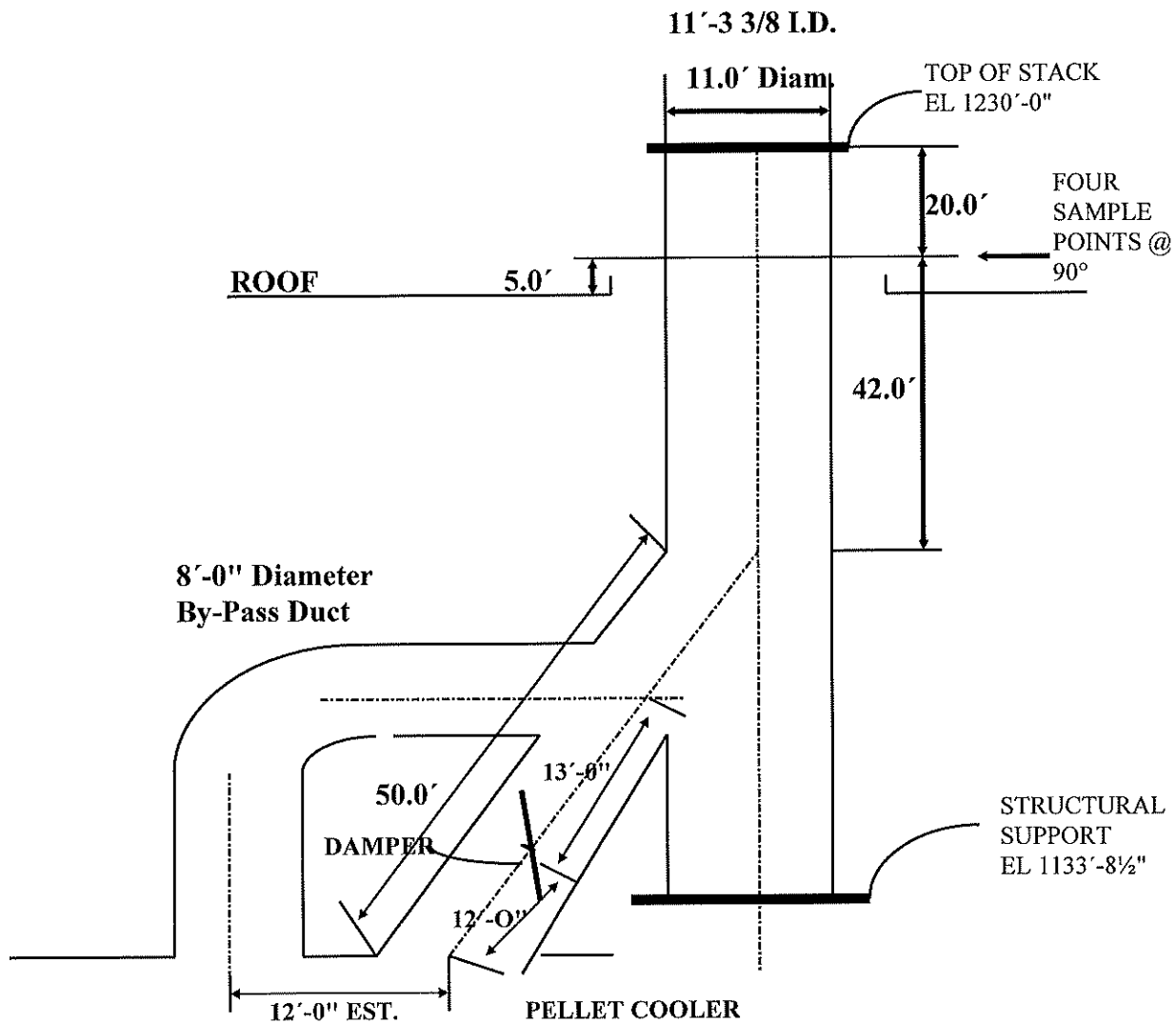


ELEVATION VIEW

1. Emission Source Number- SV 119 and SV 128
2. Emission Unit Number-263; 284
3. Plant Equipment Number- 262-04-1; 262-05-1
4. Stack Diameter- 11'-3"

