Commonwealth of Virginia

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

RE: Semi-Monthly Daily LFG Well Temperature Update

1 message

King, Brandon <BKing@scsengineers.com> Thu, Jan 12, 2023 at 5:12 PM
To: "hall.kristen@epa.gov" <hall.kristen@epa.gov>, "jeff.hurst@deq.virginia.gov" <jeff.hurst@deq.virginia.gov>, "willard.erinm@epa.gov" <willard.erinm@epa.gov>, "stacy.bowers@deq.virginia.gov" <stacy.bowers@deq.virginia.gov>, David Cochran <dcochran@bristolva.org>, Randall Eads <CityManager@bristolva.org>, "joey.lamie@bristolva.org" <joey.lamie@bristolva.org>, "jon.hayes@bristolva.org" <jon.hayes@bristolva.org>, "mmartin@bristolva.org" <mmartin@bristolva.org>, "jacob.chandler@bristolva.org" <jacob.chandler@bristolva.org>, "Blalock, Susan" <susan.blalock@deq.virginia.gov>
Cc: "Dick, Bob" <BDick@scsengineers.com>, "Nachman, Lucas" <LNachman@scsengineers.com>, "Mahon, Ryan" <RMahon@scsengineers.com>, "Lock, Tom" <TLock@scsengineers.com>, "Warren, Charles" <CWarren@scsengineers.com>

Ms. Hall and Ms. Blacock,

Please see the updated report with updated daily temperature table. Let me know if you have any questions.

Thank you,

D. Brandon King

SCS Engineers

Project Manager

15521 Midlothian Turnpike, Suite 305

Midlothian, VA 23113

Main 804-378-7440

Direct 804-486-1902

Cell 804-840-7846

From: King, Brandon
Sent: Friday, January 6, 2023 11:06 AM
To: 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>; joey.lamie@bristolva.org; jon.hayes@bristolva.org; 'mmartin@bristolva.org' (mmartin@bristolva.org) <mmartin@bristolva.org>; jacob.chandler@bristolva.org; Blalock, Susan <susan.blalock@deq.virginia.gov>
Cc: Dick, Bob <BDick@scsengineers.com>; Nachman, Lucas <LNachman@scsengineers.com>; Mahon, Ryan <RMahon@scsengineers.com>; Lock, Tom <TLock@scsengineers.com>; Warren, Charles

<CWarren@scsengineers.com>
Subject: Semi-Monthly Daily LFG Well Temperature Update

Ms. Hall and Ms. Blalock,

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 January 5th, 2023 status update on the existing wells, expansion of the gas collection system, and continuing operating and monitoring results, covering the period from December 16-31, 2022.

Thank you,

D. Brandon King

SCS Engineers

Project Manager

15521 Midlothian Turnpike, Suite 305

Midlothian, VA 23113

Main 804-378-7440

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Cell 804-840-7846

Bimonthly Daily LFG Well Temperature Update_12-31-22_FINAL.pdf
937K

January 5, 2023
File No. 02218208.04

MEMORANDUM

TO: Kristin Hall, EPA Region III
Tracy Blalock, VDEQ-SWRO

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

SUBJECT: Semi-Monthly Status Update – December 16th through December 31th, 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 12/16/22 through 12/31/22, pursuant of compliance provision #2.

DAILY TEMPERATURE READINGS

Twenty-five (25) individual landfill gas (LFG) wellheads in the Permit #588 Landfill have automated temperature sensors installed. Beginning on 12/1/22, VDEQ and USEPA are receiving Daily Landfill Gas Well Temperature Averages Reports presenting the data measured by the automated temperature sensors.

The LFG wellhead automated temperature sensor system is still undergoing commissioning and SCS staff is still conducting verification testing and making minor field modifications to this system. Some values reported may differ from recordings made by other field instrumentation. SCS may elect to report values gathered from other data sources (GEM, field thermometer) for regulatory purposes until commissioning is complete.

The City recorded daily temperature readings during the second half of December, which are displayed on the attached table. Existing well GW-37 had recorded readings of 152F on 12/20/22 and 12/30/22. However, well GW-46 recorded temperatures below 145F throughout the reporting period according to the City's data. New wells GW-52, GW-57, and GW-64 recorded temperatures greater than 145F intermittently during the second half of December according to the City's data.

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 LFG monthly wellfield data recorded during December 2022, LFG monthly wellfield retest data, exceedance temperatures continue in HOV requested well GW-37 according to the 12/20/22 retest. However, LFG well GW-67 recorded temperatures below 145F during 12/20/22 retest activities by SCS. SCS recorded temperatures below 145F at the remaining wells during the first half of December.

