N

N 6th St

Office Building 10-16

1016-IA1

LMW-2D

Monitoring Well

Grease Trap

AST ARE-099 and Generator

1016-IA2

PB-205

LAI-B2

LAI-B7

LAI-B1

LAI-B9

PB-204

LAI-B8

LAI-B10

LAI-B6

MW-12

MW-10

Hydraulic Compactor

AST ARE-098 and Generator

LAI-B3

Oil-filled Electrical Transformer

1013-IA2

MW-11

AST ARE-097 and Generator

PB-201

Parking Structure

Garden Ave N

PACCAR Superfund Site

Park Ave N

PB-202

Hydraulic Elevator

1013-IA1

MW-2

Office Building 10-13

LAI-B4

Chillers

PB-203

LAI-B5

N 5th St

LEGEND

- Ambient Air Sample
- Existing Well - No Sampling
- Indoor Air Sample
- Groundwater Sample
- Soil Sample
- Soil Gas Sample
- Subject Property
- Tax Parcels
- PB-206 Proposed push-probe boring and approximate locations

70 0 35 70

SCALE IN FEET

Boeing Building Parcel
Garden Avenue North and North 6th Street
Renton, Washington

SITE AND EXPLORATION PLAN

DATE: NOVEMBER 2021 Job No. P21276

Zipper Geo Associates, LLC
19019 36th Ave. W.,Suite E
Lynnwood, WA

FIGURE 3
SHT. 1 of 1

REFERENCES: (1) Figure 3, Phase II Sampling Locations, Phase II Environmental Site Assessment Report - Boeing Buildings 10-13 and 10-16 prepared by Landau Associates and dated August 7, 2018.

Table 1. Soil Analytical Results - TPH, Metals, PCBs
Boeing Renton - Building Parcel
ZGA Project No. 2509.22

ZipperGeo
Geoprofessional Consultants

Date	Boring ID	Sample ID	Depth (ft. bgs)	Analytical Results (mg/kg)					
				TPH			Metals[3]	PCBs[4]	
				GRPH[1]	DRPH[2]	ORPH[2]	Mercury	Aroclor 1254	Total PCBs
11/18/2021	PB-201	PB-201-03.0'	3.0	-	<50	<250	-	-	-
		PB-201-05.5'	5.5	-	-	-	-	-	-
	PB-202	PB-202-01.0'	1.0	-	-	-	-	-	-
		PB-202-06.0'	6.0	-	<50	<250	-	-	-
	PB-203	PB-203-01.0'	1.0	-	-	-	-	-	-
		PB-203-06.0'	6.0	-	<50	<250	-	-	-
11/17/2021	PB-204	PB-204-02.0'	2.0	-	<50	<250	-	**0.049**	**0.049**
		PB-204-08.0'	8.0	-	<50	<250	-	<0.02	<0.02
	PB-205	PB-205-02.0'	2.0	-	<50	<250	-	-	-
		PB-205-08.0'	8.0	-	<50	<250	-	-	-
MTCA Method A CUL =				**30**	**2,000 Total**		**2**	**-**	**1**
MTCA Method B CUL =				**-**	**-**	**-**	**-**	**-**	**0.5**
Puget-Sound 90th Percentile Value =				**-**	**-**	**-**	**0.07**	**-**	**NA**

LEGEND

<1	= Not detected above laboratory RDL.
75.1	= Detected above laboratory RDL, but below applicable MTCA CUL.
2,120	= Detected above applicable MTCA CUL.
-	= Not analyzed, sampled, or applicable.

NOTES

[1]Analyzed by Method NWPTH-Gx.
[2]Analyzed by Method NWPTH-Dx.
[3]Analyzed by EPA Method 6020B.
[4]Analyzed by EPA Method 8082A.
[5]Analyzed by EPA Method 8270E.

ACRONYMS

cPAHs	Carcinogenic Polycyclic Aromatic Hydrocarbons	PCBs	Polychlorinated Biphenyls
CUL	Cleanup Level	RDL	Laboratory Reported Detection Limit
mg/kg	milligrams per kilogram	TPH	Total Petroleum Hydrocarbons
MTCA	RCW 70A.305 and its implementing regulations, the Model Toxics Control Act, WAC 173-340 (collectively MTCA)	VOCs	Volatile Organic Compounds
NA	Not Applicable		

Table 2. Soil Analytical Results - cPAHs
Boeing Renton - Building Parcel
ZGA Project No. 2509.22

ZipperGeo
Geoprofessional Consultants

Date	Boring ID	Sample ID	Depth (ft. bgs)	cPAHs Toxicity Equivalency[1] (mg/kg)							TEQ[2] (mg/kg)
				Benzo(a)-pyrene TEF:1	Benzo(a)-anthracene TEF:0.1	Benzo(b)-fluoroanthene TEF:0.1	Benzo(k)-fluoroanthene TEF:0.1	Chrysene TEF:0.01	Dibenzo(a,h)-anthracene TEF:0.1	Indeno(1,2,3,cd)-pyrene TEF:0.1	
11/18/2021	PB-201	PB-201-03.0'	3.0	-	-	-	-	-	-	-	-
		PB-201-05.5'	5.5	-	-	-	-	-	-	-	-
	PB-202	PB-202-01.0'	1.0	-	-	-	-	-	-	-	-
		PB-202-06.0'	6.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
	PB-203	PB-203-01.0'	1.0	-	-	-	-	-	-	-	-
		PB-203-06.0'	6.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
11/17/2021	PB-204	PB-204-02.0'	2.0	-	-	-	-	-	-	-	-
		PB-204-08.0'	8.0	-	-	-	-	-	-	-	-
	PB-205	PB-205-02.0'	2.0	**0.091**	**0.064**	**0.12**	<0.05	**0.081**	<0.05	**0.069**	**0.122**
		PB-205-08.0'	8.0	-	-	-	-	-	-	-	-
MTCA Method A Cleanup Level (mg/kg)				***0.1***	***NE***	***NE***	***NE***	***NE***	***NE***	***NE***	***0.1***
MTCA Method B Cleanup Level, Direct Contact (mg/kg)				***0.19***	***NE***	***NE***	***NE***	***NE***	***NE***	***NE***	***0.19***

LEGEND

<RDL	= Specified analyte not detected above RDL.
0.0217	= Specified analyte detected above the RDL, but below the specified MTCA Cleanup Level.
0.162	= Specified analyte detected above the MTCA Cleanup Level.
-	= Not analyzed, sampled, or applicable.

ACRONYMS

EPA	United States Environmental Protection Agency	NE	Not Established
ft. bgs	Feet below ground surface	RDL	Laboratory reported detection limit
mg/kg	Milligrams per kilogram, aka parts-per-million or ppm	TEF	Toxicity Equivalency Factor
MTCA	Chapter 70.105D of the Revised Code of Washington and its implementing regulations, the Model Toxics Control Act, Chapter 173-340 of the Washington Administrative Code (Collectively MTCA).	TEQ	Toxicity Equivalent

NOTES

[1]Analyzed by EPA Method 8270E SIM.

[2]Analytical results for each individual cPAH is multiplied by the TEF and all seven cPAH values are added.

Table 3. Groundwater Analytical Results
Boeing Renton - Building Parcel
ZGA Project No. 2509.22

ZipperGeo
Geoprofessional Consultants

Matrix	Boring ID	Sample ID	Date	Analytical Results (µg/L)									
				TPH					Chlorinated VOCs[4]		Metals		
				GRPH[1]	DRPH[2]	ORPH[2]	DRPH[3]	ORPH[3]	Vinyl Chloride	Other VOC	Dissolved Arsenic[5]	Dissolved Mercury[6]	PCBs[7]
Groundwater	PB-201	PB-201-20211118	11/18/2021	-	**450[x]**	**400[x]**	<50	<150	<0.02	<RDL	**3.31**	-	-
	PB-202	PB-202-20211118	11/18/2021	-	<50	<150	-	-	<0.02	<RDL	**1.60**	-	-
	PB-203	PB-203-20211118	11/18/2021	-	**60[x]**	<150	-	-	<0.02	<RDL	**1.93**	-	-
	PB-204	PB-204-20211117	11/17/2021	-	**160[x]**	<150	-	-	<0.02	<RDL	**32.4**	-	<0.1
	PB-205	PB-205-20211117	11/17/2021	-	**77[x]**	<150	-	-	-	-	-	-	-
MTCA Cleanup Level for Groundwater (µg/L) [8]				**1,000**	**500 total**		**500 total**		**80[9]**	**Varies**	**5**	**2**	**0.1**

LEGEND

<3.20/<RDL	= Specified analyte not detected above the RDL.
ND	= Specified analyte not detected above the RDL.
20.2	= Specified analyte detected above the RDL, but below the MTCA Cleanup Level.
32.4	= Specified analyte detected above the MTCA Cleanup Level.
-	= Not analyzed, sampled, or applicable.

ACRONYMS

µg/L	Micrograms per liter, aka parts per million, or ppm
CLARC	Cleanup Levels and Risk Calculation
DCE	Dichloroethene
DRPH	Diesel-range petroleum hydrocarbons
EPA	United States Environmental Protection Agency
GRPH	Gasoline-range petroleum hydrocarbons
MTCA	Model Toxics Control Act
NE	Not established
NWTPH	Northwest total petroleum hydrocarbon
RDL	Laboratory Reported Detection Limit
VOC	Volatile Organic Compound

NOTES

[1] Analyzed by Method NWPTH-Gx.
[2] Analyzed by Method NWPTH-DX.
[3] Analyzed by Method NWPTH-DX after the sample was run through a silica gel column.
[4] Analyzed by EPA Method 8260D. Vinyl Chloride analyzed by 8260D-SIM.
[5] Analyzed by EPA Method 6010D.
[6] Analyzed by EPA Method 7470A.
[7] Analyzed by EPA Method 8082A.
[8] MTCA Cleanup Regulation, Chapter 173-340-900 WAC, Table 720-1 Method A Cleanup Levels for groundwater, unless noted otherwise.
[9] MTCA Cleanup Regulation, Chapter 173-340 WAC, CLARC, Groundwater, Method B, Noncancer.
[x] The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

Zipper Geo Associates, LLC	GEOPROBE BORING LOG	Sheet 1 of 1
	Project Number : 2509	
	Boring Number : PB-201	

Project Name : Boeing Renton	**Ground Surface Elevation : 140 feet above mean sea level**
Location : Parking garage basement	**Depth to Water : 2.5 feet below ground surface**
Driller / Crew : Don/Push Probe (Geoprobe)	**Start / Finish Date : 11/18/21**

Depth (ft.)	Monitoring Well Completion	Recovery (ft)	Laboratory Samples	PID (ppm)	Sheen	Description	Depth (ft.)
						3 inches of concrete at surface.	
	▽	5/6	PB-201-03.0'	<1.0	None	Brown, damp, medium dense, gravelly SAND with silt; no odors, no staining. (FILL) Brown, saturated, medium dense, gravelly SAND with silt; no odors, no staining. (FILL)	
5			PB-201-05.5'	<1.0	None	Gray, saturated, silty SAND; no odors, no staining. (FILL)	5
10						Boring terminated at 6 feet below ground surface (bgs). No odors or stains. Water measured at 2.5 bgs.	10
15							15
20							20

DRAFT

Sampler Type	**Static Water Level**	▼	**Logged by: KRN**
Continuous Core	**Water Level (ATD)**	▽	**Approved by:**

Zipper Geo Associates, LLC	GEOPROBE BORING LOG	Sheet 1 of 1
	Project Number : 2509	
	Boring Number : PB-202	

Project Name : Boeing Renton	**Ground Surface Elevation : 140 feet above mean sea level**
Location : Parking garage basement	**Depth to Water : 8.0 feet below ground surface**
Driller / Crew : Don/Push Probe (Geoprobe)	**Start / Finish Date : 11/18/21**

(ft.)	Completion	Recovery (ft)	Samples	PID (ppm)	Sheen	Description	(ft.)
			PB-202-01.0'	<1.0	None	Topsoil at surface.	
						Concrete.	
		4/5				Mottled gray, silty SAND to sandy SILT with roots; no odors, no staining. (FILL)	
						Gray to brown, medium dense, gravelly silty SAND; no odors, no staining. (FILL)	
5							5
			PB-202-06.0'	<1.0	None	Brown SAND; no odors, no staining. (FILL)	
	▽	4.5/5		<1.0	None	Mottled brown and gray, sandy SILT, interbedded with sand, with roots; no odors, no staining. (FILL)	
				<1.0	None	Mottled gray, saturated, sandy SILT to silty SAND; no odors, no staining.	
10							10
		3.75/5		<1.0	None	Dark gray, saturated, medium dense, silty SAND; no odors, no staining.	
15							15
						Boring terminated at 15 feet below ground surface (bgs). No odors or stains. Water measured at 8.0 bgs.	
20							20

DRAFT

Sampler Type	Geoprobe	**Static Water Level**	▼	**Logged by: KRN**
Continuous Core		**Water Level (ATD)**	▽	**Approved by:**

Zipper Geo Associates, LLC	GEOPROBE BORING LOG	Sheet 1 of 1
	Project Number : 2509	
	Boring Number : PB-203	

Project Name : Boeing Renton	**Ground Surface Elevation : 140 feet above mean sea level**
Location : Planter box in southwest corner	**Depth to Water : 6.0 feet below ground surface**
Driller / Crew : Don/Push Probe (Geoprobe)	**Start / Finish Date : 11/18/21**

