Volatile Organic Compound Analysis Results for Samples Collected in Nuiqsut, Alaska

Sample Location: Nuiqsut Ambient Air Quality Monitoring Station

Date Sample Collected: 3/9/2022

Analysis Conducted by: Atmospheric Analysis & Consulting, Inc.

Analysis Method: EPA Method TO-15

Laboratory Analysis Report

CLIENT : SLR International Corporation
PROJECT NO : 220499
MATRIX : AIR
UNITS : PPB (v/v)

DATE RECEIVED : 03/11/2022
DATE REPORTED : 03/11/2022
ANALYST : RC

VOLATILE ORGANIC COMPOUNDS BY EPA TO-15

Client ID	NUI AQMS			Sample Reporting Limit (SRL) (MRLxDF's)	Method Reporting Limit (MRL)
AAC ID	220499-28746				
Date Sampled	03/09/2022				
Date Analyzed	03/11/2022				
Can Dilution Factor	1.61				
Compound	Result	Qualifier	Analysis DF		
Chlorodifluoromethane	<SRL	U	1	0.81	0.50
Propene	<SRL	U	1	1.61	1.00
Dichlorodifluoromethane	<SRL	U	1	0.81	0.50
Chloromethane	<SRL	U	1	0.81	0.50
Dichlorotetrafluoroethane	<SRL	U	1	0.81	0.50
Vinyl Chloride	<SRL	U	1	0.81	0.50
Methanol	<SRL	U	1	8.07	5.00
1,3-Butadiene	<SRL	U	1	0.81	0.50
Bromomethane	<SRL	U	1	0.81	0.50
Chloroethane	<SRL	U	1	0.81	0.50
Dichlorofluoromethane	<SRL	U	1	0.81	0.50
Ethanol	<SRL	U	1	3.23	2.00
Vinyl Bromide	<SRL	U	1	0.81	0.50
Acetone	<SRL	U	1	3.23	2.00
Trichlorofluoromethane	<SRL	U	1	0.81	0.50
2-Propanol (IPA)	<SRL	U	1	3.23	2.00
Acrylonitrile	<SRL	U	1	3.23	2.00
1,1-Dichloroethene	<SRL	U	1	0.81	0.50
Methylene Chloride (DCM)	<SRL	U	1	1.61	1.00
Allyl Chloride	<SRL	U	1	1.61	1.00
Carbon Disulfide	<SRL	U	1	3.23	2.00
Trichlorotrifluoroethane	<SRL	U	1	0.81	0.50
trans-1,2-Dichloroethene	<SRL	U	1	0.81	0.50
1,1-Dichloroethane	<SRL	U	1	0.81	0.50
Methyl Tert Butyl Ether (MTBE)	<SRL	U	1	0.81	0.50
Vinyl Acetate	<SRL	U	1	1.61	1.00
2-Butanone (MEK)	<SRL	U	1	1.61	1.00
cis-1,2-Dichloroethene	<SRL	U	1	0.81	0.50
Hexane	<SRL	U	1	0.81	0.50
Chloroform	<SRL	U	1	0.81	0.50
Ethyl Acetate	<SRL	U	1	0.81	0.50
Tetrahydrofuran	<SRL	U	1	0.81	0.50
1,2-Dichloroethane	<SRL	U	1	0.81	0.50
1,1,1-Trichloroethane	<SRL	U	1	0.81	0.50
Benzene	<SRL	U	1	0.81	0.50

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Laboratory Analysis Report

CLIENT : SLR International Corporation
PROJECT NO : 220499
MATRIX : AIR
UNITS : PPB (v/v)