**Lines 4 & 5
Agglomerator
Pellet Cooler**

Step II Agglomerator
Minnesota Ore Operations
Minntac, Mt. Iron, MN



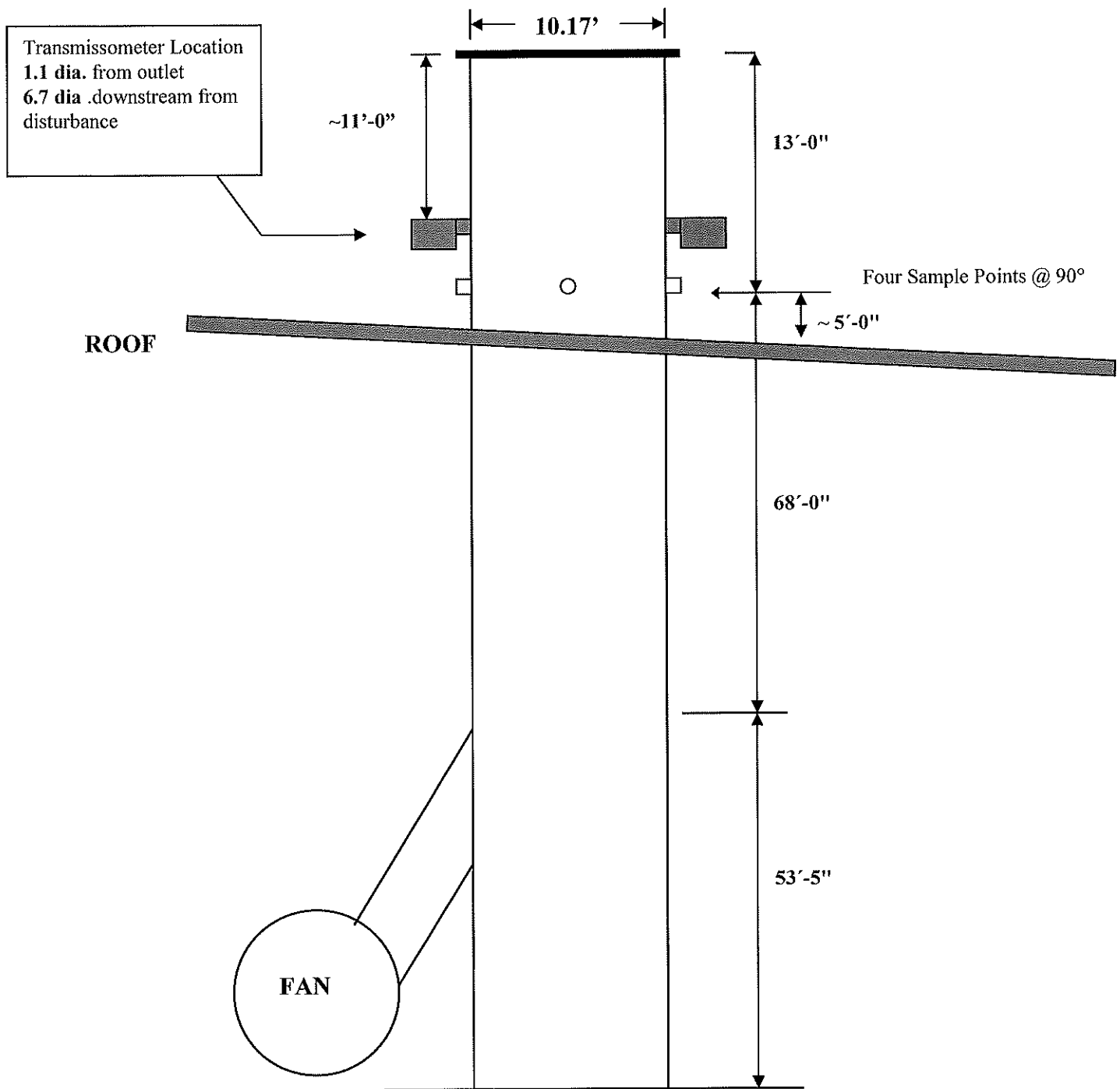
ELEVATION VIEW

1. Emission Source Number- SV 196 and SV 197
2. Emission Unit Number- 397, 398
3. Plant Equipment Number- 262-06-1; 262-07-1
4. Stack Diameter- 11.0'.
5. Stack Design Gas Velocity- 31.6 FPS.
6. Stack Design Gas Volume- 180,000 CFM.
7. Stack Design Gas Temperature- 600-700°F.
8. Pollutant- Particulates