SCS collected CO samples via 1.5L Summa Canister at wells GW-37, GW-51, and GW-67 on 12/9/22 and received the laboratory analytical data on 12/19/22. GW-37, GW-51, and GW-67 recorded CO concentrations of 144 ppm, 1,570 ppm, and 669 ppm respectively. SCS collected CO samples via 1.5L Summa Canister at wells GW-37 and GW-67 on 12/14/22 and received the laboratory analytical data on 12/20/22. GW-37 and GW-67 recorded CO concentrations of 163 ppm and 1,080 ppm respectively. Well GW-67 was also analyzed for hydrogen (H_2) during the 12/14/22 sampling event. GW-67 recorded 22.5 percent hydrogen. The laboratory analytical data is included for reference.

NON-ROUTINE O&M

On 12/21/22, the City's O&M contractor cleaned, tested and replaced four dewatering pumps in LFG wells GW-50, GW-57, GW-60, and GW-61.

The O&M contractor continued to strategically place well bore skirts around select wells during this reporting period. In addition, the contractor placed two bags of hydrated bentonite around the surface penetration of the select well casings prior to installation of the well bore skirts. The completed well bore skirt involved excavating a 10'x10' area around the well casing to create a flat area, unfolding the well bore skirt to cover this area with the neck of the skirt around the well casing, and covering the 10'x10' well bore skirt with approximately one foot of cover soil that overlaps the edges of the skirt. The soil was compacted with excavator bucket and the neck of the skirt was secured to the well casing using a banding clamp. Well bore skirts were completed on wells GW-40, GW-47, and GW-51 on 12/19/22; GW-41, GW-54, GW-39, and GW-60 well bore skirts were completed on 12/20/22; and GW-42 and GW-57 well bore skirts were completed on 12/21/22.

Connelly completed the drilling activities of temperature probes TP-1 through TP-9 during the previous reporting period. The digital temperature cable and remote monitoring control equipment installation was completed on 12/28/22.

SCS Field Services (FS) Construction has commenced construction of the Sidewall Odor Mitigation System (SOMS) effectively as of the week of 12/19/22. The initial phase of construction on the SOMS is on the western sidewall section deemed the pilot-study Phase I.

SCS is continuing work monitoring, balancing, and tuning the south end leachate cleanouts.

EVALUATION OF LFG SYSTEM

SCS is continuing weekly surface emissions monitoring per the Plan of Action Report dated 7/6/22. The City has placed intermediate cover throughout the Permit No. 588 Landfill based on soil boring testing results, including soil cover over the LFG, airline, and forcemain piping. Subsequent to the installation of the well bore skirts at 19 select LFG wells exhibiting methane exceedances at pipe penetrations during weekly SEM events, SCS monitoring data has shown significant improvement at the majority of these locations now exhibiting methane concentrations below 500 ppm. However, at three select wells with well bore skirts, additional soil is warranted based on the 12/27/22 weekly SEM results, which will be applied in January.

SCS Engineers will continue to balance and tune the LFG wellheads on the south leachate cleanouts in January, as well as other LFG System wells. SCS has already noticed improvements in LFG quality at the blower/flare station as a result of the south cleanout improvements. Furthermore, the City and SCS anticipate commencement of landfill gas (LFG) system expansion construction in the near future.