Depth (ft.)	Monitoring Well Completion	Recovery (ft)	Laboratory Samples	PID (ppm)	Sheen	Description	Depth (ft.)
			PB-203-01.0'	<1.0	None	6 inches dark brown, silty SAND, with roots; no odors, no staining. (TOPSOIL)	
		4/5				Brown, silty SAND; no odors, no staining. (FILL)	
5						Mottled brown and gray, medium dense, moist, silty SAND; no odors, no staining. (FILL)	5
	▽					Brown, medium dense, moist, silty SAND; no odors, no staining. (FILL)	
		4.5/5	PB-202-07.0'	<1.0	None		
				<1.0	None	Mottled brown and gray, medium dense, saturated, silty SAND; no odors, no staining. (FILL)	
10							10
				<1.0	None	Gray, saturated, silty SAND; no odors, no staining.	
		3.75/5		<1.0	None	Gray, saturated, sandy GRAVEL; no odors, no staining.	
				<1.0	None	Gray, saturated, silty SAND; no odors, no staining.	
15							15
						Boring terminated at 15 feet below ground surface (bgs). No odors or stains. Water measured at 6.0 bgs.	
20							20

DRAFT

Sampler Type	Geoprobe	**Static Water Level**	▼	**Logged by: KRN**
Continuous Core		**Water Level (ATD)**	▽	**Approved by:**

Zipper Geo Associates, LLC	GEOPROBE BORING LOG	Sheet 1 of 1
	Project Number : 2509	
	Boring Number : PB-204	

Project Name : Boeing Renton	**Ground Surface Elevation : 140 feet above mean sea level**
Location : East side of building	**Depth to Water : 11.6 feet below ground surface**
Driller / Crew : ESN/Don	**Start / Finish Date : 11/17/21**

Depth (ft.)	Monitoring Well Completion	Recovery (ft)	Laboratory Samples	PID (ppm)	Sheen	Description	Depth (ft.)
						6 inches of concrete at surface.	
						Brown, moist, dense, silty gravelly SAND; no odors, no staining. (FILL)	
		4/5	PB-204-02.0'	<1.0	None	Gray, moist, dense, silty gravelly SAND'; no odors, no staining.	
5							5
		5/5	PB-204-08.0'	<1.0	None	Gray, moist, silty SAND with gravel; no odors, no staining.	
10							10
	▽		PB-204-010.0'	<1.0	None	Gray, moist, loose to medium dense, sandy SILT to silty SAND; no odors, no staining.	
		5/5		<1.0	None	Gray, wet to saturated, loose to medium dense, sandy SILT to silty SAND; no odors, no staining.	
15							15
		5/5		<1.0	None	Black, saturated, silty SAND to sandy SILT; interbedded sands; no odors, no staining.	
20							20
						Boring terminated at 20 feet below ground surface (bgs). No odors or stains. Water measured at 11.6 bgs	

DRAFT

Sampler Type	**Static Water Level**	▼	**Logged by: KRN**
Continuous Core	**Water Level (ATD)**	▽	**Approved by:**

Zipper Geo Associates, LLC	GEOPROBE BORING LOG	Sheet 1 of 1
	Project Number : 2509	
	Boring Number : PB-205	

Project Name : Boeing Renton	**Ground Surface Elevation : 140 feet above mean sea level**
Location : West side of building	**Depth to Water : 12.5 feet below ground**
Driller / Crew : ESN/Don	**Start / Finish Date : 11/18/21**

Depth (ft.)	Monitoring Well Completion	Recovery (ft)	Laboratory Samples	PID (ppm)	Sheen	Description	Depth (ft.)
						6 inches of concrete at surface.	
		4/5	PB-205-02.0'	<1.0	None	Brown, moist, loose to medium dense, gravelly silty SAND; black and red pockets; no odors, no staining. (FILL)	
5							5
		5/5	PB-205-08.0'	<1.0	None	Brown to gray, moist, gravelly silty SAND; no odors, no staining. (FILL)	
10			PB-205-010.0'	<1.0	None		10
	▽	5/5		<1.0	None	Brown, wet, sandy GRAVEL; no odors, no staining.	
				<1.0	None	Brown, saturated, gravelley SAND, some silt; no odors, no staining.	
15							15
		5/5		<1.0	None	Brown, saturated, sandy GRAVEL to gravelley SAND, some silt; no odors, no staining.	
20							20
						Boring terminated at 20 feet below ground surface (bgs). No odors or stains. Water measured at 12.5 bgs.	

DRAFT

Sampler Type — **Continuous Core**

Static Water Level ▼ — **Water Level (ATD)** ▽

Logged by: KRN

Approved by:

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
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www.friedmanandbruya.com

November 23, 2021

Chuck Cacek, Project Manager
Zipper Geo Associates, LLC
19019 36th Ave W, Suite E
Lynnwood, WA 98036

Dear Mr Cacek:

Included are the results from the testing of material submitted on November 17, 2021 from the Boeing Renton 2509.22, F&BI 111346 project. There are 28 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Kaelin Newman, Sean Donnan
ZGA1123R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on November 17, 2021 by Friedman & Bruya, Inc. from the Zipper Geo Associates, LLC Boeing Renton 2509.22, F&BI 111346 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Zipper Geo Associates, LLC
111346 -01	PB-204_20211117
111346 -02	PB-205_20211117
111346 -03	PB-101_20211117
111346 -04	PB-103_20211117
111346 -05	PB-104_20211117
111346 -06	PB-105_20211117
111346 -07	Trip Blank

The NWTPH-Dx silica ge; laboratory control sample and associated relative percent difference exceeded the acceptance criteria. No material was detected in the silica gel samples, therefore the data were acceptable.

All other quality control requirements were acceptable.

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111346
Date Extracted: 11/18/21
Date Analyzed: 11/19/21

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
PB-204_20211117 111346-01	<100	91
PB-101_20211117 111346-03	<100	93
PB-103_20211117 111346-04	<100	93
PB-104_20211117 111346-05	<100	90
PB-105_20211117 111346-06	<100	89
Trip Blank 111346-07	<100	92
Method Blank 01-2633 MB	<100	92

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111346
Date Extracted: 11/18/21
Date Analyzed: 11/19/21

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 51-134)
PB-204_20211117 111346-01	160 x	<150	114
PB-205_20211117 111346-02	77 x	<150	90
PB-101_20211117 111346-03	410 x	200 x	123
PB-103_20211117 111346-04	260 x	<150	109
PB-104_20211117 111346-05	290 x	250 x	100
PB-105_20211117 111346-06	62 x	<150	131
Method Blank 01-2702 MB	<50	<150	108

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111346
Date Extracted: 11/18/21
Date Analyzed: 11/23/21

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx
Sample Extracts Passed Through a Silica Gel Column Prior to Analysis
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
PB-101_20211117 111346-03	<50	<150	145
PB-104_20211117 111346-05	<50	<150	125
Method Blank 01-2702 MB	<50	<150	131

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	PB-204_20211117	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111346
Date Extracted:	11/18/21	Lab ID:	111346-01
Date Analyzed:	11/18/21	Data File:	111346-01.123
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	32.4

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	PB-101_20211117	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111346
Date Extracted:	11/18/21	Lab ID:	111346-03
Date Analyzed:	11/18/21	Data File:	111346-03.124
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	38.4

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	PB-104_20211117	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111346
Date Extracted:	11/18/21	Lab ID:	111346-05
Date Analyzed:	11/18/21	Data File:	111346-05.125
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	44.1

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	PB-105_20211117	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111346
Date Extracted:	11/18/21	Lab ID:	111346-06
Date Analyzed:	11/18/21	Data File:	111346-06.126
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.65

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Zipper Geo Associates, LLC
Date Received:	NA	Project:	2509.22, F&BI 111346
Date Extracted:	11/18/21	Lab ID:	I1-754 mb2
Date Analyzed:	11/18/21	Data File:	I1-754 mb2.115
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111346
Date Extracted: 11/18/21
Date Analyzed: 11/19/21

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED MERCURY USING EPA METHOD 1631E

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Dissolved Mercury
PB-101_20211117 111346-03	<0.1
Method Blank i1-761 MB	<0.1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	PB-204_20211117	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111346
Date Extracted:	11/18/21	Lab ID:	111346-01
Date Analyzed:	11/19/21	Data File:	111918.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	78	126
Toluene-d8	96	87	115
4-Bromofluorobenzene	104	92	112

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	PB-101_20211117	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111346
Date Extracted:	11/18/21	Lab ID:	111346-03
Date Analyzed:	11/19/21	Data File:	111919.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	78	126
Toluene-d8	98	87	115
4-Bromofluorobenzene	103	92	112

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	PB-105_20211117	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111346
Date Extracted:	11/18/21	Lab ID:	111346-06
Date Analyzed:	11/19/21	Data File:	111920a.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	78	126
Toluene-d8	98	87	115
4-Bromofluorobenzene	106	92	112

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Trip Blank	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111346
Date Extracted:	11/18/21	Lab ID:	111346-07
Date Analyzed:	11/19/21	Data File:	111921.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	78	126
Toluene-d8	96	87	115
4-Bromofluorobenzene	102	92	112

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	Zipper Geo Associates, LLC
Date Received:	Not Applicable	Project:	2509.22, F&BI 111346
Date Extracted:	11/18/21	Lab ID:	01-2592 mb
Date Analyzed:	11/18/21	Data File:	111807.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	109	78	126
Toluene-d8	138	87	115
4-Bromofluorobenzene	99	92	112

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	PB-101_20211117	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111346
Date Extracted:	11/18/21	Lab ID:	111346-03 1/2
Date Analyzed:	11/19/21	Data File:	111911.D
Matrix:	Water	Instrument:	GCMS9
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	40	10	60
Phenol-d6	27	10	49
Nitrobenzene-d5	87	15	144
2-Fluorobiphenyl	83	25	128
2,4,6-Tribromophenol	87	10	142
Terphenyl-d14	94	41	138

Compounds:	Concentration ug/L (ppb)
Benz(a)anthracene	<0.04
Chrysene	<0.04
Benzo(a)pyrene	<0.04
Benzo(b)fluoranthene	<0.04
Benzo(k)fluoranthene	<0.04
Indeno(1,2,3-cd)pyrene	<0.04
Dibenz(a,h)anthracene	<0.04

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Zipper Geo Associates, LLC
Date Received:	Not Applicable	Project:	2509.22, F&BI 111346
Date Extracted:	11/18/21	Lab ID:	01-2701 mb2
Date Analyzed:	11/18/21	Data File:	111809.D
Matrix:	Water	Instrument:	GCMS12
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	22	11	65
Phenol-d6	13	11	65
Nitrobenzene-d5	84	50	150
2-Fluorobiphenyl	86	44	108
2,4,6-Tribromophenol	75	10	140
Terphenyl-d14	97	50	150

Compounds:	Concentration ug/L (ppb)
Benz(a)anthracene	<0.02
Chrysene	<0.02
Benzo(a)pyrene	<0.02
Benzo(b)fluoranthene	<0.02
Benzo(k)fluoranthene	<0.02
Indeno(1,2,3-cd)pyrene	<0.02
Dibenz(a,h)anthracene	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	PB-204_20211117	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111346
Date Extracted:	11/18/21	Lab ID:	111346-01
Date Analyzed:	11/19/21	Data File:	111905.D
Matrix:	Water	Instrument:	GC9
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	55	25	160

Compounds:	Concentration ug/L (ppb)
Aroclor 1221	<0.1
Aroclor 1232	<0.1
Aroclor 1016	<0.1
Aroclor 1242	<0.1
Aroclor 1248	<0.1
Aroclor 1254	<0.1
Aroclor 1260	<0.1
Aroclor 1262	<0.1
Aroclor 1268	<0.1

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	Method Blank	Client:	Zipper Geo Associates, LLC
Date Received:	Not Applicable	Project:	2509.22, F&BI 111346
Date Extracted:	11/18/21	Lab ID:	01-2698 mb2
Date Analyzed:	11/19/21	Data File:	111904.D
Matrix:	Water	Instrument:	GC9
Units:	ug/L (ppb)	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	42	25	160

Compounds:	Concentration ug/L (ppb)
Aroclor 1221	<0.1
Aroclor 1232	<0.1
Aroclor 1016	<0.1
Aroclor 1242	<0.1
Aroclor 1248	<0.1
Aroclor 1254	<0.1
Aroclor 1260	<0.1
Aroclor 1262	<0.1
Aroclor 1268	<0.1

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111346

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 111315-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	96	69-134

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111346

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	132	112	61-133	16

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111346

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	144 vo	108	63-142	29 vo

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111346

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED METALS USING EPA METHOD 6020B

Laboratory Code: 111302-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	3.54	91	91	75-125	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	91	80-120

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111346

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED MERCURY USING EPA METHOD 1631E

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Mercury	ug/L (ppb)	0.01	114	103	78-125	10