**Lines 6 & 7
Agglomerator
Pellet Cooler**

Grade El. 1074
12'-1" OD

Step III Agglomerator
Minnesota Ore Operations
Minntac, Mt. Iron, Minnesota

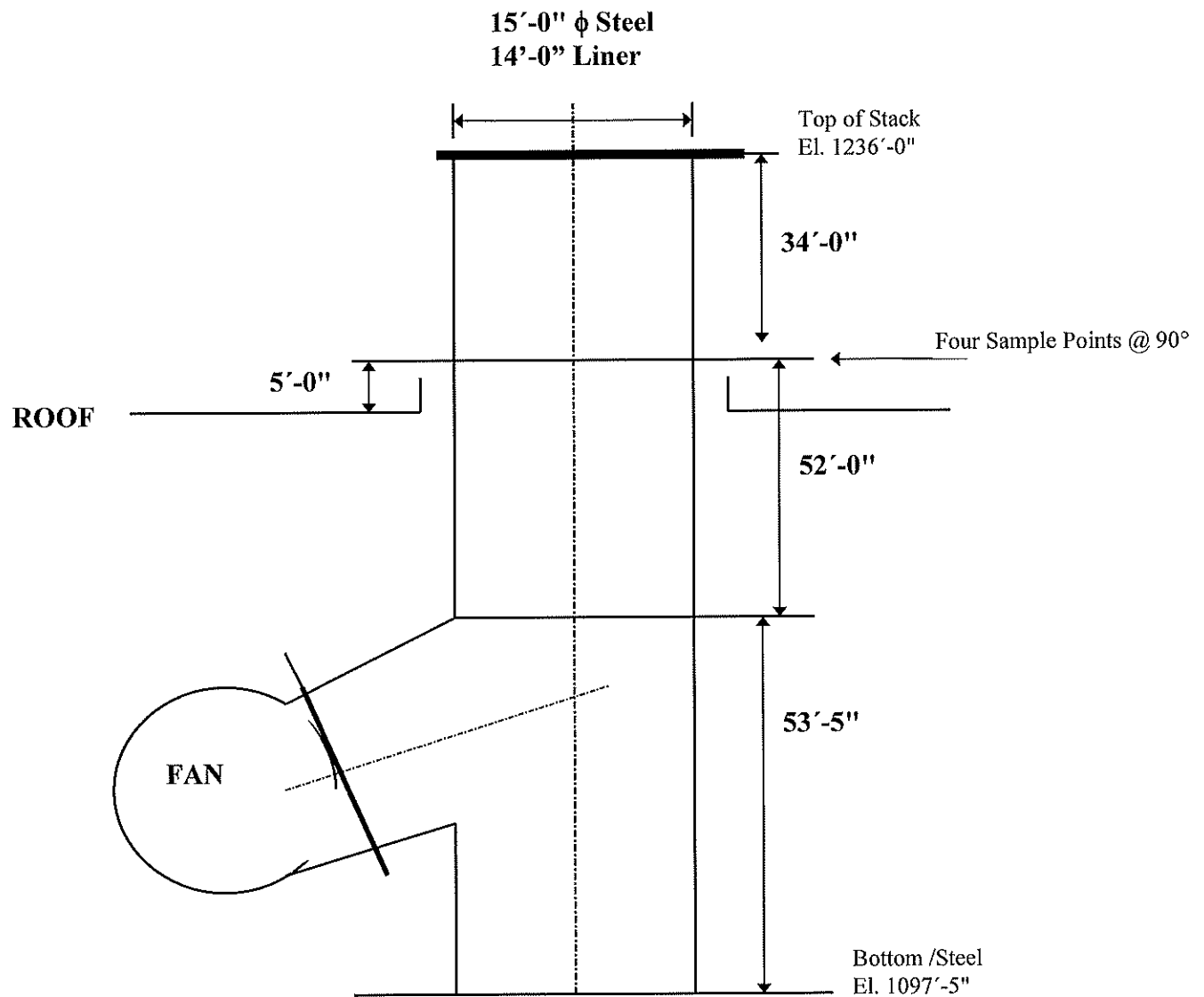


Elevation View

1. Emission Source Numbers- Line 3 SV 103
2. Emission Unit Number- Line 3 EU 223, 224, 225, 226
3. **Stack Diameter- 10.17'**
4. Gas Velocity- ~80 FPS
5. Gas Volume- ~385,000 ACFM
6. Gas Temperature- ~225°F

