Commonwealth of Virginia

**Blalock, Susan <susan.blalock@deq.virginia.gov>**

# FW: Semi-Monthly Daily LFG Well Temperature and Status Update

1 message

**Crystal Bazyk** <crystal.bazyk@deq.virginia.gov> Thu, Jun 16, 2022 at 1:08 PM
To: "Sells, Angela" <angela.p.sells@deq.virginia.gov>
Cc: "Blalock, Susan" <susan.blalock@deq.virginia.gov>

**From:** King, Brandon <BKing@scsengineers.com>
**Sent:** Wednesday, June 15, 2022 5:19 PM
**To:** crystal.bazyk@deq.virginia.gov; hall.kristen@epa.gov; jeff.hurst@deq.virginia.gov; willard.erinm@epa.gov; stacy.bowers@deq.virginia.gov; David Cochran <dcochran@bristolva.org>; Randall Eads <CityManager@bristolva.org>; 'mmartin@bristolva.org' (mmartin@bristolva.org) <mmartin@bristolva.org>
**Cc:** Warren, Charles <CWarren@scsengineers.com>; Dick, Bob <BDick@scsengineers.com>; Nachman, Lucas <LNachman@scsengineers.com>; Lock, Tom <TLock@scsengineers.com>
**Subject:** Semi-Monthly Daily LFG Well Temperature and Status Update

Ms. Hall and Ms. Bazyk,

In accordance with EPA's letter, "Approval of Higher Operating Temperature Values of Landfill Gas Wells and Submission of Gas Treatment Alternatives at the Bristol Virginia Integrated Solid Waste Facility" from August 2021, I am providing the June 15, 2022 status report on the existing wells, expansion of the gas collection system, and continuing operating and monitoring results, covering the period from June 1-15, 2022.

Let me know if you have any questions.

Thank you,

*D. Brandon King*

*Project Manager*

*SCS Engineers*

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**Bimonthly Daily LFG Well Temperature Update_6-15-22_FINAL.pdf**
6788K

June 15, 2022

File No. 02218208.04

MEMORANDUM

TO: Kristin Hall, EPA Region III
Crystal Bayzk, VDEQ-SWRO

FROM: D. Brandon King, SCS Engineers
Robert E. Dick, SCS Engineers

SUBJECT: Semi-monthly Status Update – June 1st through June 15th, 2022
Bristol Integrated Waste Management Facility, Bristol, Virginia

In accordance with the Environmental Protection Agency (EPA) Region III letter, *Approval of Higher Operating Temperature Values for Landfill Gas Wells and Submission of Gas Treatment Alternatives at the Bristol Virginia Integrated Solid Waste Management Facility*, dated 8/23/21, SCS is submitting this semi-monthly status update to satisfy the condition of compliance provision #2. This compliance provision report includes daily temperature readings of the existing and new wells installed. In addition, this report includes a summary of work accomplished during this reporting period of 6/1/22 through 6/15/22, pursuant of compliance provision #2.

## DAILY TEMPERATURE READINGS

Daily temperature readings were recorded by the City throughout the first half of June and displayed on the attached table. Existing wells GW-31R and GW-37 continue to exhibit temperatures at or near 160F, but increased to 170F at the end of this reporting period. Existing well GW-46 exhibited temperatures above 145F during this reporting period, however a reading of 100F on 6/15/22 was recorded, while existing well GW-47 remained below 145F throughout this reporting period. New well GW-64 continued to record a temperature just above 145F through June 2, but has shown readings greater than 145F since June 13. New well GW-55 recorded temperatures between 175F and 190F during this period, but has recently demonstrated limited accessibility to sample ports. The City and SCS are addressing this at well GW-55. In addition, wells GW-32R, GW-49, GW-50, GW-52, GW-54, GW-57, and GW-67 recorded relatively consistent readings greater than 145F from approximately June 10 to the end of this reporting period according to the City's data. All other LFG wells recorded temperatures below 145F during the first half of June. The City recorded temperature readings significantly lower in wells GW-40, GW-46, GW-47, GW-53, GW-57, GW-58, GW-59, and GW-66 on June 15 than the previous day. The City and SCS believe this is a result of lower vacuum upstream of the new sump. SCS has coordinated efforts to address this before the end of the week.

SCS mobilized to the site and conducted June monthly LFG wellfield monitoring on June 1st. SCS performed retest monitoring on the LFG wellfield on 6/8/22.

## LFG ANALYTICAL DATA REVIEW

The City and SCS are still awaiting the EPA's evaluation of the Higher Operating Value for Temperature Request letter submitted to EPA on 3/8/22. According to SCS June 2022 LFG monthly wellfield data, exceedance temperatures persist in HOV requested wells GW-31R, GW-37, and GW-67. SCS recorded CO samples via 1.5L Summa Canister at these three wells on 6/1/22. However,

well GW-64, which exhibited a temperature exceedance in May, recorded a temperature below 145F in June.

Well GW-55 recorded a temperature of 188F by SCS on 6/1/22. SCS recorded a CO sample via 1.5L Summa Canister at GW-55 on 6/1/22. However, landfill liquids entered the canister during the sampling activities, and thus Enthalpy Analytical was unable to perform the EPA Method CO ALT 145 laboratory analysis. SCS was unable to record a retest on well GW-55 on 6/8/22 due to liquids and maintenance concerns.

The three other CO ALT 145 samples were analyzed on 6/7-8/22. The results showed CO concentrations below the minimal detection limit (MDL) of 90 parts per million (ppm) for GW-37. The laboratory data exhibited CO concentrations of 95.3 and 155 ppm in wells GW-31R and GW-67 respectively. Well GW-67 recorded a temperature below 145F during retest activities on 6/8/22. This reestablished compliance in well GW-67. Therefore additional enhanced monitoring was not required per Subpart AAAA as the temperature was below 145F. The laboratory analytical results for EPA Method CO ALT 145 from the report dated 6/10/22 are attached for reference.