DATE RECEIVED : 03/11/2022
DATE REPORTED : 03/11/2022
ANALYST : RC

VOLATILE ORGANIC COMPOUNDS BY EPA TO-15

Client ID	NUI AQMS			Sample Reporting Limit (SRL) (MRLxDF's)	Method Reporting Limit (MRL)
AAC ID	220499-28746				
Date Sampled	03/09/2022				
Date Analyzed	03/11/2022				
Can Dilution Factor	1.61				
Compound	Result	Qualifier	Analysis DF		
Carbon Tetrachloride	<SRL	U	1	0.81	0.50
Cyclohexane	<SRL	U	1	0.81	0.50
1,2-Dichloropropane	<SRL	U	1	0.81	0.50
Bromodichloromethane	<SRL	U	1	0.81	0.50
1,4-Dioxane	<SRL	U	1	1.61	1.00
Trichloroethene (TCE)	<SRL	U	1	0.81	0.50
2,2,4-Trimethylpentane	<SRL	U	1	0.81	0.50
Heptane	<SRL	U	1	0.81	0.50
cis-1,3-Dichloropropene	<SRL	U	1	0.81	0.50
4-Methyl-2-pentanone (MiBK)	<SRL	U	1	0.81	0.50
trans-1,3-Dichloropropene	<SRL	U	1	0.81	0.50
1,1,2-Trichloroethane	<SRL	U	1	0.81	0.50
Toluene	<SRL	U	1	0.81	0.50
2-Hexanone (MBK)	<SRL	U	1	1.61	1.00
Dibromochloromethane	<SRL	U	1	0.81	0.50
1,2-Dibromoethane	<SRL	U	1	0.81	0.50
Tetrachloroethene (PCE)	<SRL	U	1	0.81	0.50
Chlorobenzene	<SRL	U	1	0.81	0.50
Ethylbenzene	<SRL	U	1	0.81	0.50
m & p-Xylene	<SRL	U	1	1.61	1.00
Bromoform	<SRL	U	1	0.81	0.50
Styrene	<SRL	U	1	0.81	0.50
1,1,2,2-Tetrachloroethane	<SRL	U	1	0.81	0.50
o-Xylene	<SRL	U	1	0.81	0.50
4-Ethyltoluene	<SRL	U	1	0.81	0.50
1,3,5-Trimethylbenzene	<SRL	U	1	0.81	0.50
1,2,4-Trimethylbenzene	<SRL	U	1	0.81	0.50
Benzyl Chloride (a-Chlorotoluene)	<SRL	U	1	0.81	0.50
1,3-Dichlorobenzene	<SRL	U	1	0.81	0.50
1,4-Dichlorobenzene	<SRL	U	1	0.81	0.50
1,2-Dichlorobenzene	<SRL	U	1	0.81	0.50
1,2,4-Trichlorobenzene	<SRL	U	1	0.81	0.50
Hexachlorobutadiene	<SRL	U	1	0.81	0.50
BFB-Surrogate Std. % Recovery		83%			70-130%

U - Compound was not detected at or above the SRL.

QUALITY CONTROL / QUALITY ASSURANCE REPORT

ANALYSIS DATE : 03/11/2022
MATRIX : High Purity N_2
UNITS : PPB (v/v)