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111346

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 111296-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	10	<0.02	89	50-150
Chloroethane	ug/L (ppb)	10	<1	84	50-150
1,1-Dichloroethene	ug/L (ppb)	10	<1	91	50-150
Methylene chloride	ug/L (ppb)	10	<5	101	50-150
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	97	50-150
1,1-Dichloroethane	ug/L (ppb)	10	<1	98	50-150
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	98	50-150
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<0.2	95	50-150
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	100	50-150
Trichloroethene	ug/L (ppb)	10	<0.5	92	50-150
Tetrachloroethene	ug/L (ppb)	10	<1	97	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	10	92	89	70-130	3
Chloroethane	ug/L (ppb)	10	87	84	70-130	4
1,1-Dichloroethene	ug/L (ppb)	10	88	86	70-130	2
Methylene chloride	ug/L (ppb)	10	103	106	43-134	3
trans-1,2-Dichloroethene	ug/L (ppb)	10	98	96	70-130	2
1,1-Dichloroethane	ug/L (ppb)	10	99	98	70-130	1
cis-1,2-Dichloroethene	ug/L (ppb)	10	98	98	70-130	0
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	96	95	70-130	1
1,1,1-Trichloroethane	ug/L (ppb)	10	101	100	70-130	1
Trichloroethene	ug/L (ppb)	10	92	91	70-130	1
Tetrachloroethene	ug/L (ppb)	10	97	99	70-130	2

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111346

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Benz(a)anthracene	ug/L (ppb)	5	96	95	70-130	1
Chrysene	ug/L (ppb)	5	98	97	70-130	1
Benzo(a)pyrene	ug/L (ppb)	5	100	100	70-130	0
Benzo(b)fluoranthene	ug/L (ppb)	5	101	102	70-130	1
Benzo(k)fluoranthene	ug/L (ppb)	5	101	99	70-130	2
Indeno(1,2,3-cd)pyrene	ug/L (ppb)	5	91	89	70-130	2
Dibenz(a,h)anthracene	ug/L (ppb)	5	90	87	70-130	3

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111346

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082A

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Aroclor 1016	ug/L (ppb)	0.25	71	64	25-111	10
Aroclor 1260	ug/L (ppb)	0.25	86	83	23-123	4

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

111396

SAMPLE CHAIN OF CUSTODY

11-17-21

E03 / VMP / AI

Page # 1 of 4

Report To Chuck, Sean, Kaelin

Company ZGA

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME: Boeing Renton

PO #: 2509.22

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
- ☐ Standard turnaround
- ☐ RUSH
- Rush charges authorized by: DRAFT BY 11/22

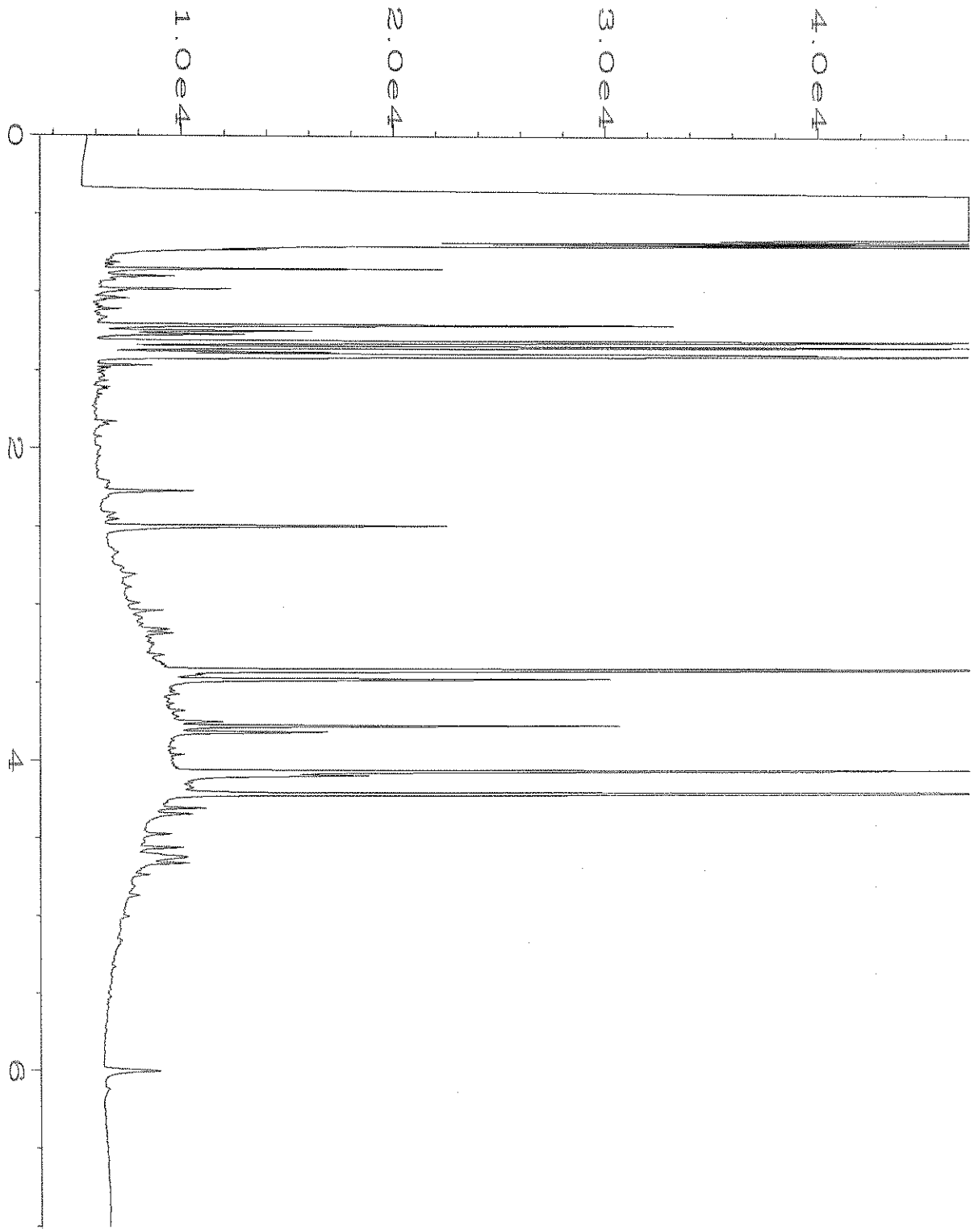
SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	cVOCs EPA 8260	cPAHs EPA 8270	PCBs EPA 8082 Dissolved	HT by 6010D Dissolved	Hg by 7470A Dissolved	Dx w/SG		Notes
PB-204_20211117	01 A-I	11/17/21	0934	GW	9	X	X			X		X	X				(X) perc 11/22/21 Notes ME
PB-205_20211117	02 A-G	↓	1140	↓	7	X	X										vinyl chloride by 8260 SIM
PB-101-20211117	03 A-I		1301		9	X	X			X	X		X	X	(X)		↓
PB-103-20211117	04 A-G		1408		7	X	X										
PB-104-20211117	05 A-H		1449		8	X	X						X		(X)		
PB-105-20211117	06 ↓	↓	1527	↓	8	X	X			X			X				
Trip Blank	07 A-B			↓	1		X			X							MCD2 11/18

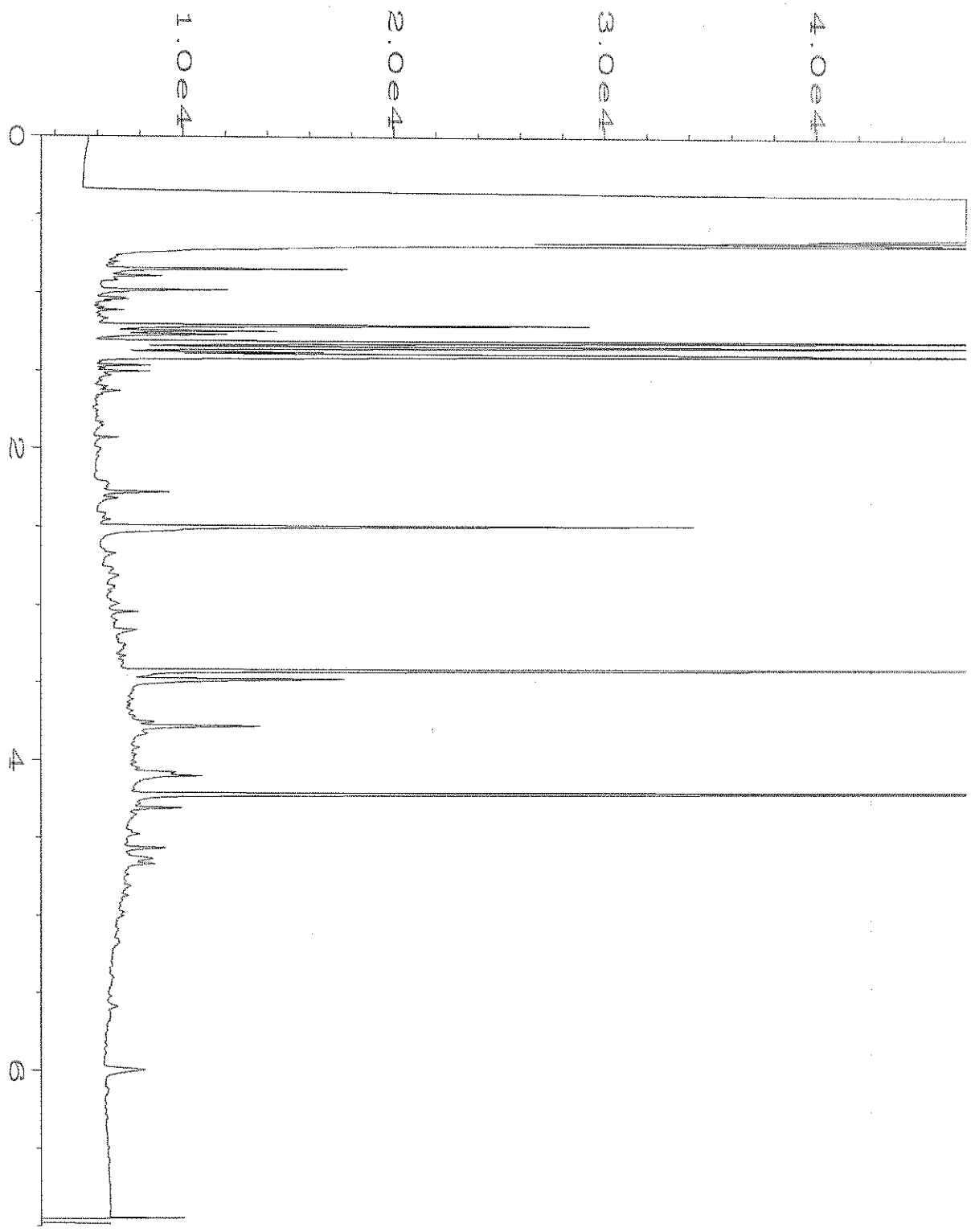
Samples received at 4 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
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Received by:	Charles Cecil	ZGA	11/17/21	1600
Relinquished by:	Charles Cecil	ZGA	11/17/21	1650
Received by:		FEB	11/17/21	1650

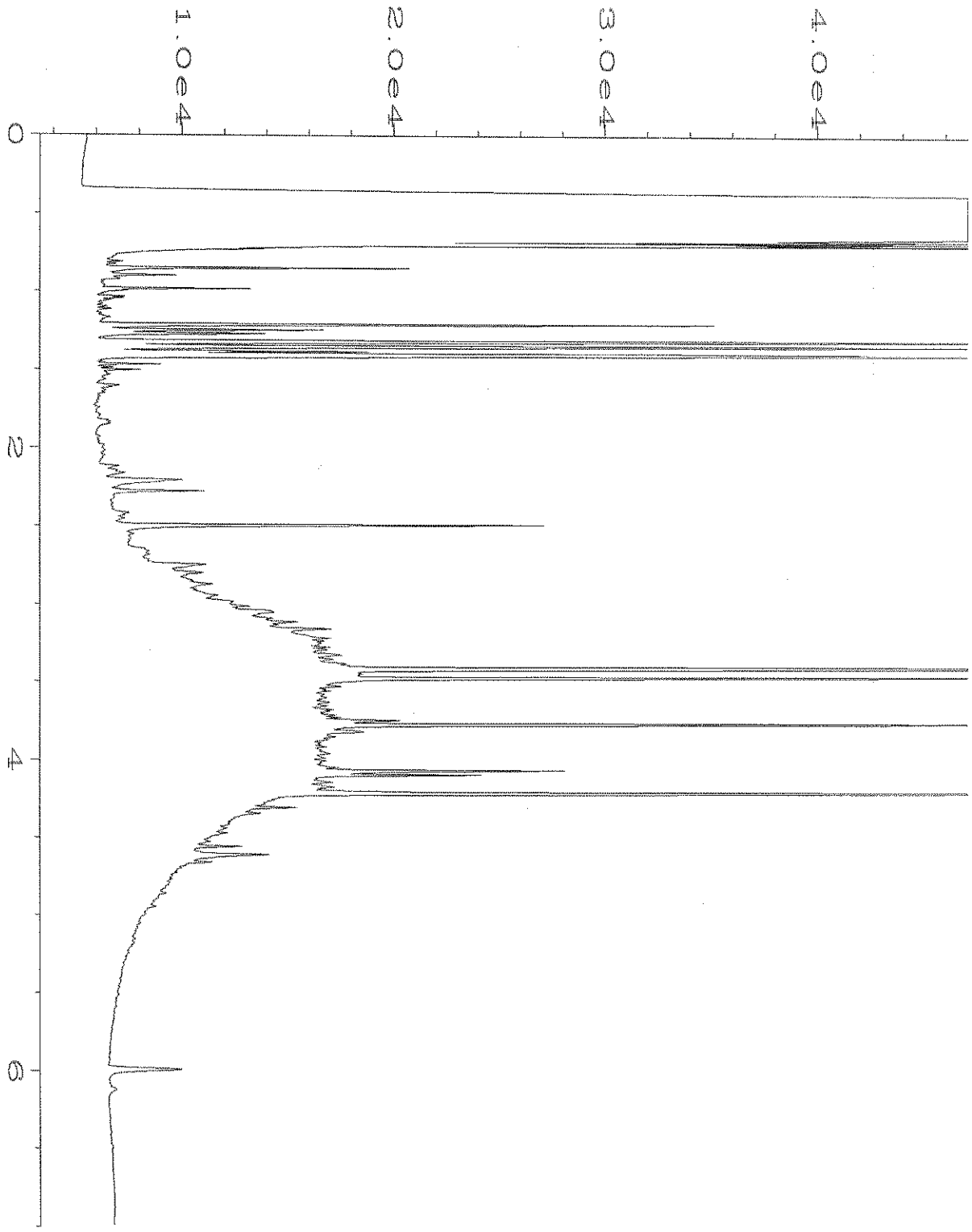
Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282