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

cc: Randall Eads, City of Bristol
Jon Hayes, 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	December	December	December	December	December	December	December	December	December	December	December	December
				Day	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				Date	20	21	22	23	24	25	26	27	28	29	30	31
				Well Number												
1	102	10/16/2016	Old Well	**35**	42		67	NM	NM	NM	NM	44	20	NM	64	
2	70	9/6/2017	Old Well	**39**	42		47	NM	NM	NM	NM	35	10	73	80	
3	100	9/7/2017	Old Well	**40**	118		66	NM	NM	NM	NM	61	34	123	116	
4	110	10/4/2016	Old Well	**46**	138		142	NM	NM	NM	NM	139	12	133	140	
5	120	10/4/2016	Old Well	**47**	88		90	NM	NM	NM	NM	51	13	91	102	
6	120	9/17/2013	Old Well	**29**	68		99	NM	NM	NM	NM	72	48	NM	84	
7	100	8/23/2017	Old Well	**30R**	126		128	NM	NM	NM	NM	124	58	NM	116	
8	120	8/30/2017	Old Well	**31R**	132		136	NM	NM	NM	NM	114	30	NM	135	
9	70	7/29/2016	Old Well	**32**	63		60	NM	NM	NM	NM	64	24	NM	72	
10	100	7/28/2016	Old Well	**33**	120		128	NM	NM	NM	NM	NM	NM	NM	NM	
11	100	7/30/2016	Old Well	**34**	138		140	NM	NM	NM	NM	121	129	NM	131	
12	100	8/1/2016	Old Well	**36**	40		60	NM	NM	NM	NM	48	42	66	64	
13	100	8/24/2017	Old Well	**37**	152		150	NM	NM	NM	NM	142	61	NM	152	
14	50	8/25/2017	Old Well	**38**	98		102	NM	NM	NM	NM	68	34	NM	102	
15	75	9/8/2017	Old Well	**41**	121		120	NM	NM	NM	NM	22	22	NM	129	
16	57	9/8/2017	Old Well	**42**	100		118	NM	NM	NM	NM	102	45	NM	118	
17	110	10/7/2016	Old Well	**48**	32		58	NM	NM	NM	NM	37	38	NM	60	
1	120	10/1/2021	New Well	**32R**	130		129	NM	NM	NM	NM	39	37	124	128	
2	110	10/1/2021	New Well	**49**	129		133	NM	NM	NM	NM	128	47	131	135	
3	96	10/1/2021	New Well	**50**	120		129	NM	NM	NM	NM	43	41	117	129	
4	114	10/1/2021	New Well	**51**	112		57	NM	NM	NM	NM	88	69	113	132	
5	109	10/1/2021	New Well	**52**	159		147	NM	NM	NM	NM	89	80	120	145	
6	91	10/1/2021	New Well	**53**	130		125	NM	NM	NM	NM	136	80	136	141	
7	91	10/1/2021	New Well	**54**	136		127	NM	NM	NM	NM	120	114	117	128	
8	104	10/1/2021	New Well	**55**	100		110	NM	NM	NM	NM	37	14	100	108	
9	109	10/1/2021	New Well	**56**	138		136	NM	NM	NM	NM	88	35	117	33	
10	103	10/1/2021	New Well	**57**	141		140	NM	NM	NM	NM	152	104	112	149	
11	92	10/1/2021	New Well	**58**	120		124	NM	NM	NM	NM	100	8	117	123	
12	72	10/1/2021	New Well	**59**	112		110	NM	NM	NM	NM	121	6	111	118	
13	120	10/1/2021	New Well	**60**	104		147	NM	NM	NM	NM	128	31	106	Blowing foam	
14	105	10/1/2021	New Well	**61**	78		104	NM	NM	NM	NM	62	32	NM	120	
15	120	10/1/2021	New Well	**62**	119		68	NM	NM	NM	NM	39	28	69	66	
16	117	10/1/2021	New Well	**63**	122		128	NM	NM	NM	NM	94	26	124	133	
17	120	10/1/2021	New Well	**64**	150		149	NM	NM	NM	NM	136	40	130	151	
18	100	10/1/2021	New Well	**65**	136		133	NM	NM	NM	NM	124	48	101	136	
19	102	10/1/2021	New Well	**66**	52		66	NM	NM	NM	NM	85	10	121	120	
20	100	10/1/2021	New Well	**67**	130		130	NM	NM	NM	NM	130	98	120	119	
21	75	10/1/2021	New Well	**68**	120		80	NM	NM	NM	NM	101	84	113	140	

*Unable to record temperature readings at LFG vertical wells in the Permit 588 Landfill.

*Unable to record temperature readings at LFG vertical wells in the Permit 588 Landfill.

*Note: there was a low level isolated area in the Permit #588 Landfill where emissions hovered over the landfill surface on 12/21/22 and 12/31/22. Therefore daily temperatures were not recorded on those days by City of Bristol personnel for health and safety reasons.

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

Certificate of Analysis

Final Report

Laboratory Order ID 22L0597

Client Name:	SCS Field Services - Harrisburg, PA	Date Received:	December 12, 2022 10:04
	4330 Lewis Road, Suite 1	Date Issued:	December 19, 2022 14:34
	Harrisburg, PA 17111	Project Number:	[none]
Submitted To:	MIke Byk	Purchase Order:	07220028.00
Client Site I.D.:	Bristol		

Enclosed are the results of analyses for samples received by the laboratory on 12/12/2022 10:04. If you have any questions concerning this report, please feel free to contact the laboratory.

Sincerely,

Mandy Mishra

Laboratory 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.

TNI Accredited
VELAP ID 460021

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	4330 Lewis Road, Suite 1	Date Issued:	December 19, 2022 14:34
	Harrisburg, PA 17111	Project Number:	[none]
Submitted To:	MIke Byk	Purchase Order:	07220028.00

Client Site I.D.: Bristol

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
37	22L0597-01	Air	12/09/2022 09:32	12/12/2022 10:04
51	22L0597-02	Air	12/09/2022 09:48	12/12/2022 10:04
67	22L0597-04	Air	12/09/2022 10:05	12/12/2022 10:04

ENTHALPY ANALYTICAL

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Submitted To:	MIke Byk	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	07220028.00

ANALYTICAL RESULTS

Project Location:

Field Sample #: 37

Sample ID: 22L0597-01

Sample Matrix: Air

Sampled: 12/9/2022 09:32

Sample Type: LV

Sample Description/Location:

Sub Description/Location:

Canister ID: 063-00474::15038D

Canister Size: 1.4L

Initial Vacuum(in Hg): 30

Final Vacuum(in Hg): 7

Receipt Vacuum(in Hg): 7

Flow Controller Type: PASSIVE

Flow Controller ID:

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	144	90.0	90.0		9	1	12/15/22 10:21	MER

ENTHALPY ANALYTICAL

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Submitted To:	MIke Byk	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	07220028.00

ANALYTICAL RESULTS

Project Location:

Field Sample #: 51

Sample ID: 22L0597-02

Sample Matrix: Air

Sampled: 12/9/2022 09:48

Sample Type: LV

Sample Description/Location:

Sub Description/Location:

Canister ID: 063-00470::15044D

Canister Size: 1.4L

Initial Vacuum(in Hg): 30

Final Vacuum(in Hg): 20

Receipt Vacuum(in Hg): 20

Flow Controller Type: PASSIVE

Flow Controller ID:

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	1570	90.0	90.0		9	1	12/15/22 13:06	MER

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Submitted To:	MIke Byk	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	07220028.00

ANALYTICAL RESULTS

Project Location:

Field Sample #: 67

Sample ID: 22L0597-04

Sample Matrix: Air

Sampled: 12/9/2022 10:05

Sample Type: LV

Sample Description/Location:

Sub Description/Location:

Canister ID: 063-00472::15042D

Canister Size: 1.4L

Initial Vacuum(in Hg): 30

Final Vacuum(in Hg): 7

Receipt Vacuum(in Hg): 7

Flow Controller Type: PASSIVE

Flow Controller ID:

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

Analyte	Result (ppmv)	MDL (ppmv)	LOQ (ppmv)	Flag/Qual	Dilution	PF	Date/Time Analyzed	Analyst
Carbon Monoxide, as received	669	90.0	90.0		9	1	12/15/22 11:17	MER

ENTHALPY ANALYTICAL

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Submitted To:	MIke Byk	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	07220028.00

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**	
22L0597-01	1.00 mL / 1.00 mL	ALT-145	BFL0593	SFL0542	AG00026
22L0597-02	1.00 mL / 1.00 mL	ALT-145	BFL0593	SFL0542	AG00026
22L0597-04	1.00 mL / 1.00 mL	ALT-145	BFL0593	SFL0542	AG00026

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Submitted To:	MIke Byk	Project Number:	[none]
Client Site I.D.:	Bristol	Purchase Order:	07220028.00

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 BFL0593 - No Prep VOC GC Air										
Blank (BFL0593-BLK1)					Prepared & Analyzed: 12/15/2022					
Carbon Monoxide	<	10.0	ppmv							
LCS (BFL0593-BS1)					Prepared & Analyzed: 12/15/2022					
Carbon Monoxide	4960	10	ppmv	5000		99.1	0-200			
Duplicate (BFL0593-DUP1)			**Source: 22L0597-01**		Prepared & Analyzed: 12/15/2022					
Carbon Monoxide	148	90.0	ppmv		144			2.65	25	
Duplicate (BFL0593-DUP2)			**Source: 22L0597-02**		Prepared & Analyzed: 12/15/2022					
Carbon Monoxide	1580	90.0	ppmv		1570			1.08	25	
Duplicate (BFL0593-DUP3)			**Source: 22L0597-04**		Prepared & Analyzed: 12/15/2022					
Carbon Monoxide	682	90.0	ppmv		669			1.93	25	
Duplicate (BFL0593-DUP4)			**Source: 22L0933-01**		Prepared & Analyzed: 12/19/2022					
Methane	130000	4500	ppmv		129000			1.42	25	
Carbon dioxide	257000	4500	ppmv		255000			0.970	25	
Oxygen (O2)	68700	4500	ppmv		68100			0.826	25	
Nitrogen (N2)	469000	18000	ppmv		465000			0.932	25	
Hydrogen (H2)	26200	1800	ppmv		25100			4.46	25	
Carbon Monoxide	159	90.0	ppmv		163			2.62	25	
Duplicate (BFL0593-DUP5)			**Source: 22L0933-02**		Prepared & Analyzed: 12/19/2022					
Methane	85900	4500	ppmv		85900			0.00460	25	
Carbon dioxide	577000	4500	ppmv		574000			0.542	25	
Oxygen (O2)	23400	4500	ppmv		23400			0.0169	25	
Hydrogen (H2)	231000	1800	ppmv		230000			0.501	25	
Nitrogen (N2)	82400	18000	ppmv		82200			0.277	25	
Carbon Monoxide	1140	90.0	ppmv		1080			4.76	25	

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Certified Analytes included in this Report

Analyte	Certifications	Analyte	Certifications

Code	Description	Laboratory ID	Expires
MdDOE	Maryland DE Drinking Water	341	12/31/2023
NC	North Carolina DENR	495	07/31/2023
NCDEQ	North Carolina DEQ	495	07/31/2023
NCDOH	North Carolina Department of Health	51714	07/31/2023
NYDOH	New York DOH Drinking Water	12096	04/01/2023
PADEP	NELAP-Pennsylvania Certificate #008	68-03503	10/31/2023
VELAP	NELAP-Virginia Certificate #12157	460021	06/14/2023
WVDEP	West Virginia DEP	350	11/30/2023