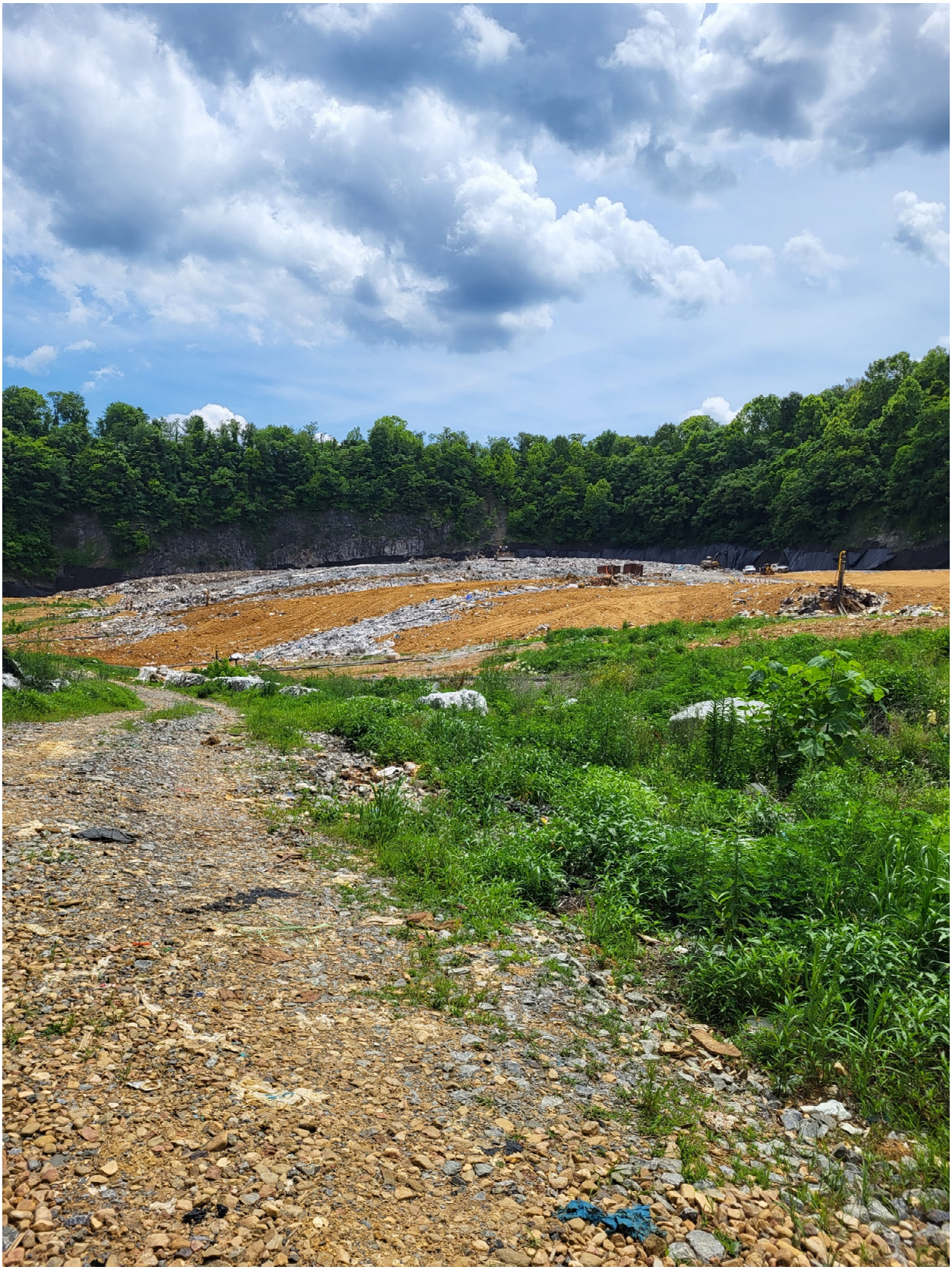
SCS personnel did not observe any signs of SSO events while performing the routine wellfield monitoring on June 1. SCS looked for smoke, settlements, discolored or deformed piping, but observed no evidence at any wellhead. Furthermore, SCS has scheduled the 15-day LFG wellfield retest monitoring for 6/16/22.

## NON-ROUTINE O&M

SCS Field Services (FS) O&M has not conducted any significant non-routine O&M to the LFG Collection System in June thus far, outside of June monthly LFG wellfield monitoring activities. During 6/8/22 LFG monitoring activities, technicians identified HDPE sample ports on well GW-55 that should be replaced with steel barbed sample ports. SCS was unable to record a retest on well GW-55 on 6/8/22 due to liquids and maintenance concerns. SCS-FS non-routine O&M staff will address this during the week of 6/20/22.

SCS-FS non-routine O&M is currently scheduled to arrive on-site 6/21/22 and remain on site through July 1 to perform pump maintenance activities and other non-routine O&M activities such as raising wells and moving lateral piping for filling activities.

City personnel have periodically been hauling cover soil into Permit #588 Landfill and spreading over exposed areas of waste in non-active filling areas thus far in June. There were 36 loads of soil hauled into the Permit #588 Landfill and spread over non-active filling areas during the week of 6/6/22, along with an additional 2 loads of Posi-Shell addressed in other areas. The City's Street Department allocated 5 dump trucks to stockpile soil (approximately 30-40 loads) on 6/13/22, which is currently being spread over non-active filling areas on 6/15/22. See reference photo from 6/10/22 below.



## EVALUATION OF LFG SYSTEM

There should be several functional dedicated pneumatic dewatering pumps available on standby to be switched out in the event a well has a non-functioning pump. As of 6/15/22, the pump in the new sump in the southeast section of the landfill needs to be cleaned or switched. SCS has coordinated with SCS-FS to address this on 6/16/22. SCS-FS O&M recommends a dedicated pneumatic pump testing and cleaning station be set up on-site in order to confirm the operational status of dewatering pneumatic pumps at the Facility. The City has responded to this request by fabricating a vice to a workshop table dedicated to cleaning the pumps and allowing SCS-FS access to the City's wash bay. In addition, the City will provide SCS-FS an air compressor from a service truck and a water barrel to test the pneumatic pumps to satisfy this need from O&M.