INSTRUMENT ID : GC/MS-02
CALIBRATION STD ID : MS1-030722-01
ANALYST : RC

VOLATILE ORGANIC COMPOUNDS BY EPA METHOD TO-15

Continuing Calibration Verification of the 03/01/2022 Calibration

Analyte Compounds		*Source*[1]	*CCV*[2]	*% Recovery*[3]
4-BFB (surrogate standard)		10.00	9.34	93
Chlorodifluoromethane		10.50	10.62	101
Propene		10.60	10.30	97
Dichlorodifluoromethane		10.40	11.13	107
Dimethyl Ether		10.80	9.81	91
Chloromethane		10.40	11.87	114
Dichlorotetrafluoroethane		10.30	12.31	120
Vinyl Chloride		10.50	11.87	113
Acetaldehyde	HR	22.50	31.43	140
Methanol	HR	20.10	76.09	379
1,3-Butadiene		10.60	11.83	112
Bromomethane		10.40	10.95	105
Chloroethane		10.30	10.66	103
Dichlorofluoromethane		10.50	11.49	109
Ethanol		11.20	9.41	84
Vinyl Bromide		10.50	11.27	107
Acrolein		11.10	11.52	104
Acetone		10.60	9.93	94
Trichlorofluoromethane		10.50	11.15	106
2-Propanol (IPA)		11.00	10.53	96
Acrylonitrile		11.40	13.34	117
1,1-Dichloroethene		10.40	10.18	98
Methylene Chloride (DCM)		10.50	10.41	99
TertButanol (TBA)		11.30	11.17	99
Allyl Chloride		10.40	9.81	94
Carbon Disulfide		10.50	10.75	102
Trichlorotrifluoroethane		10.40	10.54	101
trans-1,2-Dichloroethene		10.60	9.93	94
1,1-Dichloroethane		10.50	8.89	85
Methyl Tert Butyl Ether (MTBE)	LR	10.50	6.95	66
Vinyl Acetate		11.00	9.16	83
2-Butanone (MEK)		10.60	8.88	84
cis-1,2-Dichloroethene		10.50	9.47	90
Hexane		10.70	8.12	76
Chloroform		10.60	8.71	82
Ethyl Acetate		10.60	8.49	80
Tetrahydrofuran		10.20	8.01	79
1,2-Dichloroethane	LR	10.50	6.83	65
1,1,1-Trichloroethane		10.40	8.29	80
Benzene		10.60	8.89	84
Carbon Tetrachloride		10.20	9.06	89
Cyclohexane		10.50	8.70	83

Analyte Compounds (Continued)	*Source*[1]	*CCV*[2]	*% Recovery*[3]
1,2-Dichloropropane	10.50	9.09	87
Bromodichloromethane	10.40	8.31	80
1,4-Dioxane	10.40	8.57	82
Trichloroethene (TCE)	10.40	10.00	96
2,2,4-Trimethylpentane	10.40	9.80	94
Methyl Methacrylate	11.00	8.69	79
Heptane	10.50	8.74	83
cis-1,3-Dichloropropene	10.40	8.22	79
4-Methyl-2-pentanone (MiBK)	10.40	8.85	85
trans-1,3-Dichloropropene	10.50	7.46	71
1,1,2-Trichloroethane	10.50	9.62	92
Toluene	10.60	9.50	90
2-Hexanone (MBK)	10.50	9.07	86
Dibromochloromethane	10.30	11.12	108
1,2-Dibromoethane	10.60	10.36	98
Tetrachloroethene (PCE)	10.40	9.81	94
Chlorobenzene	10.60	10.03	95
Ethylbenzene	10.50	9.80	93
m & p-Xylene	21.00	21.08	100
Bromoform	10.50	11.27	107
Styrene	10.50	10.50	100
1,1,2,2-Tetrachloroethane	10.50	12.08	115
o-Xylene	10.50	10.54	100
1,2,3-Trichloropropane	10.40	11.61	112
Isopropylbenzene (Cumene)	10.40	11.31	109
α-Pinene	11.40	10.49	92
2-Chlorotoluene	10.40	11.34	109
n-Propylbenzene	10.50	11.49	109
4-Ethyltoluene	10.30	11.33	110
1,3,5-Trimethylbenzene	10.30	10.89	106
β-Pinene	11.30	11.37	101
1,2,4-Trimethylbenzene	10.30	11.19	109
Benzyl Chloride (a-Chlorotoluene)	10.40	9.81	94
1,3-Dichlorobenzene	10.40	11.82	114
1,4-Dichlorobenzene	10.30	11.48	111
Sec-ButylBenzene	10.40	11.79	113
1,2-Dichlorobenzene	10.60	11.45	108
n-ButylBenzene	10.40	11.87	114
1,2-Dibromo-3-Chloropropane	10.40	11.97	115
1,2,4-Trichlorobenzene	11.00	10.95	100
Naphthalene	11.50	11.53	100
Hexachlorobutadiene	11.00	11.51	105

[1] Concentration of analyte compound in certified source standard.

[2] Measured result from daily Continuing Calibration Verification (CCV).

[3] The acceptable range for analyte recovery is 100±30%.

HR - Recovery for this compound was high. Results should be considered biased high.

LR - Recovery for this compound was low. Results should be considered estimated.