Qualifiers and Definitions

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 12/22/2022

COMPANY NAME: SCS Field Services - Harrisburg	INVOICE TO: **Same**	PROJECT NAME/Quote #: **Bristol**
CONTACT: **Mike Byk**	INVOICE CONTACT:	SITE NAME: Bristol
ADDRESS:	INVOICE ADDRESS:	PROJECT NUMBER: 07220028.00
PHONE #:	INVOICE PHONE #:	P.O. #:
FAX #: EMAIL:		Pretreatment Program:
Is sample for compliance reporting? (YES) NO	**Regulatory State:** VA	Is sample from a chlorinated supply? YES (NO)
SAMPLER NAME (PRINT): Ryan Seymour	SAMPLER SIGNATURE: Ryan Seymour	**Turn Around Time:** Circle: 10 (5 Days) or __ Day

PWS I.D. #:

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

063-22K-0018

	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	96001	20054	~~15043~~ 15038	1.4	221110-02	30	7	12/9/22	9:30 AM	30	148	12/9/22	9:52 AM	7	148	LG	x		
2)	51			15044	1.4	221110-02	30	20	12/9/22	9:42 AM	30	163	12/9/22	9:48 AM	20	163	LG	x		
3)	~~54~~			15038			30		12/9/22		30	138	12/9/22	NO SAMPLE		138				
4)	67			15042			30	7	12/9/22	10:00 PM	30	172	12/9/22	10:05	7	172				

15039 was Apart of the last Batch.

310 20.3 no ice no seal

RELINQUISHED: Ryan Seymour		RECEIVED: fedex	DATE / TIME	QC Data Package: Level I ☐
RELINQUISHED: fedex	DATE / TIME	RECEIVED: YO	DATE / TIME 12/12/22 1004	Level II ☐
RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME	Level III ☐ Level IV ☐

LAB USE ONLY

SCS Field Services 22L0597
Bristol
Recd: 12/12/2022 Due: 12/19/2022

v130325002

063-22K-0018-Bristol CO in air-COC

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Certificate of Analysis

Final Report

Laboratory Order ID 22L0933

Client Name:	SCS Field Services - Harrisburg, PA	Date Received:	December 16, 2022 9:25
	4330 Lewis Road, Suite 1	Date Issued:	December 20, 2022 15:39
	Harrisburg, PA 17111	Project Number:	07226028.00
Submitted To:	Ryan Seymour	Purchase Order:	07-SO04485

Client Site I.D.: Bristol

Enclosed are the results of analyses for samples received by the laboratory on 12/16/2022 09:25. 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.

TNI Accredited
VELAP ID 460021

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Submitted To:	Ryan Seymour	Purchase Order:	07-SO04485

Client Site I.D.: Bristol

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
37	22L0933-01	Air	12/14/2022 09:56	12/16/2022 09:25
67	22L0933-02	Air	12/14/2022 10:03	12/16/2022 09:25

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Client Site I.D.:	Bristol	Purchase Order:	07-SO04485

ANALYTICAL RESULTS

Project Location:

Field Sample #: 37

Sample ID: 22L0933-01

Sample Matrix: Air

Sampled: 12/14/2022 09:56

Sample Type: LV

Sample Description/Location:

Sub Description/Location:

Canister ID: 063-00184::11073D

Canister Size: 1.4L

Initial Vacuum(in Hg): 21.2

Final Vacuum(in Hg): 4.6

Receipt Vacuum(in Hg): 4.6

Flow Controller Type: Passive

Flow Controller ID:

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

Analyte	Result (ppmv)	MDL (ppmv)	LOQ (ppmv)	Flag/Qual	Dilution	PF	Date/Time Analyzed	Analyst
Carbon Monoxide, as received	163	90.0	90.0		9	1	12/19/22 13:12	DFH

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ANALYTICAL RESULTS

Project Location:

Field Sample #: 67

Sample ID: 22L0933-02

Sample Matrix: Air

Sampled: 12/14/2022 10:03

Sample Type: LV

Sample Description/Location:

Sub Description/Location:

Canister ID: 063-00197::11322D

Canister Size: 1.4L

Initial Vacuum(in Hg): 21.2

Final Vacuum(in Hg): 3.6

Receipt Vacuum(in Hg): 3.6

Flow Controller Type: Passive

Flow Controller ID:

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

Analyte	Result (ppmv)	MDL (ppmv)	LOQ (ppmv)	Flag/Qual	Dilution	PF	Date/Time Analyzed	Analyst
Carbon Monoxide, as received	1080	90.0	90.0		9	1	12/19/22 11:26	DFH