Furthermore, SCS Engineers advises the City to procure a QED AP4.5 Ultra High-Temperature pneumatic pump with dedicated high temperature tubing bundle to compare overall performance and time duration between pump maintenance (e.g. pump pulling and cleaning) to the One Pump by Pump One. Looking further ahead, it will be important for the City to have at least 4 or 5 additional dewatering pumps that are tested and confirmed to be operational to have on standby. SCS is investigating other pumps that may require less maintenance in these conditions.

SCS performed the Second Quarter 2022 Surface Emissions Monitoring event on 6/9/22. Results from this event indicated one exceedance of the 76 points monitored on the serpentine route. In addition, seven exceedances were identified at the well surface cover penetration. The City is currently performing corrective actions at these eight exceedance locations and SCS will be on-site on 6/16/22 to perform the initial 10-day retest.

Please contact SCS or City personnel if you have any questions or require additional information.

cc: Randall Eads, City of Bristol
Michael Maine, City of Bristol
Jeff Hurst, VDEQ-SWRO
Tom Lock, SCS Field Services
David Cochran, City of Bristol
Erin Willard, EPA Region III
Stacy Bowers, VDEQ-SWRO
Robert E. Dick, P.E., SCS Engineers

| Note | Well Depth | Date Drill | Phase | Month | May | June | June | June | June | June | June | June | June | June | June | June | June | June | June |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Day | Tuesday | Wednesda | Thursday | Friday | Saturday | Sunday | Monday | Tuesday | Wednesda | Thursday | Friday | Saturday | Sunday | Monday | Tuesday | Wednesda |
| | | | | Date | 31 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| | | | | Well Number | | | | | | | | | | | | | | | | |
| ADI | 102 | 10/16/2016 | Old Well | **35** | 94 | 90 | 90 | 75 | | 90 | 95 | 80 | 85 | 90 | 90 | 95 | 92 | 100 | 90 | 105 |
| ADI | 70 | 9/6/2017 | Old Well | **39** | 122 | 120 | 120 | 119 | | 112 | 115 | 110 | 110 | 115 | 130 | 134 | 125 | 130 | 125 | 130 |
| ADI | 100 | 9/7/2017 | Old Well | **40** | 110 | 110 | 110 | 115 | | 112 | 118 | 115 | 110 | 110 | 115 | 120 | 110 | 115 | 115 | 80 |
| ADI | 110 | 10/4/2016 | Old Well | **46** | 160 | 150 | 160 | 150 | | 150 | 152 | 160 | 150 | 170 | 170 | 165 | 172 | 180 | 180 | 100 |
| ADI | 120 | 10/4/2016 | Old Well | **47** | 122 | | 130 | 130 | | 124 | 120 | 115 | 120 | 130 | 130 | 128 | 135 | 140 | 135 | 100 |
| | | | | | | | | | | | | | | | | | | | | |
| 6 | 120 | 9/17/2013 | Old Well | **29** | | | | | | | | | | | | | | | | |
| 7 | 100 | 8/23/2017 | Old Well | **30R** | | | | | | | | | | | | | | | | |
| 8 | 120 | 8/30/2017 | Old Well | **31R** | 139 | 150 | 150 | 145 | | 150 | 149 | 145 | 145 | 160 | 165 | 167 | 160 | 165 | 170 | 170 |
| 9 | 70 | 7/29/2016 | Old Well | **32** | | | | | | | | | | | | | | | | |
| 10 | 100 | 7/28/2016 | Old Well | **33** | | | | | | | | | | | | | | | | |
| 11 | 100 | 7/30/2016 | Old Well | **34** | | | | | | | | | | | | | | | | |
| 12 | 100 | 8/1/2016 | Old Well | **36** | | | | | | | | | | | | | | | | |
| 13 | 100 | 8/24/2017 | Old Well | **37** | 160 | 160 | 160 | 140 | 150 | 150 | 150 | 150 | 150 | 160 | 165 | 168 | 165 | 170 | 170 | 170 |
| 14 | 50 | 8/25/2017 | Old Well | **38** | | | | | | | | | | | | | | | | |
| 15 | 75 | 9/8/2017 | Old Well | **41** | | | | | | | | | | | | | | | | |
| 16 | 57 | 9/8/2017 | Old Well | **42** | | | | | | | | | | | | | | | | |
| 17 | 110 | 10/7/2016 | Old Well | **48** | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | | | |
| 1 | 120 | 10/1/2021 | New Well | **32R** | Too Tall | 140 | 140 | 139 | Too Tall | Too Tall | Too Tall | 130 | 135 | 140 | 150 | 154 | 145 | 150 | 145 | 150 |
| 2 | 110 | 10/1/2021 | New Well | **49** | 139 | 140 | 140 | 120 | | 130 | 135 | 130 | 110 | 140 | 150 | 148 | 152 | 150 | 140 | 150 |
| 3 | 96 | 10/1/2021 | New Well | **50** | 140 | 145 | 140 | 135 | | 130 | 129 | 130 | 130 | 149 | 150 | 153 | 148 | 150 | 150 | 150 |
| 4 | 114 | 10/1/2021 | New Well | **51** | 109 | 110 | 105 | 80 | | 102 | 100 | 95 | 90 | 100 | 110 | 115 | 105 | 125 | 105 | 130 |
| 5 | 109 | 10/1/2021 | New Well | **52** | 140 | 140 | 140 | 130 | | 135 | 129 | 130 | 135 | 145 | 150 | 153 | 148 | 145 | 145 | 150 |
| 6 | 91 | 10/1/2021 | New Well | **53** | 120 | 120 | 125 | 110 | | 126 | 130 | 120 | 125 | 135 | 140 | 142 | 139 | 145 | 140 | 110 |
| 7 | 91 | 10/1/2021 | New Well | **54** | Too Tall | | 145 | 140 | Too Tall | Too Tall | Too Tall | 140 | 145 | 145 | 140 | 140 | 145 | Too Tall | | |
| 8 | 104 | 10/1/2021 | New Well | **55** | 190 | 180 | 185 | 175 | | 170 | 175 | 180 | 180 | 190 | 185 | 186 | 175 | Too Tall | | |
| 9 | 109 | 10/1/2021 | New Well | **56** | Too Tall | 140 | 140 | Too Tall | Too Tall | Too Tall | Too Tall | Too Tall | Too Tall | Too Tall | Too Tall | | | | | |
| 10 | 103 | 10/1/2021 | New Well | **57** | 140 | 145 | 120 | 125 | | 130 | 125 | 130 | 135 | 150 | 145 | 143 | 150 | 150 | 150 | 105 |
| 11 | 92 | 10/1/2021 | New Well | **58** | 120 | 120 | 120 | 115 | | 119 | 120 | 115 | 115 | 130 | 135 | 140 | 132 | 140 | 140 | 100 |
| 12 | 72 | 10/1/2021 | New Well | **59** | 111 | 120 | 120 | 100 | | 109 | 110 | 100 | 110 | 130 | 130 | 134 | 120 | 125 | 120 | 90 |
| 13 | 120 | 10/1/2021 | New Well | **60** | 120 | 120 | 130 | 120 | | 120 | 115 | 120 | 120 | 130 | 135 | 130 | 136 | 140 | 140 | 135 |
| 14 | 105 | 10/1/2021 | New Well | **61** | 112 | 110 | 110 | 100 | | 105 | 101 | 105 | 100 | 110 | 115 | 120 | 118 | 120 | 120 | 130 |
| 15 | 120 | 10/1/2021 | New Well | **62** | 100 | 110 | 120 | 110 | 112 | 110 | 112 | 110 | 110 | 110 | 120 | 115 | 125 | 125 | 120 | 130 |
| 16 | 117 | 10/1/2021 | New Well | **63** | Too Tall | 80 | 90 | 90 | Too Tall | Too Tall | Too Tall | 80 | 85 | 85 | 90 | 100 | 95 | 100 | 95 | 105 |
| 17 | 120 | 10/1/2021 | New Well | **64** | 149 | 145 | 145 | 130 | 130 | 138 | 140 | 140 | 140 | 145 | 140 | 130 | 135 | 155 | 155 | 160 |
| 18 | 100 | 10/1/2021 | New Well | **65** | 135 | 120 | 119 | 110 | | 110 | 112 | 90 | 119 | 100 | 105 | 110 | 108 | 120 | 105 | 120 |
| 19 | 102 | 10/1/2021 | New Well | **66** | 130 | 130 | 130 | 120 | | 130 | 132 | 120 | 120 | 140 | 145 | 139 | 142 | 140 | 145 | 105 |
| 20 | 100 | 10/1/2021 | New Well | **67** | 139 | 150 | 150 | 140 | | 140 | 135 | 130 | 140 | 125 | 155 | 161 | 160 | 160 | 160 | 155 |
| 21 | 75 | 10/1/2021 | New Well | **68** | 122 | 120 | 120 | 110 | | 110 | 108 | 115 | 120 | 120 | 130 | 125 | 132 | 130 | 130 | 130 |