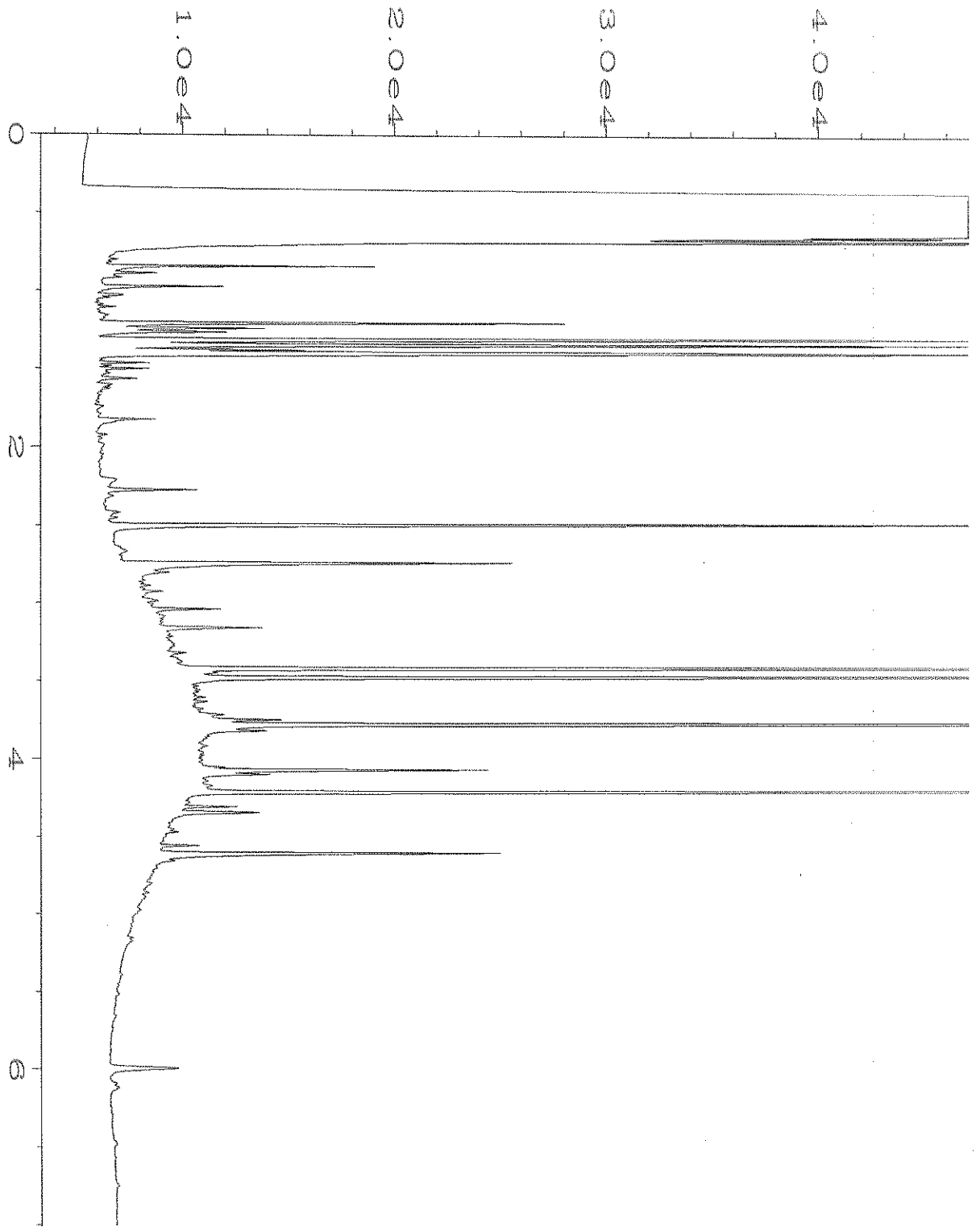
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Instrument	: GC6	Vial Number	: 18
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Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 19 Nov 21 10:29 AM	Instrument Method	: DX.MTH
Report Created on	: 22 Nov 21 09:50 AM	Analysis Method	: DEFAULT.MTH



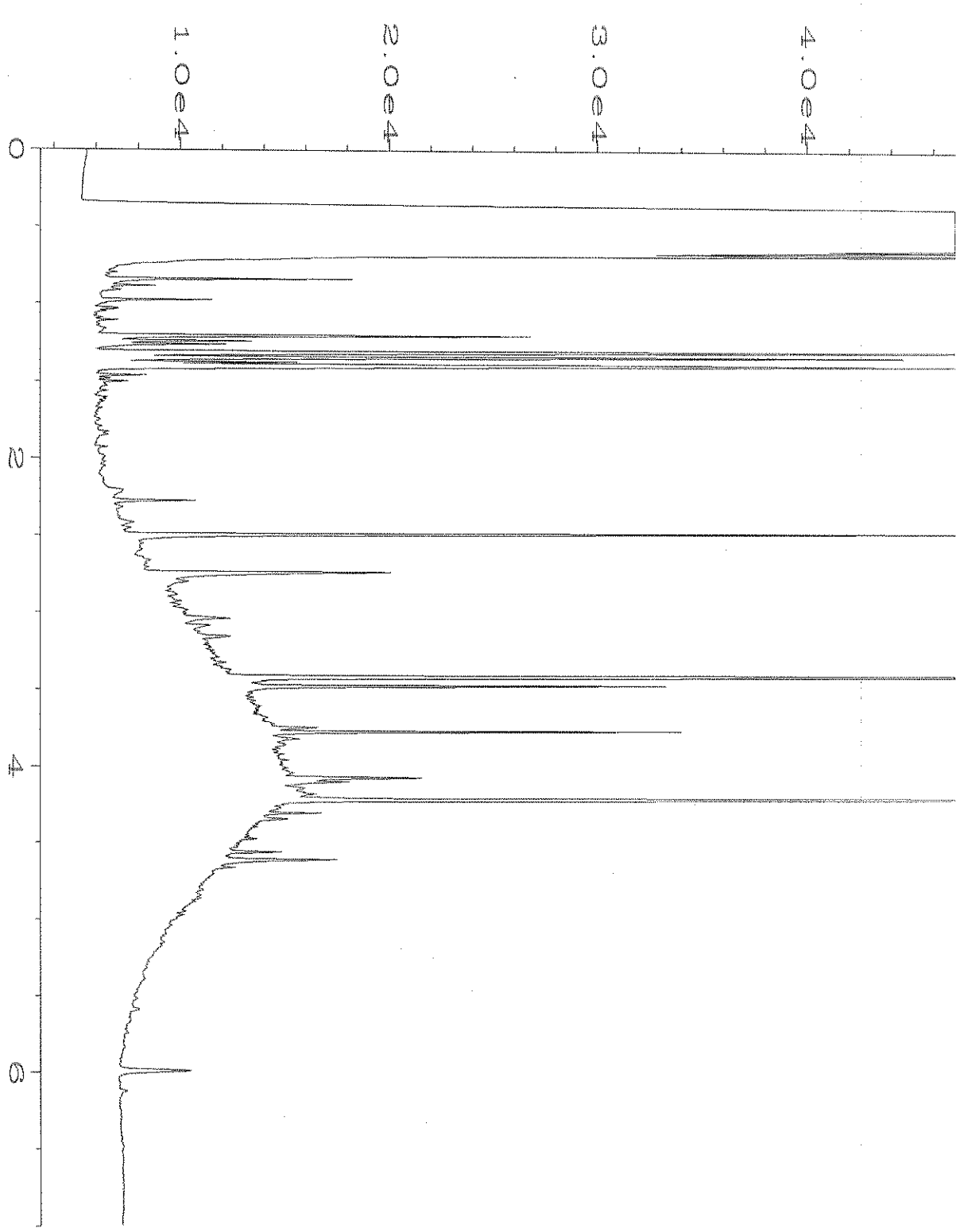
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Report Created on	: 22 Nov 21 09:51 AM	Analysis Method	: DEFAULT.MTH



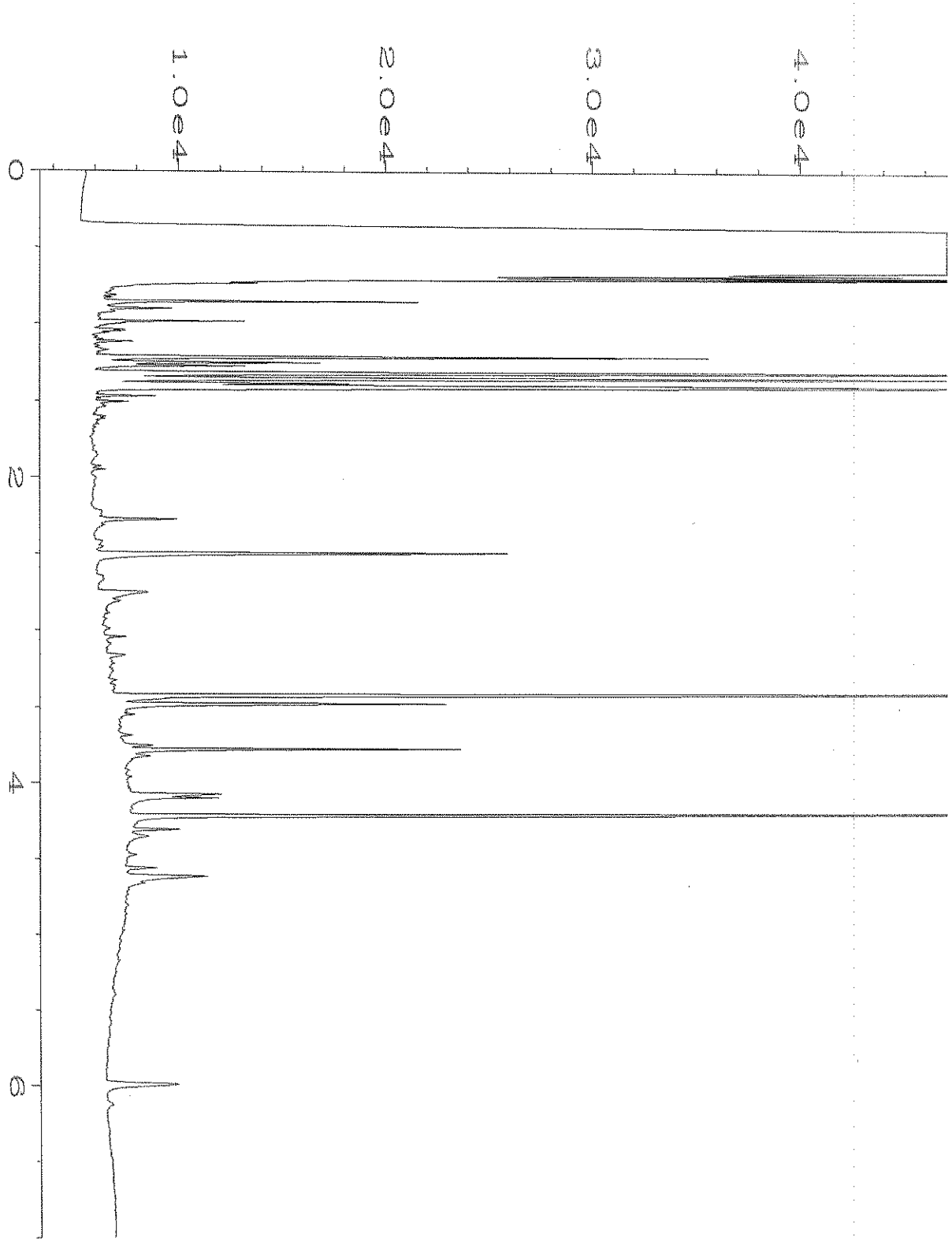
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Instrument	: GC6	Vial Number	: 20
Sample Name	: 111346-03 rr	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 19 Nov 21 10:51 AM	Instrument Method	: DX.MTH
Report Created on:	22 Nov 21 09:51 AM	Analysis Method	: DEFAULT.MTH