Volatile Organic Compounds by GC/TCD - Unadjusted, as received basis
EPA 3C

Analyte	Result (Vol%)	MDL (Vol%)	LOQ (Vol%)	Flag/Qual	Dilution	PF	Date/Time Analyzed	Analyst
Hydrogen (H2), as received	22.5	1.08	1.08		54	1	12/19/22 12:19	DFH

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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**	
22L0933-02	1.00 mL / 1.00 mL	EPA 3C	BFL0532	SFL0656	AG00026
22L0933-02RE1	1.00 mL / 1.00 mL	EPA 3C	BFL0532	SFL0656	AG00026
22L0933-01	1.00 mL / 1.00 mL	ALT-145	BFL0593	SFL0660	AG00026
22L0933-02	1.00 mL / 1.00 mL	ALT-145	BFL0593	SFL0660	AG00026

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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 BFL0532 - No Prep VOC GC Air										
Blank (BFL0532-BLK1)					Prepared & Analyzed: 12/14/2022					
Hydrogen (H2)	<	0.02	Vol%							
LCS (BFL0532-BS1)					Prepared & Analyzed: 12/14/2022					
Methane	4120	0.05	ppmv	5000		82.4	70-130			
Carbon dioxide	4280	0.05	ppmv	5000		85.6	70-130			
Oxygen (O2)	5150	0.05	ppmv	5000		103	70-130			
Nitrogen (N2)	5510	1	ppmv	5000		110	70-130			
Hydrogen (H2)	5920	0.02	ppmv	5100		116	70-130			
Carbon Monoxide	4950	0.001	ppmv	5000		99.0	70-130			
Duplicate (BFL0532-DUP1)			**Source: 22L0475-02**		Prepared & Analyzed: 12/14/2022					
Methane	<	0.15	Vol%		<0.15			NA	5	
Carbon dioxide	<	0.15	Vol%		<0.15			NA	5	
Oxygen (O2)	22.1	0.15	Vol%		22.0			0.493	5	
Nitrogen (N2)	74.9	3.00	Vol%		74.9			0.0113	5	
Hydrogen (H2)	<	0.06	Vol%		<0.06			NA	5	
Carbon Monoxide	<	0.003	Vol%		0.02			NA	5	
Duplicate (BFL0532-DUP2)			**Source: 22L0475-03**		Prepared & Analyzed: 12/14/2022					
Methane	<	0.15	Vol%		<0.15			NA	5	
Carbon dioxide	<	0.15	Vol%		<0.15			NA	5	
Oxygen (O2)	21.6	0.15	Vol%		21.3			1.46	5	
Nitrogen (N2)	73.3	3.00	Vol%		72.5			1.05	5	
Hydrogen (H2)	<	0.06	Vol%		<0.06			NA	5	
Carbon Monoxide	<	0.003	Vol%		<0.003			NA	5	
Duplicate (BFL0532-DUP3)			**Source: 22L0475-04**		Prepared & Analyzed: 12/14/2022					
Methane	<	0.15	Vol%		<0.15			NA	5	
Carbon dioxide	<	0.15	Vol%		<0.15			NA	5	
Oxygen (O2)	22.3	0.15	Vol%		21.9			1.74	5	
Hydrogen (H2)	<	0.06	Vol%		<0.06			NA	5	
Nitrogen (N2)	75.5	3.00	Vol%		74.0			1.91	5	
Carbon Monoxide	<	0.003	Vol%		<0.003			NA	5	

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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 BFL0532 - No Prep VOC GC Air										
Duplicate (BFL0532-DUP4)				**Source: 22L0475-05**	Prepared & Analyzed: 12/14/2022					
Methane	<	0.15	Vol%		<0.15			NA	5	
Carbon dioxide	<	0.15	Vol%		<0.15			NA	5	
Oxygen (O2)	21.6	0.15	Vol%		21.1			2.37	5	
Nitrogen (N2)	74.1	3.00	Vol%		72.7			1.90	5	
Hydrogen (H2)	<	0.06	Vol%		<0.06			NA	5	
Carbon Monoxide	<	0.003	Vol%		<0.003			NA	5	
Duplicate (BFL0532-DUP5)				**Source: 22L0475-06**	Prepared & Analyzed: 12/14/2022					
Methane	<	0.15	Vol%		<0.15			NA	5	
Carbon dioxide	<	0.15	Vol%		<0.15			NA	5	
Oxygen (O2)	22.0	0.15	Vol%		21.4			2.74	5	
Hydrogen (H2)	<	0.06	Vol%		<0.06			NA	5	
Nitrogen (N2)	74.8	3.00	Vol%		73.0			2.44	5	
Carbon Monoxide	<	0.003	Vol%		<0.003			NA	5	
Duplicate (BFL0532-DUP6)				**Source: 22L0475-07**	Prepared & Analyzed: 12/14/2022					
Methane	<	0.15	Vol%		<0.15			NA	5	
Carbon dioxide	<	0.15	Vol%		<0.15			NA	5	
Oxygen (O2)	21.8	0.15	Vol%		21.4			1.68	5	
Nitrogen (N2)	73.8	3.00	Vol%		72.9			1.19	5	
Hydrogen (H2)	<	0.06	Vol%		<0.06			NA	5	
Carbon Monoxide	<	0.003	Vol%		<0.003			NA	5	
Duplicate (BFL0532-DUP8)				**Source: 22L0840-01RE1**	Prepared & Analyzed: 12/16/2022					
Methane	50.3	0.45	Vol%		50.5			0.471	5	
Carbon dioxide	19.8	0.45	Vol%		19.9			0.745	5	
Oxygen (O2)	3.77	0.45	Vol%		3.67			2.72	5	
Hydrogen (H2)	<	0.18	Vol%		<0.18			NA	5	
Nitrogen (N2)	21.3	9.00	Vol%		21.0			1.41	5	
Carbon Monoxide	<	0.009	Vol%		<0.009			NA	5	