**STEP I LINE 3
AGGLOMERATOR
WASTE GAS**

Step I Line 3 Agglomerator
Minnesota Ore Operations
Minntac, Mt. Iron, MN

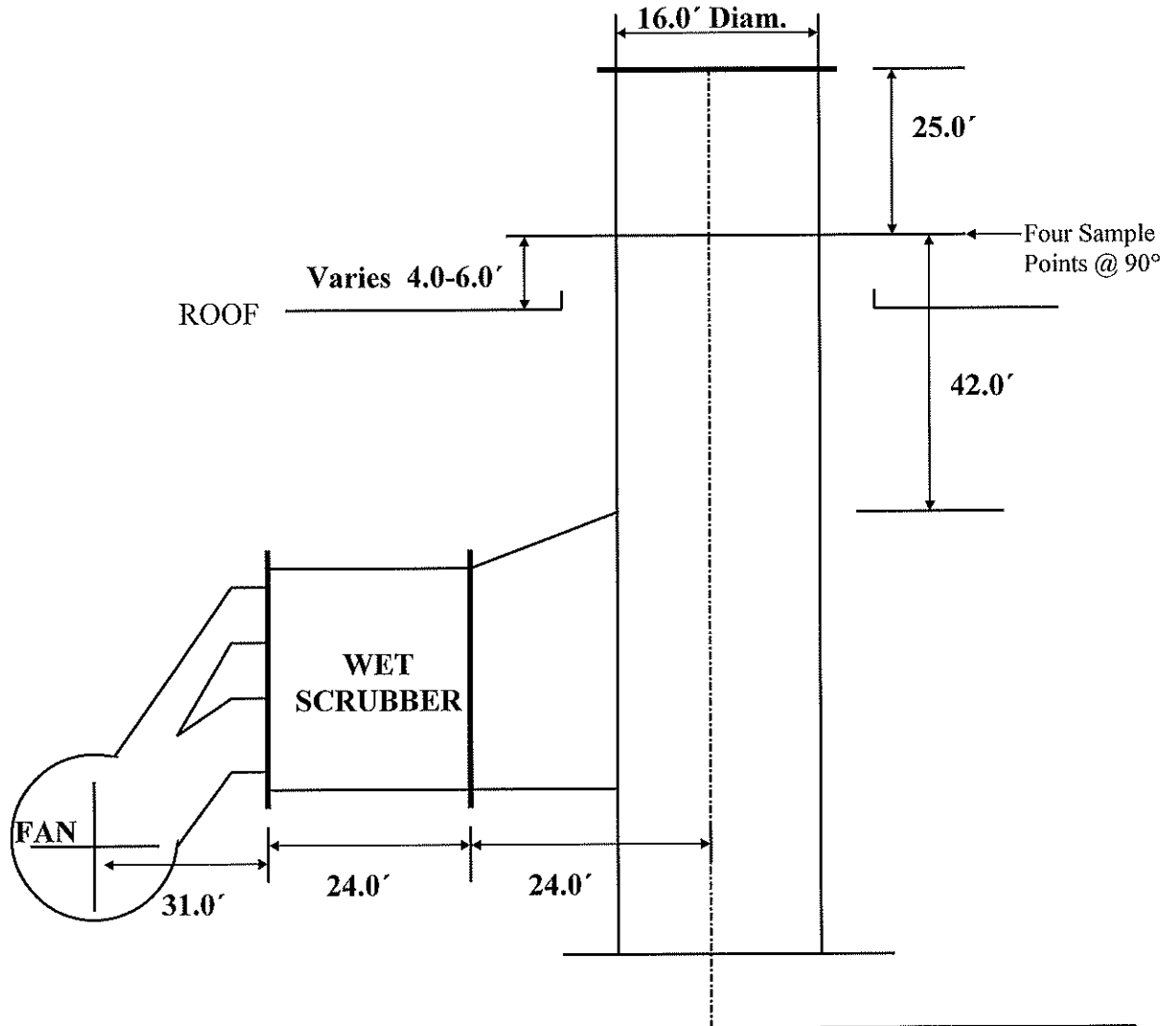


**STEP II
AGGLOMERATOR
WASTE GAS**

Elevation View

1. Emission Source Numbers- Line 4 SV 118, Line 5 SV 127
2. Emission Unit Number- Line 4 EU 259, 260, 261, 262 Line 5 EU 280, 282, 282, 283
3. Plant Equipment Number- 242; 261; 252; 262
4. Stack Diameter- 15.0' with 14'-0" diameter fiberglass liner
5. Stack Design Gas Velocity- 56.3 FPS
6. Stack Design Gas Volume- 591,000 CFM
7. Stack Design Gas Temperature- 125 to 150°F