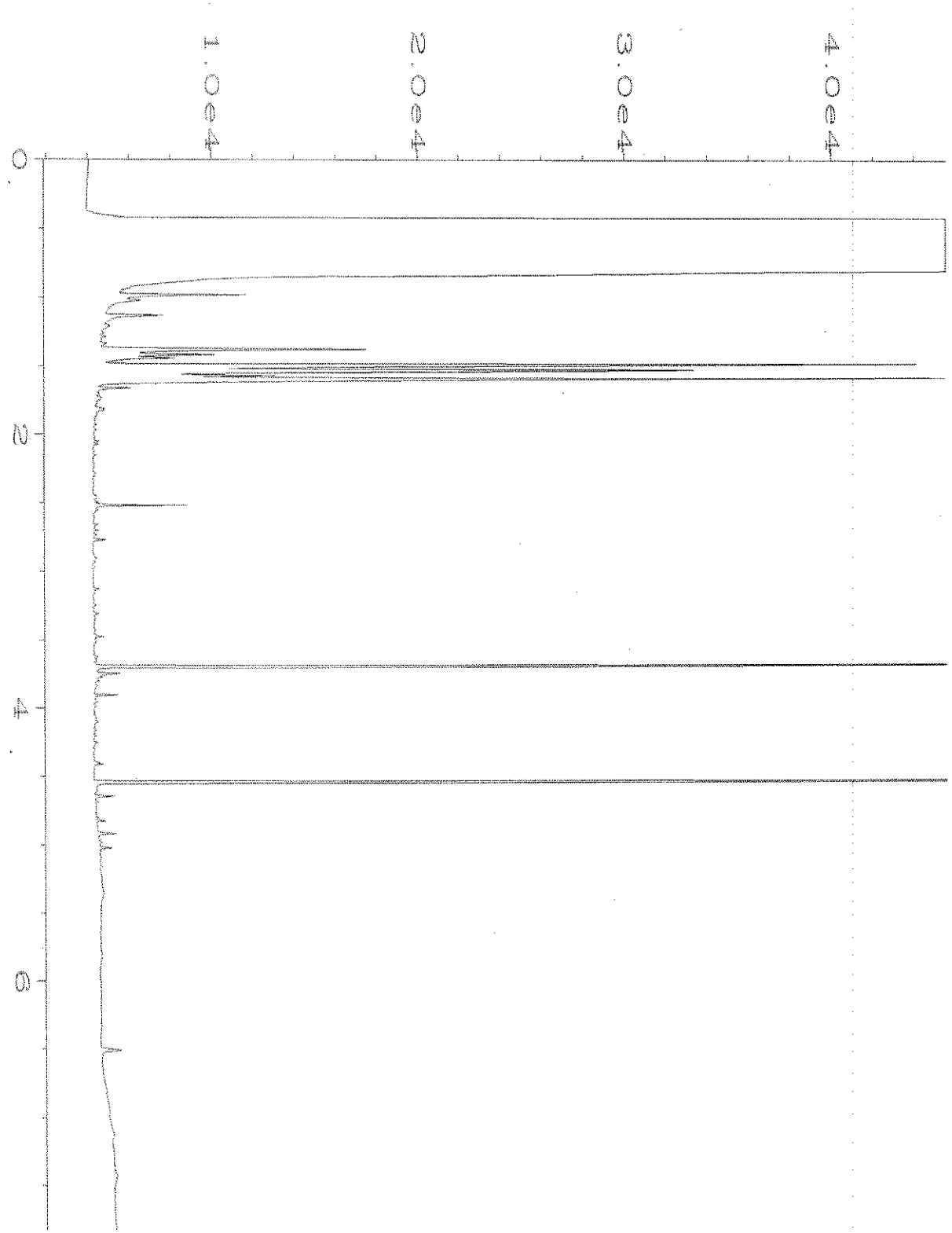
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Instrument	: GC6	Vial Number	: 21
Sample Name	: 111346-04 rr	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 19 Nov 21 11:01 AM	Instrument Method	: DX.MTH
Report Created on	: 22 Nov 21 09:51 AM	Analysis Method	: DEFAULT.MTH



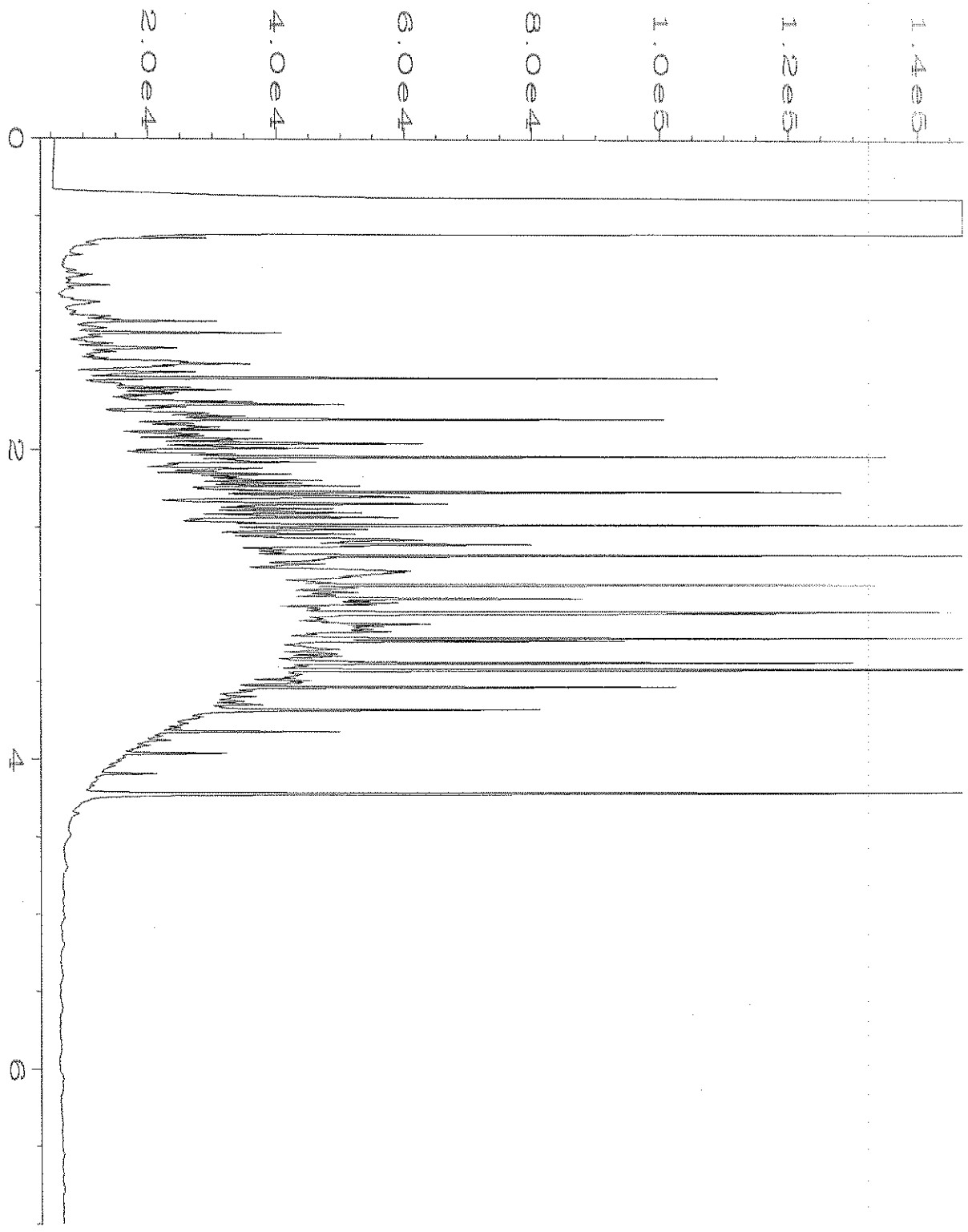
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Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 22
Sample Name	: 111346-05 rr	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 19 Nov 21 11:12 AM	Instrument Method	: DX.MTH
Report Created on	: 22 Nov 21 09:51 AM	Analysis Method	: DEFAULT.MTH



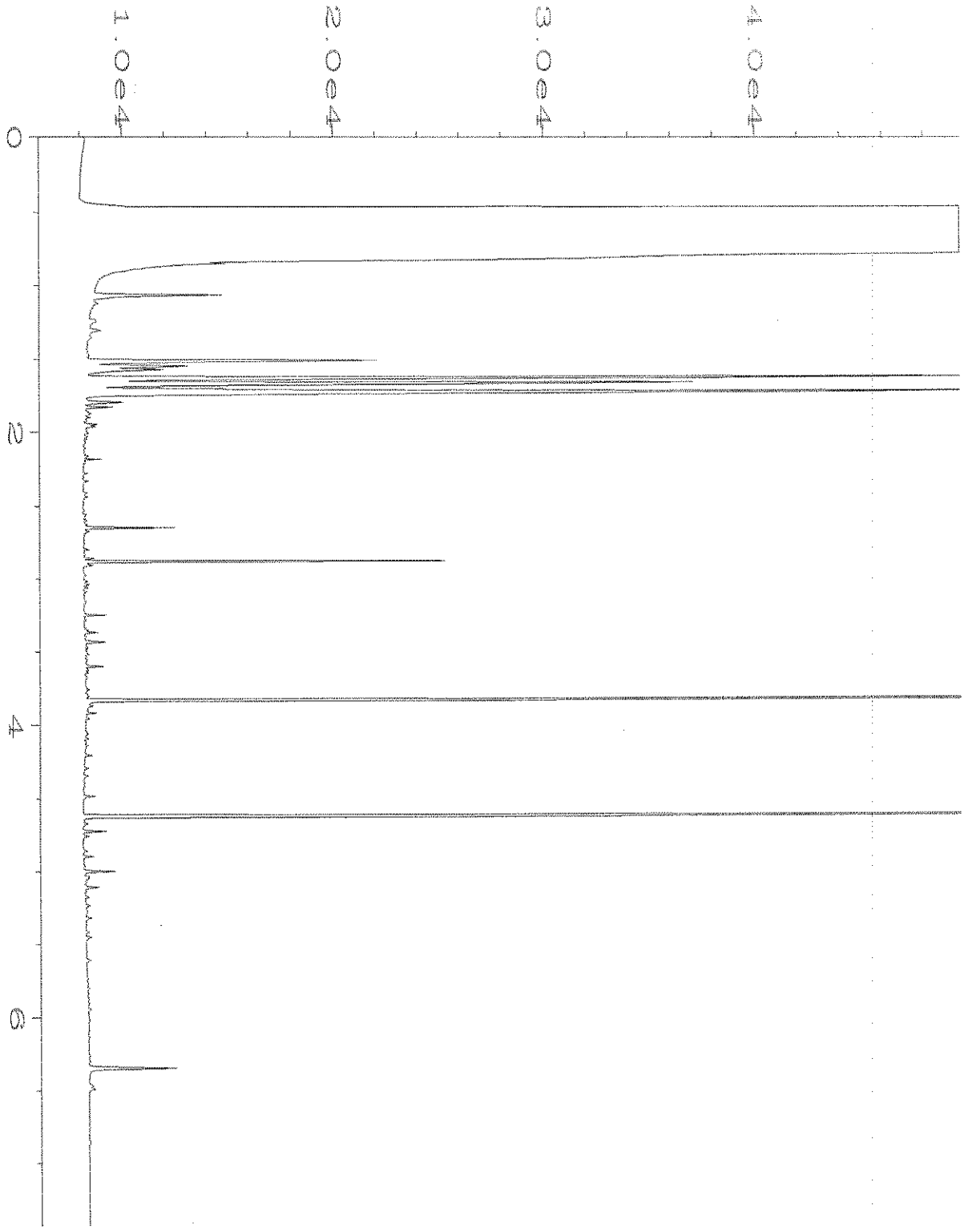
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Instrument	: GC6	Vial Number	: 23
Sample Name	: 111346-06 rr	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 19 Nov 21 11:23 AM	Instrument Method	: DX.MTH
Report Created on	: 22 Nov 21 09:51 AM	Analysis Method	: DEFAULT.MTH