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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 BFL0532 - No Prep VOC GC Air										
Duplicate (BFL0532-DUP9)			**Source: 22L0840-02**		Prepared & Analyzed: 12/16/2022					
Methane	21.8	0.45	Vol%		21.6			0.941	5	
Carbon dioxide	13.7	0.45	Vol%		13.5			1.47	5	
Oxygen (O2)	6.78	0.45	Vol%		7.39			8.67	5	P
Hydrogen (H2)	<	0.18	Vol%		<0.18			NA	5	
Carbon Monoxide	<	0.009	Vol%		<0.009			NA	5	
Duplicate (BFL0532-DUPA)			**Source: 22L0840-03**		Prepared & Analyzed: 12/16/2022					
Methane	2.42	0.45	Vol%		2.43			0.466	5	
Carbon dioxide	10.2	0.45	Vol%		10.4			1.81	5	
Oxygen (O2)	6.94	0.45	Vol%		6.97			0.394	5	
Hydrogen (H2)	<	0.18	Vol%		<0.18			NA	5	
Carbon Monoxide	<	0.009	Vol%		<0.009			NA	5	
Duplicate (BFL0532-DUPB)			**Source: 22L0840-04**		Prepared & Analyzed: 12/16/2022					
Methane	11.8	0.45	Vol%		11.9			0.691	5	
Carbon dioxide	10.0	0.45	Vol%		9.97			0.411	5	
Oxygen (O2)	5.69	0.45	Vol%		5.57			2.24	5	
Hydrogen (H2)	<	0.18	Vol%		<0.18			NA	5	
Carbon Monoxide	<	0.009	Vol%		<0.009			NA	5	
Duplicate (BFL0532-DUPD)			**Source: 22L0840-05**		Prepared & Analyzed: 12/19/2022					
Methane	58.2	0.45	Vol%		58.2			0.0663	5	
Carbon dioxide	7.85	0.45	Vol%		7.88			0.365	5	
Oxygen (O2)	4.95	0.45	Vol%		4.82			2.60	5	
Hydrogen (H2)	<	0.18	Vol%		<0.18			NA	5	
Nitrogen (N2)	23.9	9.00	Vol%		23.4			2.03	5	
Carbon Monoxide	<	0.009	Vol%		<0.009			NA	5	

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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 BFL0532 - No Prep VOC GC Air										
Duplicate (BFL0532-DUPE)			**Source: 22L0933-02**		Prepared & Analyzed: 12/19/2022					
Methane	8.59	0.45	Vol%		8.59			0.00461	5	
Carbon dioxide	57.7	0.45	Vol%		57.4			0.542	5	
Oxygen (O2)	2.34	0.45	Vol%		2.34			0.0169	5	
Nitrogen (N2)	<	9.00	Vol%		<9.00			NA	5	
Carbon Monoxide	0.11	0.009	Vol%		0.11			4.76	5	
Batch BFL0593 - No Prep VOC GC Air										
Blank (BFL0593-BLK1)					Prepared & Analyzed: 12/15/2022					
Carbon Monoxide	<	10.0	ppmv							
LCS (BFL0593-BS1)					Prepared & Analyzed: 12/15/2022					
Carbon Monoxide	4960	10	ppmv	5000		99.1	0-200			
Duplicate (BFL0593-DUP1)			**Source: 22L0597-01**		Prepared & Analyzed: 12/15/2022					
Carbon Monoxide	148	90.0	ppmv		144			2.65	25	
Duplicate (BFL0593-DUP2)			**Source: 22L0597-02**		Prepared & Analyzed: 12/15/2022					
Carbon Monoxide	1580	90.0	ppmv		1570			1.08	25	
Duplicate (BFL0593-DUP3)			**Source: 22L0597-04**		Prepared & Analyzed: 12/15/2022					
Carbon Monoxide	682	90.0	ppmv		669			1.93	25	
Duplicate (BFL0593-DUP4)			**Source: 22L0933-01**		Prepared & Analyzed: 12/19/2022					
Methane	130000	4500	ppmv		129000			1.42	25	
Carbon dioxide	257000	4500	ppmv		255000			0.970	25	
Oxygen (O2)	68700	4500	ppmv		68100			0.826	25	
Hydrogen (H2)	26200	1800	ppmv		25100			4.46	25	
Nitrogen (N2)	469000	18000	ppmv		465000			0.932	25	
Carbon Monoxide	159	90.0	ppmv		163			2.62	25	