1941 Reymet Road ● Richmond, Virginia 23237 ● Tel: (804)-358-8295 Fax: (804)-358-8297

# Certificate of Analysis

***Final Report***

**Laboratory Order ID 22F0186**

| | | | |
|---|---|---|---|
| Client Name: | SCS Field Services - Harrisburg, PA | Date Received: | June 3, 2022 10:15 |
| | 4330 Lewis Road, Suite 1 | Date Issued: | June 10, 2022 16:02 |
| | Harrisburg, PA 17111 | Project Number: | [none] |
| Submitted To: | Mike Gibbons | Purchase Order: | |
| Client Site I.D.: | Bristol | | |

Enclosed are the results of analyses for samples received by the laboratory on 06/03/2022 10:15. If you have any questions concerning this report, please feel free to contact the laboratory.

Sincerely,

Ted Soyars

Technical Director

**End Notes**:

The test results listed in this report relate only to the samples submitted to the laboratory and as received by the Laboratory.

Unless otherwise noted, the test results for solid materials are calculated on a wet weight basis. Analyses for pH, dissolved oxygen, temperature, residual chlorine and sulfite that are performed in the laboratory do not meet NELAC requirements due to extremely short holding times. These analyses should be performed in the field. The results of field analyses performed by the Sampler included in the Certificate of Analysis are done so at the client's request and are not included in the laboratory's fields of certification nor have they been audited for adherence to a reference method or procedure.

The signature on the final report certifies that these results conform to all applicable NELAC standards unless otherwise specified. For a complete list of the Laboratory's NELAC certified parameters please contact customer service.

This report shall not be reproduced except in full without the expressed and written approval of an authorized representative of Enthalpy Analytical, Inc.

TNI Accredited
VELAP ID 460021

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**ANALYTICAL REPORT FOR SAMPLES**

| Sample ID | Laboratory ID | Matrix | Date Sampled | Date Received |
|---|---|---|---|---|
| 37 | 22F0186-01 | Air | 06/01/2022 13:50 | 06/03/2022 10:15 |
| 31 | 22F0186-02 | Air | 06/01/2022 14:07 | 06/03/2022 10:15 |
| 67 | 22F0186-03 | Air | 06/01/2022 14:17 | 06/03/2022 10:15 |

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| Submitted To: | Mike Gibbons | Project Number: | [none] |
| Client Site I.D.: | Bristol | Purchase Order: | |

**ANALYTICAL RESULTS**

Project Location:

**Field Sample #: 37**

**Sample ID: 22F0186-01**

Sample Matrix: Air

Sampled: 6/1/2022 13:50

Sample Type: :LG

Sample Description/Location:

Sub Description/Location:

Canister ID: 063-00183: 12064

Canister Size: 1.4

Initial Vacuum(in Hg): 20.2

Final Vacuum(in Hg): 4.0

Receipt Vacuum(in Hg): 4.0

Flow Controller Type: Passive

Flow Controller ID: LFGST001

**Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis ALT-145**

| Analyte | ppmv Result | MDL | LOQ | Flag/Qual | Dilution | PF | Date/Time Analyzed | Analyst |
|---|---|---|---|---|---|---|---|---|
| Carbon Monoxide, as received | ND | 90.0 | 90.0 | | 9 | 1 | 6/7/22 15:57 | DFH |