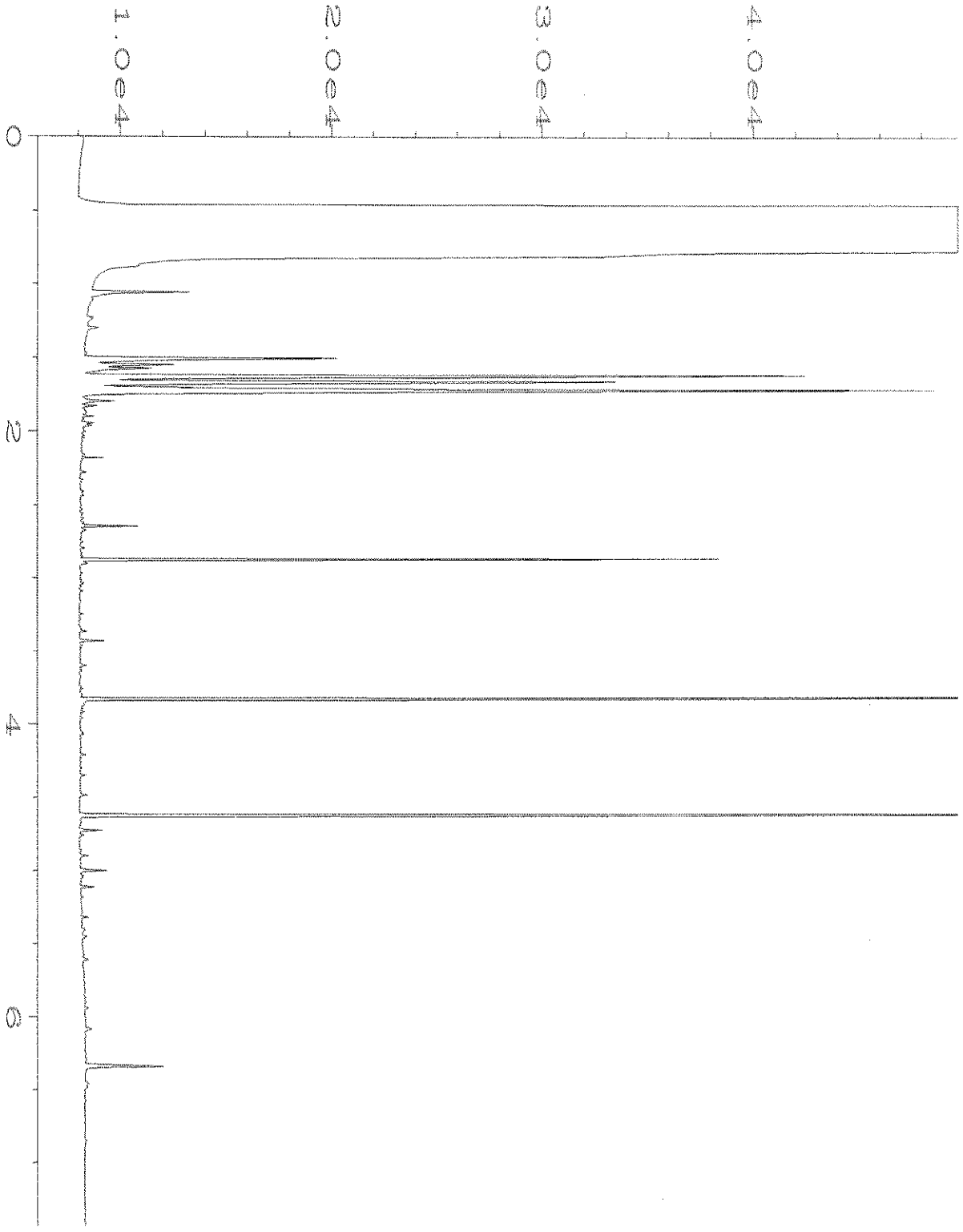
Data File Name	: C:\HPCHEM\4\DATA\11-18-21\016F0501.D		
Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 16
Sample Name	: 01-2702 mb	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 18 Nov 21 03:28 PM	Instrument Method	: DX.MTH
Report Created on	: 22 Nov 21 10:10 AM	Analysis Method	: DEFAULT.MTH



Data File Name	: C:\HPCHEM\6\DATA\11-19-21\003F1701.D		
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 3
Sample Name	: 500 Dx 64-13H	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 17
Acquired on	: 19 Nov 21 07:32 PM	Instrument Method	: DX.MTH
Report Created on:	22 Nov 21 09:50 AM	Analysis Method	: DEFAULT.MTH

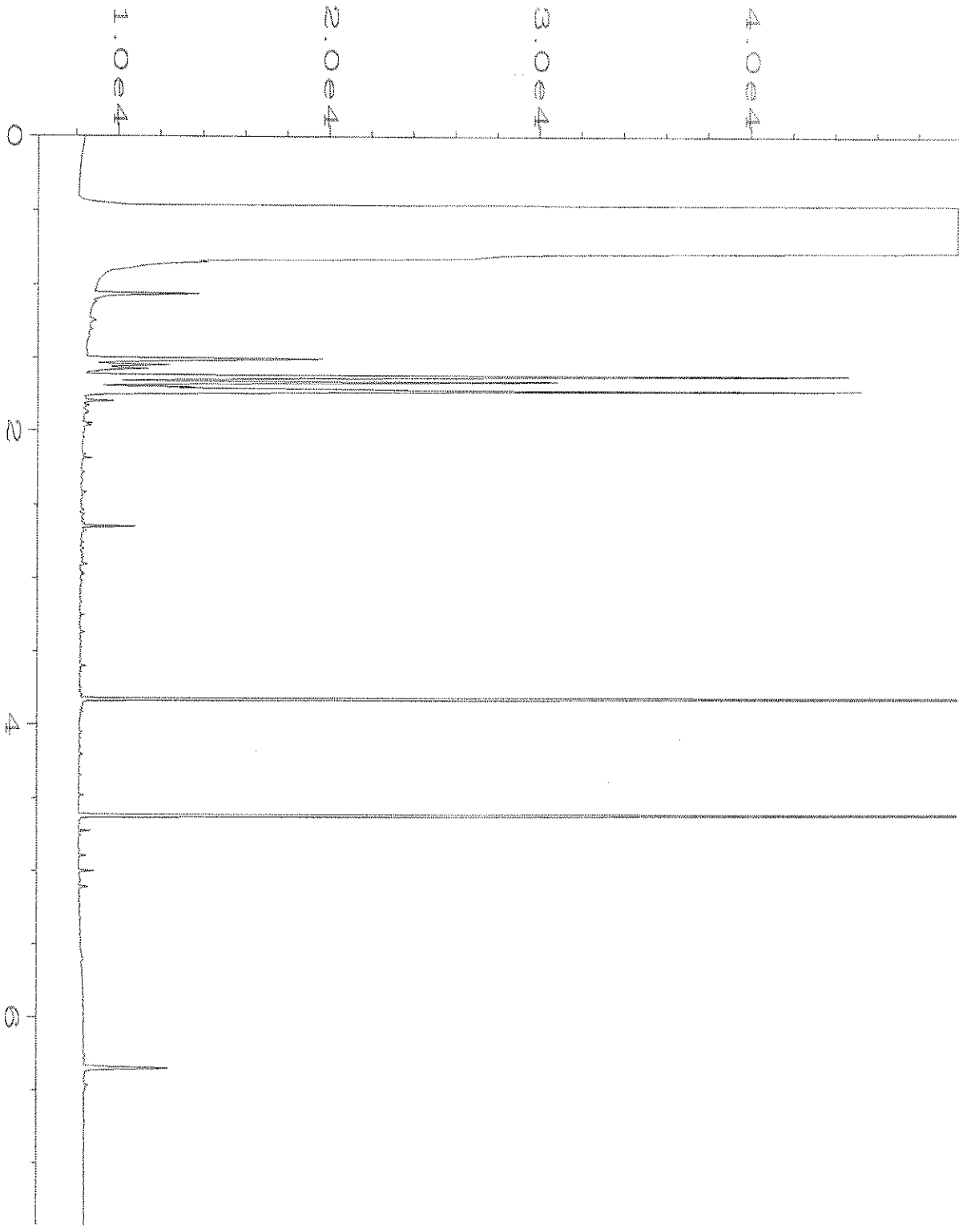


Data File Name	: C:\HPCHEM\1\DATA\11-23-21\015F0501.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 15
Sample Name	: 111346-03 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 23 Nov 21 11:50 AM	Instrument Method	: DX.MTH
Report Created on	: 23 Nov 21 12:23 PM	Analysis Method	: DEFAULT.MTH

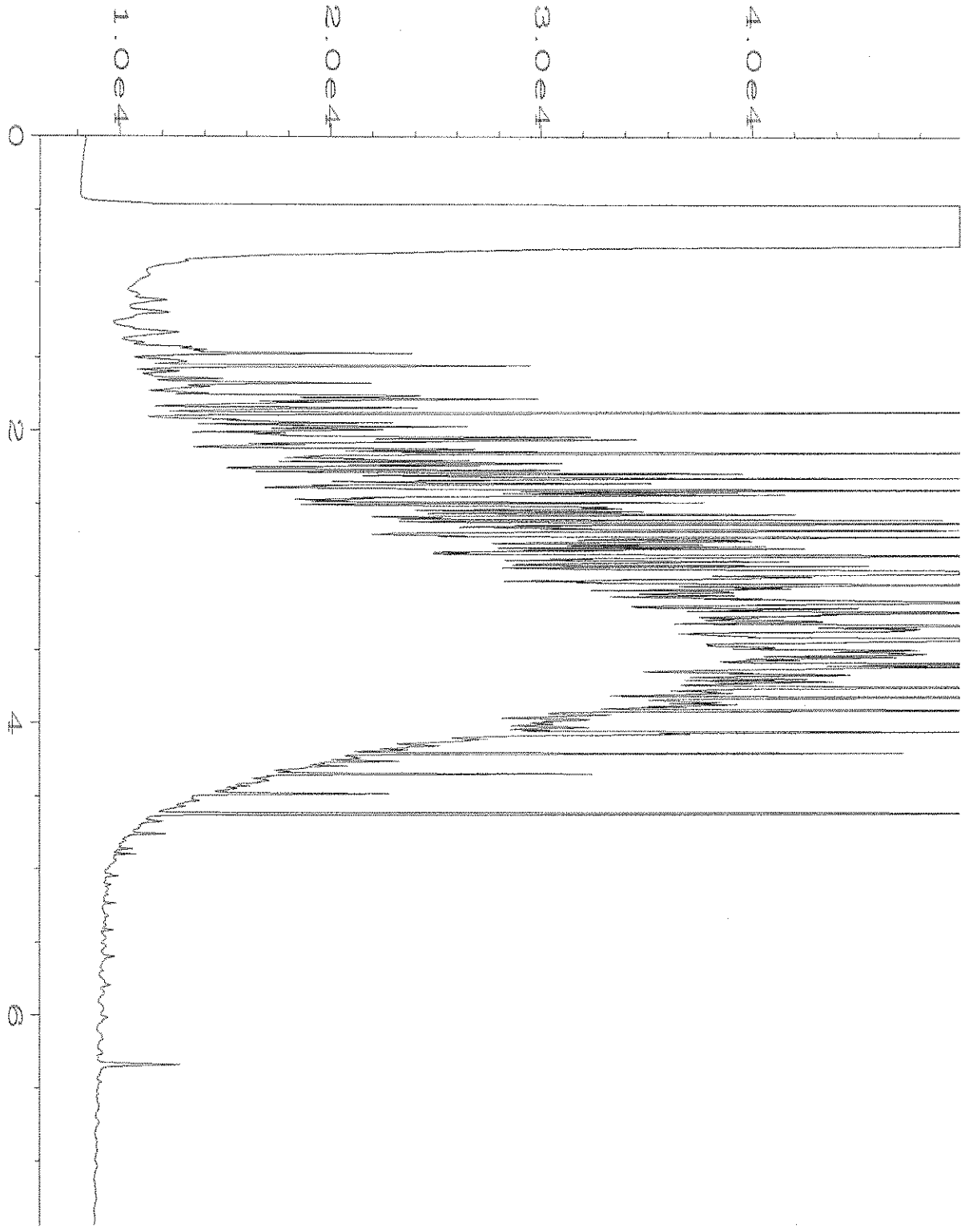


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Operator : TL
Instrument : GC1
Sample Name : 111346-05 sg
Run Time Bar Code:
Acquired on : 23 Nov 21 12:05 PM
Report Created on: 23 Nov 21 12:23 PM

Page Number : 1
Vial Number : 16
Injection Number : 1
Sequence Line : 5
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name	: C:\HPCHEM\1\DATA\11-23-21\012F0501.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 12
Sample Name	: 01-2702 mb sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 23 Nov 21 11:08 AM	Instrument Method	: DX.MTH
Report Created on	: 23 Nov 21 12:23 PM	Analysis Method	: DEFAULT.MTH



Data File Name	: C:\HPCHEM\1\DATA\11-23-21\003F0201.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 3
Sample Name	: 500 Dx 64-13H	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 2
Acquired on	: 23 Nov 21 06:07 AM	Instrument Method	: DX.MTH
Report Created on	: 23 Nov 21 12:23 PM	Analysis Method	: DEFAULT.MTH

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
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November 23, 2021

Chuck Cacek, Project Manager
Zipper Geo Associates, LLC
19019 36th Ave W, Suite E
Lynnwood, WA 98036

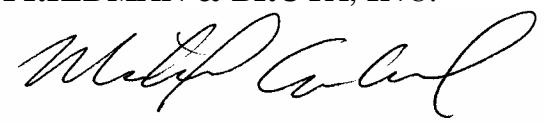
Dear Mr Cacek:

Included are the results from the testing of material submitted on November 17, 2021 from the Boeing Renton 2509.22, F&BI 111347 project. There are 20 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Kaelin Newman, Sean Donnan
ZGA1123R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on November 17, 2021 by Friedman & Bruya, Inc. from the Zipper Geo Associates, LLC Boeing Renton 2509.22, F&BI 111347 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Zipper Geo Associates, LLC
111347 -01	PB-204-02.0'
111347 -02	PB-204-08.0'
111347 -03	PB-204-10.0'
111347 -04	PB-205-02.0'
111347 -05	PB-205-08.0'
111347 -06	PB-205-10.0'
111347 -07	PB-101-02.0'
111347 -08	PB-101-07.5'
111347 -09	PB-103-03.0'
111347 -10	PB-103-05.5'
111347 -11	PB-104-02.0'
111347 -12	PB-104-05.5'
111347 -13	PB-105-02.0'
111347 -14	PB-105-06.0'

Mercury in the 6020B matrix spike duplicate failed the acceptance criteria. The laboratory control sample passed the acceptance criteria, therefore the results were due to matrix effect.