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Enthalpy Analytical

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Qual
Batch BFL0593 - No Prep VOC GC Air										
Duplicate (BFL0593-DUP5)				**Source: 22L0933-02**	Prepared & Analyzed: 12/19/2022					
Methane	85900	4500	ppmv		85900			0.00460	25	
Carbon dioxide	577000	4500	ppmv		574000			0.542	25	
Oxygen (O2)	23400	4500	ppmv		23400			0.0169	25	
Nitrogen (N2)	82400	18000	ppmv		82200			0.277	25	
Hydrogen (H2)	231000	1800	ppmv		230000			0.501	25	
Carbon Monoxide	1140	90.0	ppmv		1080			4.76	25	
Duplicate (BFL0593-DUP6)				**Source: 22L0948-01**	Prepared & Analyzed: 12/19/2022					
Methane	146000	4500	ppmv		147000			0.929	25	
Carbon dioxide	493000	4500	ppmv		496000			0.653	25	
Oxygen (O2)	5170	4500	ppmv		5230			1.11	25	
Hydrogen (H2)	371000	1800	ppmv		374000			0.919	25	
Nitrogen (N2)	<	18000	ppmv		<18000			NA	25	
Carbon Monoxide	<	90.0	ppmv		<90.0			NA	25	
Duplicate (BFL0593-DUP7)				**Source: 22L0948-02**	Prepared & Analyzed: 12/19/2022					
Methane	419000	4500	ppmv		418000			0.327	25	
Carbon dioxide	431000	4500	ppmv		429000			0.624	25	
Oxygen (O2)	<	4500	ppmv		<4500			NA	25	
Hydrogen (H2)	35000	1800	ppmv		34600			1.02	25	
Nitrogen (N2)	66200	18000	ppmv		65900			0.460	25	
Carbon Monoxide	<	90.0	ppmv		<90.0			NA	25	

Certified Analytes included in this Report

Analyte	Certifications	Analyte	Certifications

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Code	Description	Laboratory ID	Expires
MdDOE	Maryland DE Drinking Water	341	12/31/2023
NC	North Carolina DENR	495	07/31/2023
NCDEQ	North Carolina DEQ	495	07/31/2023
NCDOH	North Carolina Department of Health	51714	07/31/2023
NYDOH	New York DOH Drinking Water	12096	04/01/2023
PADEP	NELAP-Pennsylvania Certificate #008	68-03503	10/31/2023
VELAP	NELAP-Virginia Certificate #12157	460021	06/14/2023
WVDEP	West Virginia DEP	350	11/30/2023

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 12/23

COMPANY NAME: SCS Field Services - Harrisburg	INVOICE TO: **Same**	PROJECT NAME/Quote #: **Bristol**
CONTACT: Ryan Seymour	INVOICE CONTACT:	SITE NAME: Bristol
ADDRESS:	INVOICE ADDRESS:	PROJECT NUMBER: 07226028.00
PHONE #:	INVOICE PHONE #:	P.O. #:
FAX #: EMAIL:		Pretreatment Program:
Is sample for compliance reporting? (YES) NO	**Regulatory State:** VA	Is sample from a chlorinated supply? YES (NO)
		PWS I.D. #:
SAMPLER NAME (PRINT): Ryan Seymour	SAMPLER SIGNATURE: Ryan Seymour	**Turn Around Time:** Circle: 10 (5 Days) or __ Day

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

063-22K-0027

	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	Hydrogen	
1)	37			11073	1.4	221121-01	21.2	~~-10~~ DFE 12/2 4.6	12/14/22	9:54 AM	27	148	12/14/22	9:56	10	148	LG	x		
2)	67			11322	1.4	221122-03	21.2	DFE 12/2 3.6	12/14/22	10:00 AM	27	170	12/14/22	10:03	9	175	LG	x	X	
3)				11325	1.4	221122-03	21.2										LG	x		
4)				12408	1.4	221121-01	21.2										LG	x		

20.4°C, 310, no ice, no seal

RELINQUISHED: Ryan Seymour	12/15/22	RECEIVED: Fedex E	DATE / TIME
RELINQUISHED: Fedex E	DATE / TIME 10:45 AM	RECEIVED: CSB	DATE / TIME 12/16/22 0925
RELINQUISHED:	DATE / TIME	RECEIVED:	DATE / TIME

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

LAB USE ONLY

SCS Field Services 22L0933
Bristol
Recd: 12/16/2022 Due: 12/23/2022

v130325002