Step II Agglomerator
Minnesota Ore Operations
Minntac, Mt. Iron, MN



Elevation View

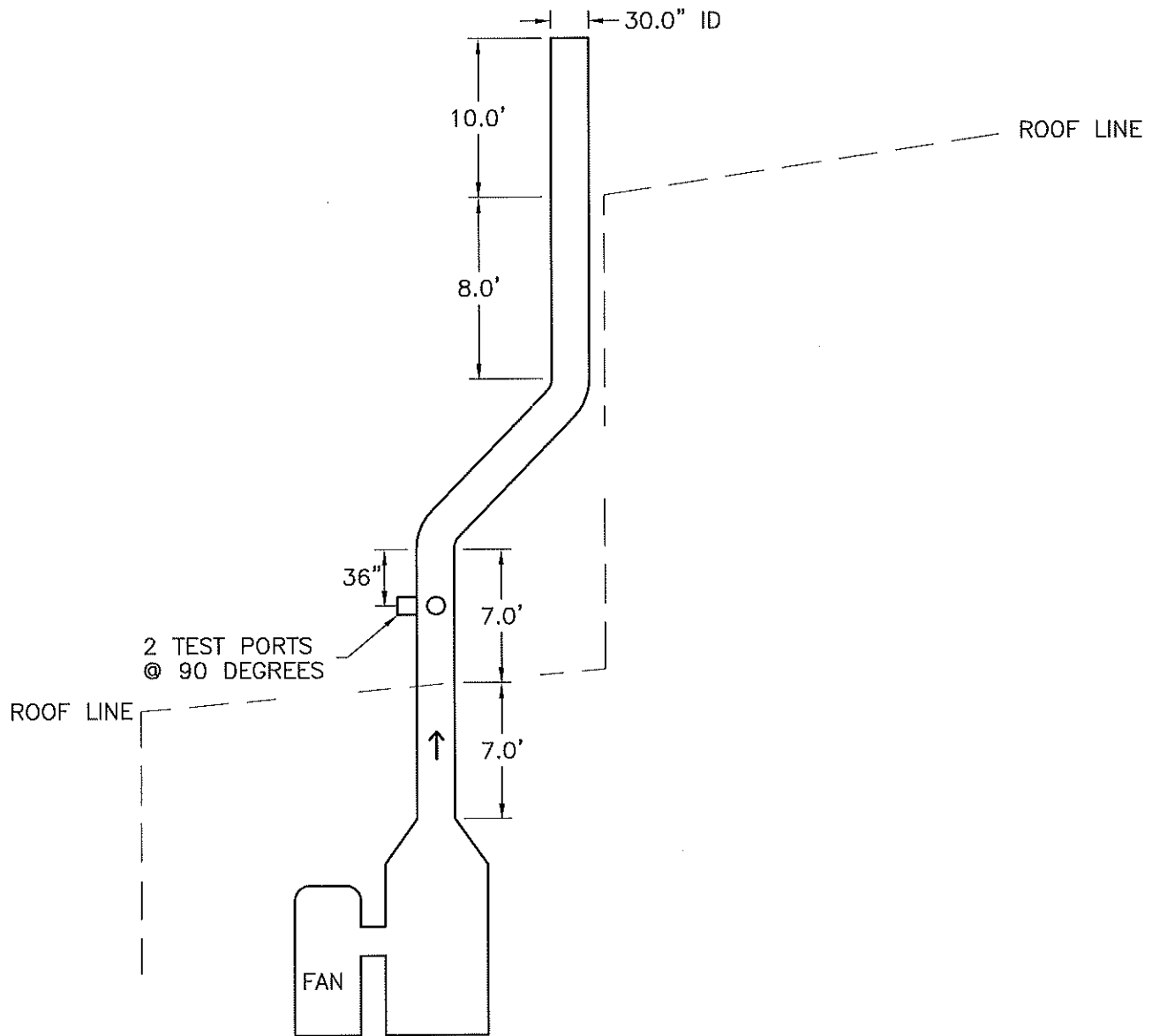
1. Emission Source Number- Line 6 SV 144 & Line 7 SV 151
2. Emission Unit Number- 313, 314, 315, 316 (at SV 144)
332, 333, 334, 335 (at SV 151)
3. Plant Equipment Number- 242-06-1; 261-06-1;
252-06-1; 262-06-1 (or 07-1 for the Line 7 equipment)
4. Stack Diameter- 16.0'
5. Stack Design Gas Temperature- 125 to 150°F
6. Stack Test Ports – 4 ea. 8" dia. Pipe nipple x 7" long
with 150 lb flange. Hanger hook 5' above.