All other quality control requirements were acceptable.

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111347
Date Extracted: 11/18/21
Date Analyzed: 11/19/21

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
PB-101-02.0' 111347-07	<5	95
PB-103-03.0' 111347-09	<5	98
PB-103-05.5' 111347-10	<5	91
PB-104-02.0' 111347-11	<5	95
PB-104-05.5' 111347-12	<5	87
PB-105-02.0' 111347-13	<5	86
Method Blank 01-2631 MB	<5	91

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111347
Date Extracted: 11/19/21
Date Analyzed: 11/19/21

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 48-168)
PB-204-02.0' 111347-01	<50	<250	94
PB-204-08.0' 111347-02	<50	<250	92
PB-205-02.0' 111347-04	<50	<250	93
PB-205-08.0' 111347-05	<50	<250	92
PB-103-03.0' 111347-09	1,300	2,100	95
PB-103-05.5' 111347-10	<50	<250	94
PB-104-02.0' 111347-11	<50	<250	92
PB-104-05.5' 111347-12	<50	<250	103
PB-105-02.0' 111347-13	<50	<250	93
Method Blank 01-2706 MB	<50	<250	94

Analysis For Total Metals By EPA Method 6020B

Client ID:	PB-101-02.0'	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111347
Date Extracted:	11/18/21	Lab ID:	111347-07
Date Analyzed:	11/18/21	Data File:	111347-07.111
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Mercury	<0.5

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Zipper Geo Associates, LLC
Date Received:	NA	Project:	2509.22, F&BI 111347
Date Extracted:	11/18/21	Lab ID:	I1-756 mb2
Date Analyzed:	11/18/21	Data File:	I1-756 mb2.046
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Mercury	<0.5

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	PB-205-02.0'	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111347
Date Extracted:	11/19/21	Lab ID:	111347-04 1/25
Date Analyzed:	11/19/21	Data File:	111913.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	83 d	39	103
Phenol-d6	93 d	48	109
Nitrobenzene-d5	92 d	23	138
2-Fluorobiphenyl	104 d	50	150
2,4,6-Tribromophenol	93 d	40	127
Terphenyl-d14	104 d	50	150

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	0.064
Chrysene	0.081
Benzo(a)pyrene	0.091
Benzo(b)fluoranthene	0.12
Benzo(k)fluoranthene	<0.05
Indeno(1,2,3-cd)pyrene	0.069
Dibenz(a,h)anthracene	<0.05

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	PB-101-02.0'	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111347
Date Extracted:	11/19/21	Lab ID:	111347-07 1/5
Date Analyzed:	11/19/21	Data File:	111912.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	77	39	103
Phenol-d6	87	48	109
Nitrobenzene-d5	85	23	138
2-Fluorobiphenyl	91	50	150
2,4,6-Tribromophenol	66	40	127
Terphenyl-d14	99	50	150

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	0.013
Benzo(a)pyrene	0.012
Benzo(b)fluoranthene	0.027
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	0.011
Dibenz(a,h)anthracene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	PB-103-03.0'	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111347
Date Extracted:	11/19/21	Lab ID:	111347-09 1/25
Date Analyzed:	11/19/21	Data File:	111917.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	64 d	39	103
Phenol-d6	87 d	48	109
Nitrobenzene-d5	85 d	23	138
2-Fluorobiphenyl	97 d	50	150
2,4,6-Tribromophenol	100 d	40	127
Terphenyl-d14	107 d	50	150

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	0.20
Chrysene	0.49
Benzo(a)pyrene	0.14
Benzo(b)fluoranthene	0.13
Benzo(k)fluoranthene	<0.05
Indeno(1,2,3-cd)pyrene	0.072
Dibenz(a,h)anthracene	<0.05

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	PB-104-02.0'	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111347
Date Extracted:	11/19/21	Lab ID:	111347-11 1/25
Date Analyzed:	11/19/21	Data File:	111914.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	81 d	39	103
Phenol-d6	87 d	48	109
Nitrobenzene-d5	89 d	23	138
2-Fluorobiphenyl	97 d	50	150
2,4,6-Tribromophenol	93 d	40	127
Terphenyl-d14	99 d	50	150

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	0.086
Chrysene	0.12
Benzo(a)pyrene	0.13
Benzo(b)fluoranthene	0.23
Benzo(k)fluoranthene	0.069
Indeno(1,2,3-cd)pyrene	0.095
Dibenz(a,h)anthracene	<0.05

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	PB-105-02.0'	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111347
Date Extracted:	11/19/21	Lab ID:	111347-13 1/25
Date Analyzed:	11/19/21	Data File:	111915.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	79 d	39	103
Phenol-d6	88 d	48	109
Nitrobenzene-d5	86 d	23	138
2-Fluorobiphenyl	99 d	50	150
2,4,6-Tribromophenol	100 d	40	127
Terphenyl-d14	106 d	50	150

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	0.064
Chrysene	0.11
Benzo(a)pyrene	0.081
Benzo(b)fluoranthene	0.10
Benzo(k)fluoranthene	<0.05
Indeno(1,2,3-cd)pyrene	0.054
Dibenz(a,h)anthracene	<0.05

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Zipper Geo Associates, LLC
Date Received:	Not Applicable	Project:	2509.22, F&BI 111347
Date Extracted:	11/19/21	Lab ID:	01-2707 mb 1/5
Date Analyzed:	11/19/21	Data File:	111909.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	80	39	103
Phenol-d6	87	48	109
Nitrobenzene-d5	96	23	138
2-Fluorobiphenyl	91	50	150
2,4,6-Tribromophenol	88	40	127
Terphenyl-d14	92	50	150

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	PB-204-02.0'	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111347
Date Extracted:	11/18/21	Lab ID:	111347-01 1/6
Date Analyzed:	11/19/21	Data File:	111907.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	76	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	0.049
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	PB-204-08.0'	Client:	Zipper Geo Associates, LLC
Date Received:	11/17/21	Project:	2509.22, F&BI 111347
Date Extracted:	11/18/21	Lab ID:	111347-02 1/6
Date Analyzed:	11/19/21	Data File:	111908.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	64	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Analysis For PCBs By EPA Method 8082A

Client Sample ID:	Method Blank	Client:	Zipper Geo Associates, LLC
Date Received:	Not Applicable	Project:	2509.22, F&BI 111347
Date Extracted:	11/18/21	Lab ID:	01-2703 mb 1/6
Date Analyzed:	11/18/21	Data File:	111804.D
Matrix:	Soil	Instrument:	GC9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
TCMX	97	23	120

Compounds:	Concentration mg/kg (ppm)
Aroclor 1221	<0.02
Aroclor 1232	<0.02
Aroclor 1016	<0.02
Aroclor 1242	<0.02
Aroclor 1248	<0.02
Aroclor 1254	<0.02
Aroclor 1260	<0.02
Aroclor 1262	<0.02
Aroclor 1268	<0.02

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111347

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 111339-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	80	71-131

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111347

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 111347-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	110	106	73-135	4

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	102	74-139

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111347

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 111312-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm	5	<1	82	60 vo	75-125	31 vo

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Mercury	mg/kg (ppm)	5	104	80-120

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111347

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: 111323-01 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Benz(a)anthracene	mg/kg (ppm)	0.83	<0.01	89	90	50-150	1
Chrysene	mg/kg (ppm)	0.83	<0.01	90	91	50-150	1
Benzo(a)pyrene	mg/kg (ppm)	0.83	<0.01	95	95	50-150	0
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	<0.01	95	96	50-150	1
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	<0.01	90	89	50-150	1
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	<0.01	92	92	50-150	0
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	<0.01	87	91	50-150	4

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benz(a)anthracene	mg/kg (ppm)	0.83	92	64-116
Chrysene	mg/kg (ppm)	0.83	95	66-119
Benzo(a)pyrene	mg/kg (ppm)	0.83	96	62-116
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	96	61-118
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	94	65-119
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	94	64-130
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	93	67-131

Date of Report: 11/23/21
Date Received: 11/17/21
Project: Boeing Renton 2509.22, F&BI 111347

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082A

Laboratory Code: 111337-03 1/6 (Matrix Spike) 1/6

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Control Limits	RPD (Limit 20)
Aroclor 1016	mg/kg (ppm)	0.25	<0.02	71	68	44-107	4
Aroclor 1260	mg/kg (ppm)	0.25	<0.02	67	66	38-124	2

Laboratory Code: Laboratory Control Sample 1/6

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Aroclor 1016	mg/kg (ppm)	0.25	96	47-158
Aroclor 1260	mg/kg (ppm)	0.25	101	69-147

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

SAMPLE CHAIN OF CUSTODY

111347 11/17-21 VS4/B04

Page # 1 of 2

Report To Chuck, Sean, Kaelin

Company ZGA

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME: Boeing Renton

PO #: 2509.22

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
- ☐ Standard turnaround
- ☐ RUSH
- Rush charges authorized by: DRAFT B/ 11/22

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	cPAHs EPA 8270	PCBs EPA 8082	Mercury				Notes
PB-204-02.0'	01 A-B	11/17/21	0848	Soil	2	X						X					
PB-204-08.0'	02		0855			X						X					
PB-204-10.0'	03		0907														
PB-205-02.0'	04		1059			X					X						
PB-205-08.0'	05		1104			X											
PB-205-10.0'	06		1116		↓	X											
PB-101-02.0'	07 A-F		1242		6		X				X		X				
PB-101-07.5'	08		1258		6												
PB-103-03.0'	09		1406		6	X	X				X						
PB-103-05.5'	10	↓	1418	↓	6	X	X										

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kaelin Newman	ZGA	11/17/21	1600
Received by:	Chuck Carl	ZGA	11/17/21	1690
Relinquished by:	Chuck Carl	ZGA	11/17/21	1650
Received by:	Eric Hawk	FB	11/17/21	1650

Samples received at 4 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

111397

SAMPLE CHAIN OF CUSTODY

11-17-21 VS4/ B04

Page # 2 of 2

Report To Chuck, Sean, Kaelin

Company ZGA

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME: Boeing Renton

PO #: 2509.22

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME
- ☐ Standard turnaround
- ☐ RUSH
- Rush charges authorized by:

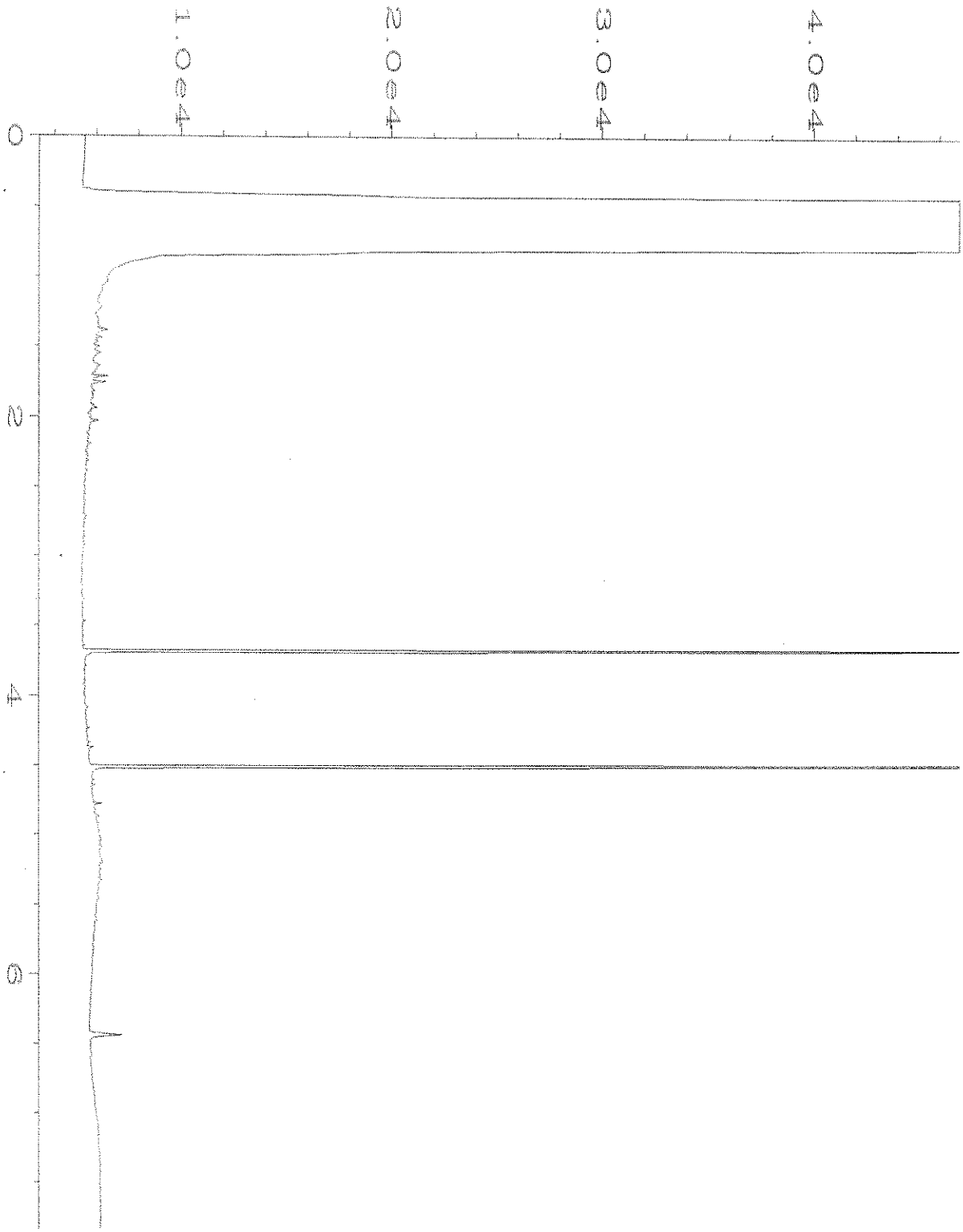
SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED: NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	cPAHs EPA 8270	PCBs EPA 8082					Notes
PB-104-02.0'	11 A-G	11/17/21	1459		6	X	X				X						
PB-104-05.5'	12		1502		6	X	X										
PB-105-02.0'	13		1520		6	X	X				X						
PB-105-06.0'	14		1522		6	X	X										