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QUALITY CONTROL / QUALITY ASSURANCE REPORT

ANALYSIS DATE : 03/11/2022
MATRIX : High Purity N_2
UNITS : PPB (v/v)

INSTRUMENT ID : GC/MS-02
CALIBRATION STD ID : MS1-030722-01
ANALYST : RC

VOLATILE ORGANIC COMPOUNDS BY EPA METHOD TO-15

Laboratory Control Spike Analysis

System Monitoring Compounds	*Sample Concentration*	*Spike Added*	*LCS[1] Recovery*	*LCSD[1] Recovery*	*LCS[1] % Recovery[2]*	*LCSD[1] % Recovery[2]*	*RPD[3]*
4-BFB (surrogate standard)	0.0	10.00	9.34	8.96	93.4	89.6	4.2
1,1-Dichloroethene	0.0	10.40	10.18	10.26	98	99	0.8
Methylene Chloride (DCM)	0.0	10.50	10.41	10.80	99	103	3.7
Benzene	0.0	10.60	8.89	9.20	84	87	3.4
Trichloroethene (TCE)	0.0	10.40	10.00	10.02	96	96	0.2
Toluene	0.0	10.60	9.50	9.61	90	91	1.2
Tetrachloroethene (PCE)	0.0	10.40	9.81	10.15	94	98	3.4
Chlorobenzene	0.0	10.60	10.03	10.15	95	96	1.2
Ethylbenzene	0.0	10.50	9.80	9.64	93	92	1.6
m & p-Xylene	0.0	21.00	21.08	21.09	100	100	0.0
o-Xylene	0.0	10.50	10.54	10.74	100	102	1.9

[1] Laboratory Control Spike (LCS) / Laboratory Control Spike Duplicate (LCSD)

[2] The acceptable range for analyte recovery is 100±30%.

[3] Relative Percent Difference (RPD) between LCS recovery and LCSD recovery (acceptable range is <25%).

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QUALITY CONTROL / QUALITY ASSURANCE REPORT

ANALYSIS DATE : 03/11/2022 | **INSTRUMENT ID : GC/MS-02**
MATRIX : High Purity He or N_2 | **ANALYST : RC**
UNITS : PPB (v/v)

VOLATILE ORGANIC COMPOUNDS BY EPA METHOD TO-15

Method Blank Analysis

Analyte Compounds	*MB 031122*	*Reporting Limit (RL)*
4-BFB (surrogate standard)	86%	100±30%
Chlorodifluoromethane	<RL	0.5
Propene	<RL	1.0
Dichlorodifluoromethane	<RL	0.5
Dimethyl Ether	<RL	0.5
Chloromethane	<RL	0.5
Dichlorotetrafluoroethane	<RL	0.5
Vinyl Chloride	<RL	0.5
Acetaldehyde	<RL	5.0
Methanol	<RL	5.0
1,3-Butadiene	<RL	0.5
Bromomethane	<RL	0.5
Chloroethane	<RL	0.5
Dichlorofluoromethane	<RL	0.5
Ethanol	<RL	2.0
Vinyl Bromide	<RL	0.5
Acrolein	<RL	1.0
Acetone	<RL	2.0
Trichlorofluoromethane	<RL	0.5
2-Propanol (IPA)	<RL	2.0
Acrylonitrile	<RL	2.0
1,1-Dichloroethene	<RL	0.5
Methylene Chloride (DCM)	<RL	1.0
TertButanol (TBA)	<RL	0.5
Allyl Chloride	<RL	1.0
Carbon Disulfide	<RL	2.0
Trichlorotrifluoroethane	<RL	0.5
trans-1,2-Dichloroethene	<RL	0.5
1,1-Dichloroethane	<RL	0.5
Methyl Tert Butyl Ether (MTBE)	<RL	0.5
Vinyl Acetate	<RL	1.0
2-Butanone (MEK)	<RL	1.0
cis-1,2-Dichloroethene	<RL	0.5
Hexane	<RL	0.5
Chloroform	<RL	0.5
Ethyl Acetate	<RL	0.5
Tetrahydrofuran	<RL	0.5
1,2-Dichloroethane	<RL	0.5
1,1,1-Trichloroethane	<RL	0.5
Benzene	<RL	0.5
Carbon Tetrachloride	<RL	0.5
Cyclohexane	<RL	0.5