**STEP III
AGGLOMERATOR
WASTE GAS**

Step III Agglomerator
Minnesota Ore Operations
Minntac, Mt. Iron, MN

REVISED 01-03-00

US STEEL MINNESOTA ORE OPERATIONS
MOUNTAIN IRON, MINNESOTA
STEP 1 AGGLOMERATOR



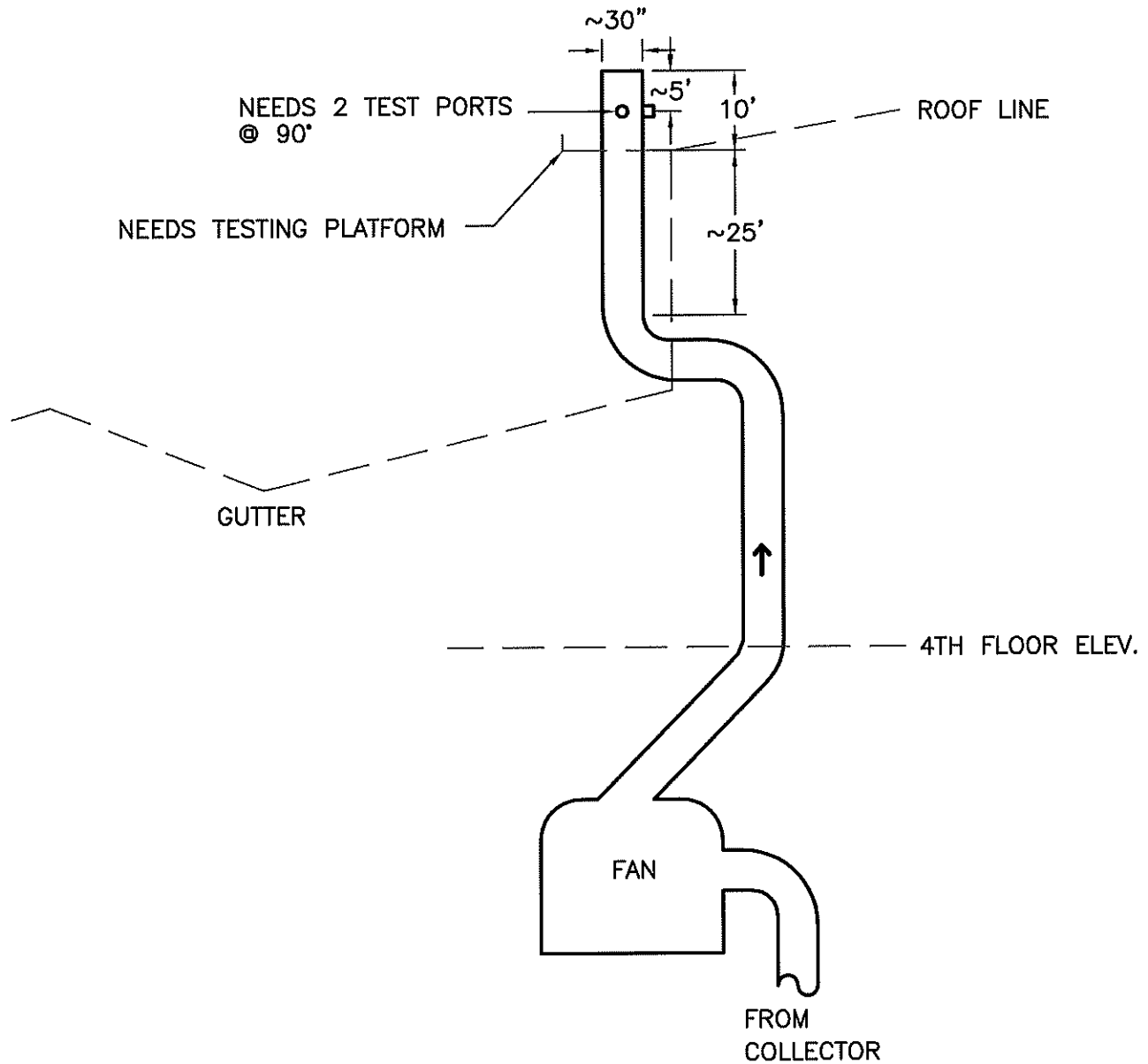
TEST PORT LOCATIONS

041/046-042 CONVEYOR TRANSFER

SV: 109
EU: 234,235
CE: 092
GROUP: 21
298-03-4

NOT TO SCALE
2369_792

US STEEL MINNESOTA ORE OPERATIONS
MOUNTAIN IRON, MINNESOTA
STEP 3 AGGLOMERATOR



TEST PORT LOCATIONS

GRATE FEED

SV: 149
EU: 330
CE: 131
GROUP: 25

DRAWING # 298-07-4
NOT TO SCALE

Appendix G

Project Participants and Contact Information

Project Participants and Contact Information

Minnesota Pollution Control Agency

Andy Place – State Program Administrator Principal

U.S. Steel Corporation – Minntac

Chrissy Bartovich – Director Environmental Services

Stephani Campbell – Environmental Control Engineer

Clark Nurmi – Process Coordinator

Brad Gerlach – Process Coordinator

Barr Engineering Co.

Tom Kuchinski – Vice President/Stack Testing Services Coordinator

Dan Koschak – Project Manager/Senior Air Quality Technician

Mike Norstrem – Air Quality Engineer

CONTACT INFORMATION

| MPCA | U. S. Steel Corporation - Minntac | Barr Engineering Co. |
|--|---|---|
| Andy Place Air Quality Compliance Tracking Coordinator Minnesota Pollution Control Agency 520 Lafayette Rd. N. Saint Paul, Minnesota 55155 (651) 757-2295 Andrew.Place@state.mn.us | Stephani Campbell Environmental Control Engineer U.S. Steel - Minntac P.O. Box 417 8819 Old Hwy 169 Mt. Iron, MN 55768 (218) 778-8684 scampbell@uss.com | Tom Kuchinski Vice President/Stack Testing Services Coordinator Barr Engineering Co. 4300 Market Pointe Drive Minneapolis, MN 55435 (952) 832-2727 (952) 832-2601 tkuchinski@barr.com |