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| Submitted To: | Mike Gibbons | Project Number: | [none] |
| Client Site I.D.: | Bristol | Purchase Order: | |

**ANALYTICAL RESULTS**

Project Location:

**Field Sample #: 31**

**Sample ID: 22F0186-02**

Sample Matrix: Air

Sampled: 6/1/2022 14:07

Sample Type: :LG

Sample Description/Location:

Sub Description/Location:

Canister ID: 063-00307: 305

Canister Size: 1.4

Initial Vacuum(in Hg): 20.2

Final Vacuum(in Hg): 4.0

Receipt Vacuum(in Hg): 4.0

Flow Controller Type: Passive

Flow Controller ID: LFGST001

**Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis ALT-145**

| Analyte | ppmv Result | MDL | LOQ | Flag/Qual | Dilution | PF | Date/Time Analyzed | Analyst |
|---|---|---|---|---|---|---|---|---|
| Carbon Monoxide, as received | 95.3 | 90.0 | 90.0 | | 9 | 1 | 6/7/22 17:16 | DFH |

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| Submitted To: | Mike Gibbons | Project Number: | [none] |
| Client Site I.D.: | Bristol | Purchase Order: | |

**ANALYTICAL RESULTS**

Project Location:

**Field Sample #: 67**

**Sample ID: 22F0186-03**

Sample Matrix: Air

Sampled: 6/1/2022 14:17

Sample Type: :LG

Sample Description/Location:

Sub Description/Location:

Canister ID: 063-00006: 12407

Canister Size: 1.4

Initial Vacuum(in Hg): 20.2

Final Vacuum(in Hg): 4.0

Receipt Vacuum(in Hg): 4.0

Flow Controller Type: Passive

Flow Controller ID: LFGST001

**Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis ALT-145**

| Analyte | ppmv Result | MDL | LOQ | Flag/Qual | Dilution | PF | Date/Time Analyzed | Analyst |
|---|---|---|---|---|---|---|---|---|
| Carbon Monoxide, as received | 155 | 90.0 | 90.0 | | 9 | 1 | 6/8/22 12:06 | DFH |

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| Submitted To: | Mike Gibbons | Project Number: | [none] |
| Client Site I.D.: | Bristol | Purchase Order: | |

## Analytical Summary

| Sample ID | Preparation Factors Initial / Final | Method | Batch ID | Sequence ID | Calibration ID |
|---|---|---|---|---|---|
| **Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis** | | | **Preparation Method:** | **No Prep VOC GC Air** | |
| 22F0186-01 | 1.00 mL / 1.00 mL | ALT-145 | BFF0235 | SFF0236 | AG00026 |
| 22F0186-02 | 1.00 mL / 1.00 mL | ALT-145 | BFF0235 | SFF0236 | AG00026 |
| 22F0186-03 | 1.00 mL / 1.00 mL | ALT-145 | BFF0235 | SFF0236 | AG00026 |
| 22F0186-03RE1 | 1.00 mL / 1.00 mL | ALT-145 | BFF0235 | SFF0295 | AG00026 |

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| Submitted To: | Mike Gibbons | Project Number: | [none] |
| Client Site I.D.: | Bristol | Purchase Order: | |

## Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis - Quality Control

## Enthalpy Analytical

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch BFF0235 - No Prep VOC GC Air** | | | | | | | | | | |
| **Blank (BFF0235-BLK1)** | | | | | Prepared & Analyzed: 06/06/2022 | | | | | |
| Carbon Monoxide | < | 10.0 | ppmv | | | | | | | |
| **LCS (BFF0235-BS1)** | | | | | Prepared & Analyzed: 06/06/2022 | | | | | |
| Methane | 4520 | 500 | ppmv | 5000 | | 90.3 | 0-200 | | | |
| Carbon dioxide | 3950 | 500 | ppmv | 5000 | | 79.0 | 0-200 | | | |
| Oxygen (O2) | 4750 | 500 | ppmv | 5000 | | 95.1 | 0-200 | | | |
| Nitrogen (N2) | 4840 | 500 | ppmv | 5000 | | 96.8 | 0-200 | | | |
| Hydrogen (H2) | 5290 | 200 | ppmv | 5100 | | 104 | 0-200 | | | |
| Carbon Monoxide | 4660 | 10 | ppmv | 5000 | | 93.3 | 0-200 | | | |
| **Duplicate (BFF0235-DUP1)** | | | **Source: 22F0180-01** | | Prepared & Analyzed: 06/06/2022 | | | | | |
| Methane | 5340 | 4500 | ppmv | | 5350 | | | 0.0741 | 25 | |
| Carbon dioxide | 616000 | 4500 | ppmv | | 619000 | | | 0.469 | 25 | |
| Oxygen (O2) | 16700 | 4500 | ppmv | | 16700 | | | 0.368 | 25 | |
| Nitrogen (N2) | 60900 | 4500 | ppmv | | 61200 | | | 0.448 | 25 | |
| Hydrogen (H2) | 248000 | 1800 | ppmv | | 250000 | | | 0.589 | 25 | |
| Carbon Monoxide | 3160 | 90.0 | ppmv | | 3180 | | | 0.496 | 25 | |
| **Duplicate (BFF0235-DUP2)** | | | **Source: 22F0180-02** | | Prepared & Analyzed: 06/06/2022 | | | | | |
| Methane | 294000 | 4500 | ppmv | | 295000 | | | 0.0568 | 25 | |
| Carbon dioxide | 513000 | 4500 | ppmv | | 509000 | | | 0.819 | 25 | |
| Oxygen (O2) | < | 4500 | ppmv | | <4500 | | | NA | 25 | |
| Hydrogen (H2) | 75500 | 1800 | ppmv | | 75500 | | | 0.0997 | 25 | |
| Nitrogen (N2) | 34100 | 4500 | ppmv | | 34100 | | | 0.0417 | 25 | |
| Carbon Monoxide | 317 | 90.0 | ppmv | | 314 | | | 1.11 | 25 | |
| **Duplicate (BFF0235-DUP3)** | | | **Source: 22F0240-01** | | Prepared & Analyzed: 06/06/2022 | | | | | |
| Methane | 192000 | 4500 | ppmv | | 189000 | | | 1.63 | 25 | |
| Carbon dioxide | 201000 | 4500 | ppmv | | 198000 | | | 1.10 | 25 | |
| Oxygen (O2) | 106000 | 4500 | ppmv | | 107000 | | | 1.25 | 25 | |
| Nitrogen (N2) | 430000 | 4500 | ppmv | | 434000 | | | 0.954 | 25 | |
| Hydrogen (H2) | 14100 | 1800 | ppmv | | 14200 | | | 0.926 | 25 | |
| Carbon Monoxide | < | 90.0 | ppmv | | <90.0 | | | NA | 25 | |