Analyte Compounds (Continued)	*MB 031122*	*Reporting Limit (RL)*
1,2-Dichloropropane	<RL	0.5
Bromodichloromethane	<RL	0.5
1,4-Dioxane	<RL	1.0
Trichloroethene (TCE)	<RL	0.5
2,2,4-Trimethylpentane	<RL	0.5
Methyl Methacrylate	<RL	0.5
Heptane	<RL	0.5
cis-1,3-Dichloropropene	<RL	0.5
4-Methyl-2-pentanone (MiBK)	<RL	0.5
trans-1,3-Dichloropropene	<RL	0.5
1,1,2-Trichloroethane	<RL	0.5
Toluene	<RL	0.5
2-Hexanone (MBK)	<RL	1.0
Dibromochloromethane	<RL	0.5
1,2-Dibromoethane	<RL	0.5
Tetrachloroethene (PCE)	<RL	0.5
Chlorobenzene	<RL	0.5
Ethylbenzene	<RL	0.5
m & p-Xylene	<RL	1.0
Bromoform	<RL	0.5
Styrene	<RL	0.5
1,1,2,2-Tetrachloroethane	<RL	0.5
o-Xylene	<RL	0.5
1,2,3-Trichloropropane	<RL	0.5
Isopropylbenzene (Cumene)	<RL	0.5
α-Pinene	<RL	0.5
2-Chlorotoluene	<RL	0.5
n-Propylbenzene	<RL	0.5
4-Ethyltoluene	<RL	0.5
1,3,5-Trimethylbenzene	<RL	0.5
β-Pinene	<RL	0.5
1,2,4-Trimethylbenzene	<RL	0.5
Benzyl Chloride (a-Chlorotoluene)	<RL	0.5
1,3-Dichlorobenzene	<RL	0.5
1,4-Dichlorobenzene	<RL	0.5
Sec-ButylBenzene	<RL	0.5
1,2-Dichlorobenzene	<RL	0.5
n-ButylBenzene	<RL	0.5
1,2-Dibromo-3-Chloropropane	<RL	0.5
1,2,4-Trichlorobenzene	<RL	0.5
Naphthalene	<RL	1.0
Hexachlorobutadiene	<RL	0.5

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QUALITY CONTROL / QUALITY ASSURANCE REPORT

ANALYSIS DATE : 03/11/2022
MATRIX : Air
UNITS : PPB (v/v)

INSTRUMENT ID : GC/MS-02
ANALYST : RC
DILUTION FACTOR[1] : x1

VOLATILE ORGANIC COMPOUNDS BY EPA METHOD TO-15

Duplicate Analysis of AAC Sample ID: CCV/LCSD

Analyte Compounds	*Sample*	*Duplicate*	*RPD[2]*
4-BFB (surrogate standard)	9.34	8.96	4.2
Chlorodifluoromethane	10.6	10.6	0.1
Propene	10.3	10.3	0.2
Dichlorodifluoromethane	11.1	10.9	2.0
Dimethyl Ether	9.81	9.35	4.8
Chloromethane	11.9	11.8	0.3
Dichlorotetrafluoroethane	12.3	12.2	0.7
Vinyl Chloride	11.9	11.9	0.1
Acetaldehyde	31.4	32.5	3.3
Methanol	76.1	79.2	4.0
1,3-Butadiene	11.8	12.3	3.9
Bromomethane	11.0	10.8	1.2
Chloroethane	10.7	10.2	4.6
Dichlorofluoromethane	11.5	11.7	1.6
Ethanol	9.41	9.95	5.6
Vinyl Bromide	11.3	11.3	0.4
Acrolein	11.5	11.3	1.8
Acetone	9.93	9.57	3.7
Trichlorofluoromethane	11.2	10.9	1.9
2-Propanol (IPA)	10.5	10.9	3.5
Acrylonitrile	13.3	12.9	3.3
1,1-Dichloroethene	10.2	10.3	0.8
Methylene Chloride (DCM)	10.4	10.8	3.7
TertButanol (TBA)	11.2	11.1	0.7
Allyl Chloride	9.81	9.61	2.1
Carbon Disulfide	10.8	11.0	2.5
Trichlorotrifluoroethane	10.5	10.7	1.3
trans-1,2-Dichloroethene	9.93	9.88	0.5
1,1-Dichloroethane	8.89	8.75	1.6
Methyl Tert Butyl Ether (MTBE)	6.95	6.97	0.3
Vinyl Acetate	9.16	9.31	1.6
2-Butanone (MEK)	8.88	8.88	0.0
cis-1,2-Dichloroethene	9.47	9.45	0.2
Hexane	8.12	8.12	0.0
Chloroform	8.71	8.80	1.0
Ethyl Acetate	8.49	8.62	1.5
Tetrahydrofuran	8.01	8.01	0.0
1,2-Dichloroethane	6.83	7.10	3.9
1,1,1-Trichloroethane	8.29	8.34	0.6
Benzene	8.89	9.20	3.4
Carbon Tetrachloride	9.06	9.30	2.6
Cyclohexane	8.70	9.09	4.4

Analyte Compounds (Continued)	*Sample*	*Duplicate*	*RPD[2]*
1,2-Dichloropropane	9.09	9.35	2.8
Bromodichloromethane	8.31	8.51	2.4
1,4-Dioxane	8.57	9.00	4.9
Trichloroethene (TCE)	10.0	10.0	0.2
2,2,4-Trimethylpentane	9.80	9.84	0.4
Methyl Methacrylate	8.69	8.87	2.1
Heptane	8.74	8.61	1.5
cis-1,3-Dichloropropene	8.22	8.33	1.3
4-Methyl-2-pentanone (MiBK)	8.85	8.97	1.3
trans-1,3-Dichloropropene	7.46	7.61	2.0
1,1,2-Trichloroethane	9.62	9.77	1.5
Toluene	9.50	9.61	1.2
2-Hexanone (MBK)	9.07	9.33	2.8
Dibromochloromethane	11.1	11.3	1.9
1,2-Dibromoethane	10.4	10.6	2.3
Tetrachloroethene (PCE)	9.81	10.2	3.4
Chlorobenzene	10.0	10.2	1.2
Ethylbenzene	9.80	9.64	1.6
m & p-Xylene	21.1	21.1	0.0
Bromoform	11.3	11.2	1.1
Styrene	10.5	10.2	2.7
1,1,2,2-Tetrachloroethane	12.1	12.2	0.6
o-Xylene	10.5	10.7	1.9
1,2,3-Trichloropropane	11.6	11.4	1.6
Isopropylbenzene (Cumene)	11.3	11.1	1.9
α-Pinene	10.5	10.1	4.2
2-Chlorotoluene	11.3	11.4	0.2
n-Propylbenzene	11.5	11.2	3.0
4-Ethyltoluene	11.3	11.1	1.7
1,3,5-Trimethylbenzene	10.9	10.7	1.8
β-Pinene	11.4	9.67	16.2
1,2,4-Trimethylbenzene	11.2	11.1	0.9
Benzyl Chloride (a-Chlorotoluene)	9.81	9.70	1.1
1,3-Dichlorobenzene	11.8	11.5	2.5
1,4-Dichlorobenzene	11.5	11.3	1.8
Sec-ButylBenzene	11.8	11.5	2.6
1,2-Dichlorobenzene	11.5	11.5	0.4
n-ButylBenzene	11.9	11.6	2.1
1,2-Dibromo-3-Chloropropane	12.0	11.7	2.5
1,2,4-Trichlorobenzene	11.0	11.0	0.4
Naphthalene	11.5	11.7	1.5
Hexachlorobutadiene	11.5	11.7	1.3

[1] Dilution factor is the product of the Canister Dilution Factor and the Analysis Dilution Factor.

[2] Relative Percent Difference (RPD) between Sample analysis and Duplicate analysis (acceptable range is <25%).

SRL - Sample Reporting Limit (minimum)