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# Certificate of Analysis

Final Report

**Laboratory Order ID 22F0186**

| | | | |
|---|---|---|---|
| Client Name: | SCS Field Services - Harrisburg, PA<br>4330 Lewis Road, Suite 1<br><br>Harrisburg, PA 17111 | Date Received:<br>Date Issued: | June 3, 2022 10:15<br>June 10, 2022 16:02 |
| Submitted To: | Mike Gibbons | Project Number: | [none] |
| Client Site I.D.: | Bristol | Purchase Order: | |

## Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis - Quality Control

## Enthalpy Analytical

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch BFF0235 - No Prep VOC GC Air** | | | | | | | | | | |
| **Duplicate (BFF0235-DUP4)** | | | | **Source: 22F0233-01** | Prepared & Analyzed: 06/06/2022 | | | | | |
| Methane | 392000 | 4500 | ppmv | | 394000 | | | 0.368 | 25 | |
| Carbon dioxide | 344000 | 4500 | ppmv | | 348000 | | | 1.02 | 25 | |
| Oxygen (O2) | 10200 | 4500 | ppmv | | 10300 | | | 0.457 | 25 | |
| Hydrogen (H2) | 15200 | 1800 | ppmv | | 15400 | | | 1.05 | 25 | |
| Nitrogen (N2) | 113000 | 4500 | ppmv | | 113000 | | | 0.429 | 25 | |
| Carbon Monoxide | < | 90.0 | ppmv | | <90.0 | | | NA | 25 | |
| **Duplicate (BFF0235-DUP5)** | | | | **Source: 22F0234-01** | Prepared & Analyzed: 06/06/2022 | | | | | |
| Methane | 285000 | 4500 | ppmv | | 285000 | | | 0.178 | 25 | |
| Carbon dioxide | 332000 | 4500 | ppmv | | 334000 | | | 0.491 | 25 | |
| Oxygen (O2) | 24000 | 4500 | ppmv | | 24100 | | | 0.191 | 25 | |
| Hydrogen (H2) | 93400 | 1800 | ppmv | | 93300 | | | 0.0830 | 25 | |
| Nitrogen (N2) | 151000 | 4500 | ppmv | | 151000 | | | 0.291 | 25 | |
| Carbon Monoxide | 93.2 | 90.0 | ppmv | | 94.0 | | | 0.769 | 25 | |
| **Duplicate (BFF0235-DUP6)** | | | | **Source: 22F0234-02** | Prepared & Analyzed: 06/06/2022 | | | | | |
| Methane | 127000 | 4500 | ppmv | | 126000 | | | 0.178 | 25 | |
| Carbon dioxide | 182000 | 4500 | ppmv | | 201000 | | | 9.78 | 25 | |
| Oxygen (O2) | 88000 | 4500 | ppmv | | 87900 | | | 0.169 | 25 | |
| Hydrogen (H2) | 68600 | 1800 | ppmv | | 68600 | | | 0.0477 | 25 | |
| Nitrogen (N2) | 378000 | 4500 | ppmv | | 377000 | | | 0.268 | 25 | |
| Carbon Monoxide | 121 | 90.0 | ppmv | | 120 | | | 0.299 | 25 | |
| **Duplicate (BFF0235-DUP7)** | | | | **Source: 22F0234-03** | Prepared & Analyzed: 06/06/2022 | | | | | |
| Methane | 303000 | 4500 | ppmv | | 304000 | | | 0.354 | 25 | |
| Carbon dioxide | 372000 | 4500 | ppmv | | 373000 | | | 0.337 | 25 | |
| Oxygen (O2) | 5740 | 4500 | ppmv | | 5750 | | | 0.244 | 25 | |
| Nitrogen (N2) | 50500 | 4500 | ppmv | | 50700 | | | 0.411 | 25 | |
| Hydrogen (H2) | 152000 | 1800 | ppmv | | 153000 | | | 0.491 | 25 | |
| Carbon Monoxide | 175 | 90.0 | ppmv | | 176 | | | 0.514 | 25 | |

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| Submitted To: | Mike Gibbons | Project Number: | [none] |
| Client Site I.D.: | Bristol | Purchase Order: | |

## Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis - Quality Control

## Enthalpy Analytical

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch BFF0235 - No Prep VOC GC Air** | | | | | | | | | | |
| **Duplicate (BFF0235-DUP8)** | | | **Source: 22F0234-04** | | Prepared & Analyzed: 06/06/2022 | | | | | |
| Methane | 306000 | 4500 | ppmv | | 307000 | | | 0.0640 | 25 | |
| Carbon dioxide | 293000 | 4500 | ppmv | | 294000 | | | 0.285 | 25 | |
| Oxygen (O2) | < | 4500 | ppmv | | <4500 | | | NA | 25 | |
| Hydrogen (H2) | 217000 | 1800 | ppmv | | 217000 | | | 0.168 | 25 | |
| Nitrogen (N2) | 62400 | 4500 | ppmv | | 62600 | | | 0.226 | 25 | |
| Carbon Monoxide | 162 | 90.0 | ppmv | | 160 | | | 1.17 | 25 | |
| **Duplicate (BFF0235-DUP9)** | | | **Source: 22F0174-01** | | Prepared: 06/06/2022 Analyzed: 06/07/2022 | | | | | |
| Methane | 447000 | 4500 | ppmv | | 444000 | | | 0.513 | 25 | |
| Carbon dioxide | 434000 | 4500 | ppmv | | 430000 | | | 0.885 | 25 | |
| Oxygen (O2) | < | 4500 | ppmv | | <4500 | | | NA | 25 | |
| Nitrogen (N2) | 50000 | 4500 | ppmv | | 49800 | | | 0.536 | 25 | |
| Hydrogen (H2) | < | 1800 | ppmv | | <1800 | | | NA | 25 | |
| Carbon Monoxide | < | 90.0 | ppmv | | <90.0 | | | NA | 25 | |
| **Duplicate (BFF0235-DUPA)** | | | **Source: 22F0174-02** | | Prepared: 06/06/2022 Analyzed: 06/07/2022 | | | | | |
| Methane | 437000 | 4500 | ppmv | | 447000 | | | 2.13 | 25 | |
| Carbon dioxide | 400000 | 4500 | ppmv | | 411000 | | | 2.56 | 25 | |
| Oxygen (O2) | < | 4500 | ppmv | | <4500 | | | NA | 25 | |
| Nitrogen (N2) | 46400 | 4500 | ppmv | | 46600 | | | 0.400 | 25 | |
| Hydrogen (H2) | 15700 | 1800 | ppmv | | 16200 | | | 2.96 | 25 | |
| Carbon Monoxide | < | 90.0 | ppmv | | <90.0 | | | NA | 25 | |
| **Duplicate (BFF0235-DUPB)** | | | **Source: 22F0186-01** | | Prepared: 06/06/2022 Analyzed: 06/07/2022 | | | | | |
| Methane | 152000 | 4500 | ppmv | | 153000 | | | 0.205 | 25 | |
| Carbon dioxide | 204000 | 4500 | ppmv | | 209000 | | | 2.58 | 25 | |
| Oxygen (O2) | 62700 | 4500 | ppmv | | 63000 | | | 0.490 | 25 | |
| Hydrogen (H2) | 4950 | 1800 | ppmv | | 4870 | | | 1.67 | 25 | |
| Nitrogen (N2) | 432000 | 4500 | ppmv | | 433000 | | | 0.332 | 25 | |
| Carbon Monoxide | < | 90.0 | ppmv | | <90.0 | | | NA | 25 | |

ENTHALPY ANALYTICAL

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# Certificate of Analysis

Final Report

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| Submitted To: | Mike Gibbons | Project Number: | [none] |
| Client Site I.D.: | Bristol | Purchase Order: | |

## Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis - Quality Control

## Enthalpy Analytical

| Analyte | Result | Reporting Limit | Units | Spike Level | Source Result | %REC | %REC Limits | RPD | RPD Limit | Qual |
|---|---|---|---|---|---|---|---|---|---|---|
| **Batch BFF0235 - No Prep VOC GC Air** | | | | | | | | | | |
| **Duplicate (BFF0235-DUPC)** | | | **Source: 22F0186-02** | | Prepared: 06/06/2022 Analyzed: 06/07/2022 | | | | | |
| Methane | 267000 | 4500 | ppmv | | 267000 | | | 0.161 | 25 | |
| Carbon dioxide | 504000 | 4500 | ppmv | | 500000 | | | 0.697 | 25 | |
| Oxygen (O2) | 10400 | 4500 | ppmv | | 10400 | | | 0.000868 | 25 | |
| Nitrogen (N2) | 77500 | 4500 | ppmv | | 77900 | | | 0.617 | 25 | |
| Hydrogen (H2) | 7930 | 1800 | ppmv | | 8020 | | | 1.04 | 25 | |
| Carbon Monoxide | 90.6 | 90.0 | ppmv | | 95.3 | | | 5.03 | 25 | |
| **Duplicate (BFF0235-DUPF)** | | | **Source: 22F0186-03RE1** | | Prepared: 06/06/2022 Analyzed: 06/08/2022 | | | | | |
| Methane | 325000 | 4500 | ppmv | | 399000 | | | 20.4 | 25 | |
| Carbon dioxide | 337000 | 4500 | ppmv | | 421000 | | | 22.1 | 25 | |
| Oxygen (O2) | 8050 | 4500 | ppmv | | 5310 | | | 41.0 | 25 | P |
| Hydrogen (H2) | 26300 | 1800 | ppmv | | 31400 | | | 17.8 | 25 | |
| Nitrogen (N2) | 26300 | 4500 | ppmv | | 17900 | | | 37.6 | 25 | P |
| Carbon Monoxide | 143 | 90.0 | ppmv | | 155 | | | 8.35 | 25 | |

## Certified Analytes included in this Report

| Analyte | Certifications | Analyte | Certifications |
|---|---|---|---|

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# Certificate of Analysis

Final Report

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| Submitted To: | Mike Gibbons | Project Number: | [none] |
| Client Site I.D.: | Bristol | Purchase Order: | |

| Code | Description | Laboratory ID | Expires |
|---|---|---|---|
| MADEP | Massachusetts DEP | M-VA913 | 06/30/2022 |
| MdDOE | Maryland DE Drinking Water | 341 | 12/31/2022 |
| NC | North Carolina DENR | 495 | 07/31/2022 |
| NCDEQ | North Carolina DEQ | 495 | 12/31/2022 |
| NCDOH | North Carolina Department of Health | 51714 | 07/31/2022 |
| NJDEP | NELAP-New Jersey DEP | VA015 | 06/30/2022 |
| NYDOH | New York DOH Drinking Water | 12096 | 04/01/2023 |
| PADEP | NELAP-Pennsylvania Certificate #007 | 68-03503 | 10/31/2022 |
| VELAP | NELAP-Virginia Certificate #11900 | 460021 | 06/14/2023 |
| WVDEP | West Virginia DEP | 350 | 11/30/2022 |

## Qualifiers and Definitions

| | |
|---|---|
| P | Duplicate analysis does not meet the acceptance criteria for precision |
| RPD | Relative Percent Difference |
| Qual | Qualifers |
| -RE | Denotes sample was re-analyzed |
| PF | Preparation Factor |
| MDL | Method Detection Limit |
| LOQ | Limit of Quantitation |
| ppbv | parts per billion by volume |

TIC — Tentatively Identified Compounds are compounds that are identified by comparing the analyte mass spectral pattern with the NIST spectral library. A TIC spectral match is reported when the pattern is at least 75% consistent with the published pattern. Compound concentrations are estimated and are calculated using an internal standard response factor of 1.

All EPA method 3C results are reported as normalized values when the sum total of all evaluated constituents is outside ± 10% of the absolute.

ENTHALPY ANALYTICAL
formerly Air, Water & Soil Laboratories

# AIR ANALYSIS
## CHAIN OF CUSTODY

**Equipment due 4/29/22**

| | | |
|---|---|---|
| COMPANY NAME: SCS Field Services - Harrisburg | INVOICE TO: **Same** | PROJECT NAME/Quote #: **Bristol** |
| CONTACT: | INVOICE CONTACT: | SITE NAME: |
| ADDRESS: | INVOICE ADDRESS: | PROJECT NUMBER: |
| PHONE #: | INVOICE PHONE #: | P.O. #: |
| FAX #: EMAIL: | | Pretreatment Program: |
| Is sample for compliance reporting? YES NO | **Regulatory State:** Is sample from a chlorinated supply? YES NO | PWS I.D. #: |
| SAMPLER NAME (PRINT): | SAMPLER SIGNATURE: | **Turn Around Time:** Circle: **10** **5 Days** **or** __ Day |

Matrix Codes: AA=Indoor/Ambient Air SG=Soil Gas LV=Landfill/Vent Gas OT=Other_____

| | CLIENT SAMPLE I.D. | Regulator Info: Flow Controller ID | Regulator Info: Cal Flow (mL/min) | Canister Information: Canister ID | Size (L) | Cleaning Batch ID | LAB Outgoing Canister Vacuum (in Hg) | LAB Receiving Canister Vacuum (in Hg) | Sampling Start Information: Barometric Pres. (in Hg): Start Date | Start Time (24hr clock) | Initial Canister Vacuum (in Hg) | Starting Sample Temp °F | Sampling Stop Information: Barometric Pres. (in Hg): Stop Date | Stop Time (24hr clock) | Final Canister Vacuum (in Hg) | Ending Sample Temp °F | Matrix (See Codes) | ANALYSIS: Alt 145 CO | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1) | 37 | LFGSS001 | | 12064 ~~305~~ WP | 1.4 | BC220413-02 | 20.2 | 4.0 | 6/1/22 | 1349 | 730 | 150 | 6/1/22 | 1350 | -24 | 150 | LG | x | | |
| 2) | 31 | | | 305 ~~12064~~ WP | 1.4 | BC220413-02 | 20.2 | 4.0 | 6/1/22 | 1406 | 730 | 148 | 6/1/22 | 1407 | -24 | 148 | LG | x | | |
| 3) | 67 | | | 12407 | 1.4 | BC220413-02 | 20.2 | 4.0 | 6/1/22 | 1416 | 730 | 146 | 6/1/22 | 1417 | -24 | 140 | LG | x | | |
| 4) | 55 | | | 12857 ~~12414~~ | 1.4 | BC220413-02 | 20.2 | 16.8 | 6/1/22 | 1425 | 730 | 181 | 6/1/22 | 1426 | -24 | 181 | LG | x | | |

21.1°C 510 Note Noted

| | | | |
|---|---|---|---|
| RELINQUISHED: Ryan Aspden | | RECEIVED: FedEx | DATE / TIME |
| RELINQUISHED: FedEx | DATE / TIME | RECEIVED: [signature] 6/3/22 1015 | DATE / TIME |
| RELINQUISHED: | DATE / TIME | RECEIVED: | DATE / TIME |

QC Data Package
- Level I ☐
- Level II ☐
- Level III ☐
- Level IV ☐

**LAB USE ONLY**

063 - 22D - 0035

22F0186

**SCS Field Services 22F0186**
**Bristol**
**Recd: 06/03/2022 Due: 06/10/2022**

v130325002

1941 Reymet Road ● Richmond, Virginia 23237 ● Tel: (804)-358-8295 Fax: (804)-358-8297

# Certificate of Analysis

Final Report

**Laboratory Order ID 22F0186**

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|---|---|---|---|
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| Submitted To: | Mike Gibbons | Project Number: | [none] |
| Client Site I.D.: | Bristol | Purchase Order: | |

## Sample Conditions Checklist

| | |
|---|---|
| Samples Received at: | **21.10°C** |
| How were samples received? | FedEx Express |
| Were Custody Seals used? If so, were they received intact? | No |
| Are the custody papers filled out completely and correctly? | Yes |
| Do all bottle labels agree with custody papers? | Yes |
| Is the temperature blank or representative sample within acceptable limits or received on ice, and recently taken? | Yes |
| Are all samples within holding time for requested laboratory tests? | Yes |
| Is a sufficient amount of sample provided to perform the tests included? | Yes |
| Are all samples in appropriate containers for the analyses requested? | Yes |
| Were volatile organic containers received? | No |
| Are all volatile organic and TOX containers free of headspace? | NA |
| Is a trip blank provided for each VOC sample set? VOC sample sets include EPA8011, EPA504, EPA8260, EPA624, EPA8015 GRO, EPA8021, EPA524, and RSK-175. | NA |
| Are all samples received appropriately preserved? Note that metals containers do not require field preservation but lab preservation may delay analysis. | Yes |

### Work Order Comments

No turnaround provided. Logged for a standard 5 day turnaround
Tom Lock notified via email
JNH 6/3/22 1140

Per Tom Lock via email
Mike Gibbons is the project manager
JNH 6/3/22 1255