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kaelin Newman	ZGA	11/17/21	1500
Received by:	Chris Cace	ZGA	"	1640
Relinquished by:	Charlie Cace	ZGA	11/18/21	1650
Received by:	Eric Blom	F&B	11/17/21	1650

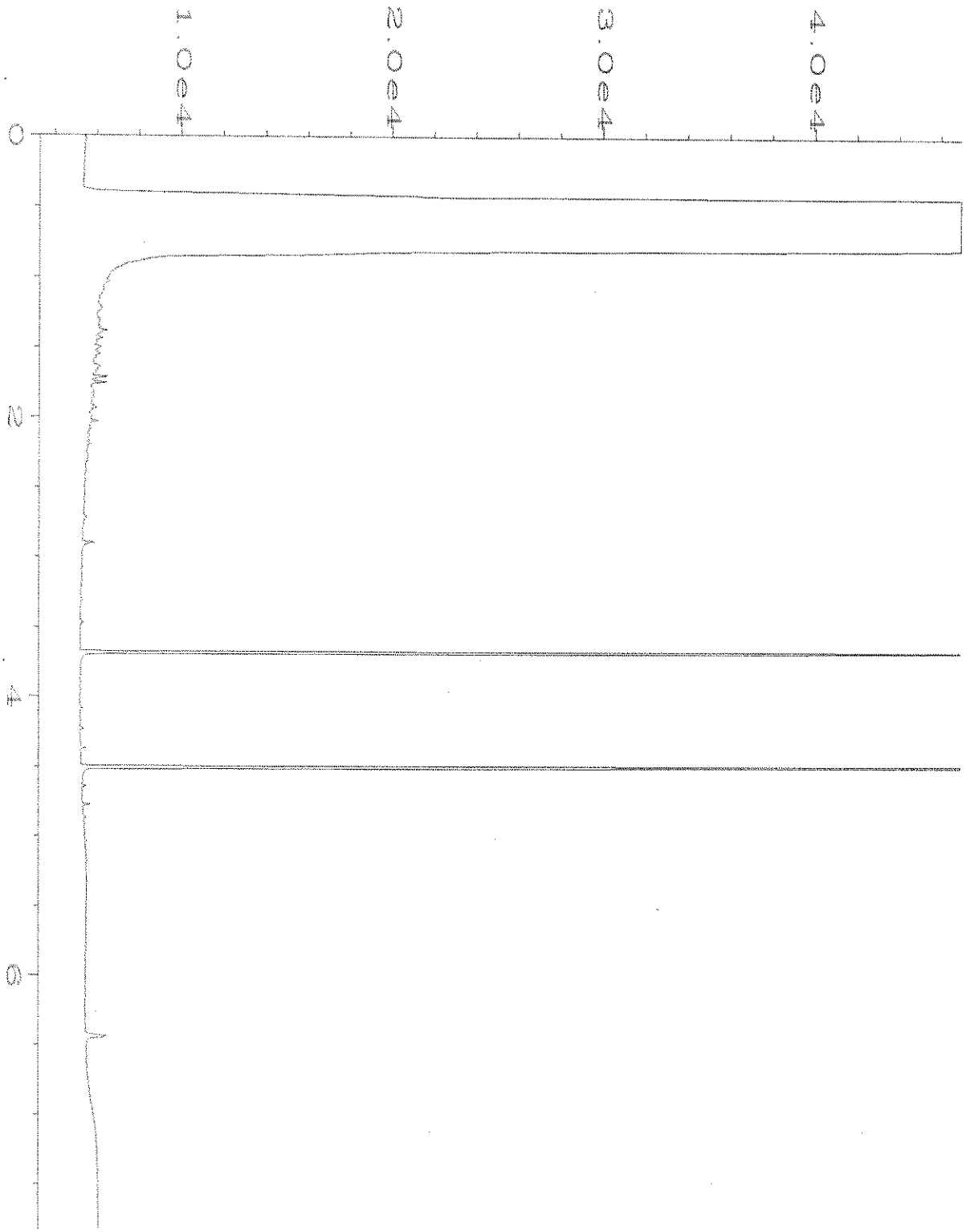
Samples received at 4

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282



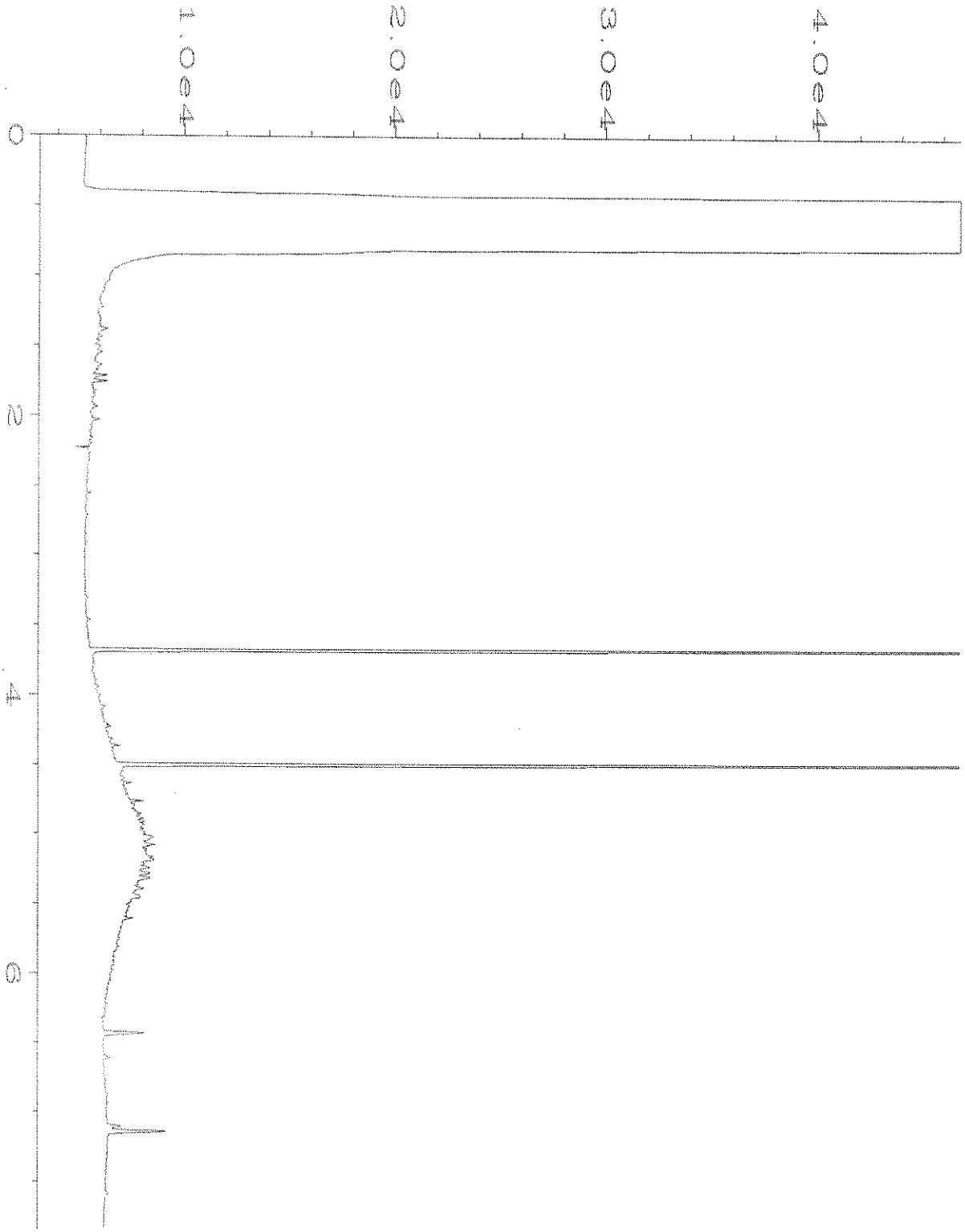
Data File Name : C:\HPCHEM\4\DATA\11-19-21\018F0301.D
Operator : TL
Instrument : GC#4
Sample Name : 111347-01
Run Time Bar Code:
Acquired on : 19 Nov 21 12:12 PM
Report Created on: 22 Nov 21 08:33 AM

Page Number : 1
Vial Number : 18
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

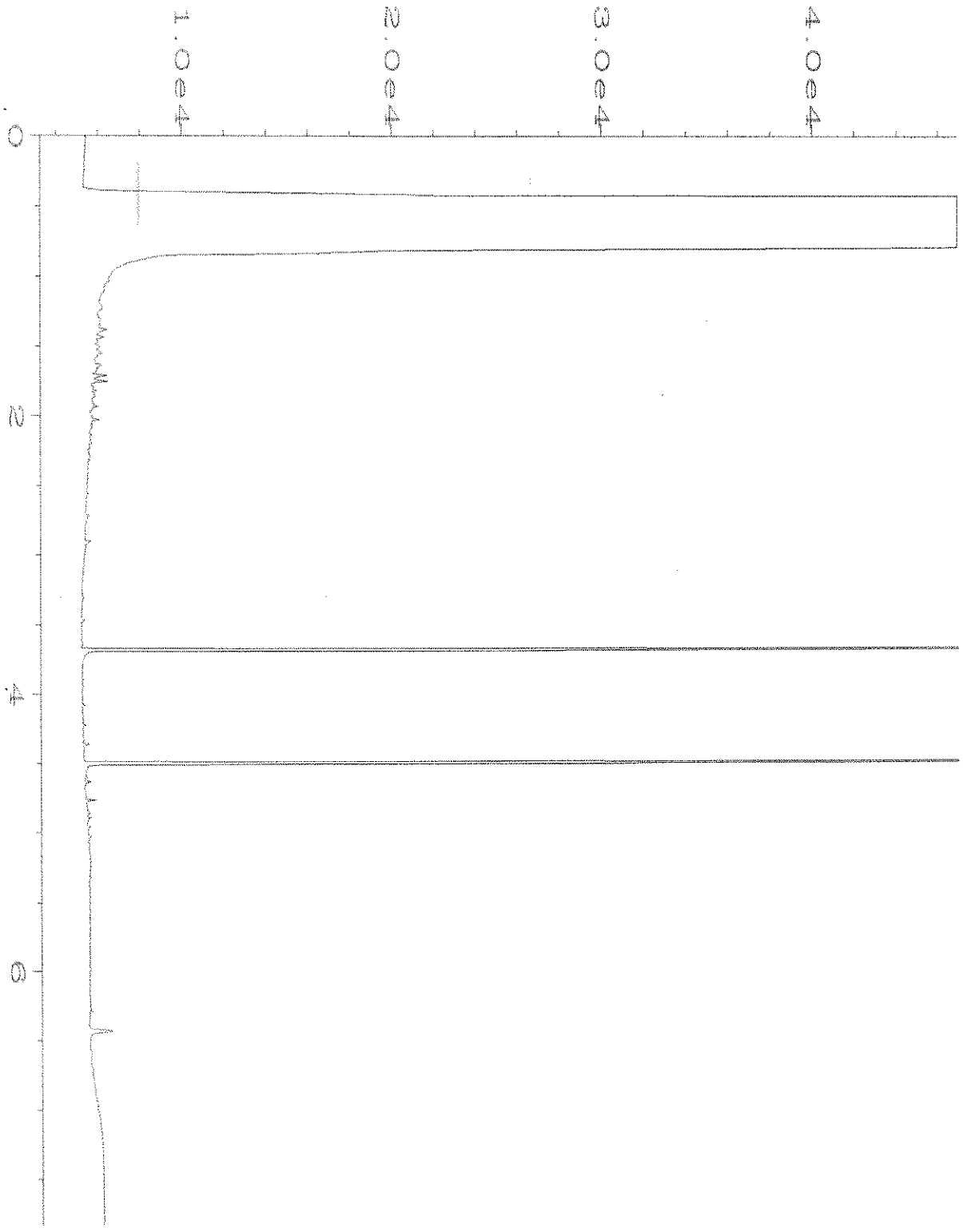


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Operator : TL
Instrument : GC#4
Sample Name : 111347-02
Run Time Bar Code:
Acquired on : 19 Nov 21 12:24 PM
Report Created on: 22 Nov 21 08:34 AM

Page Number : 1
Vial Number : 19
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

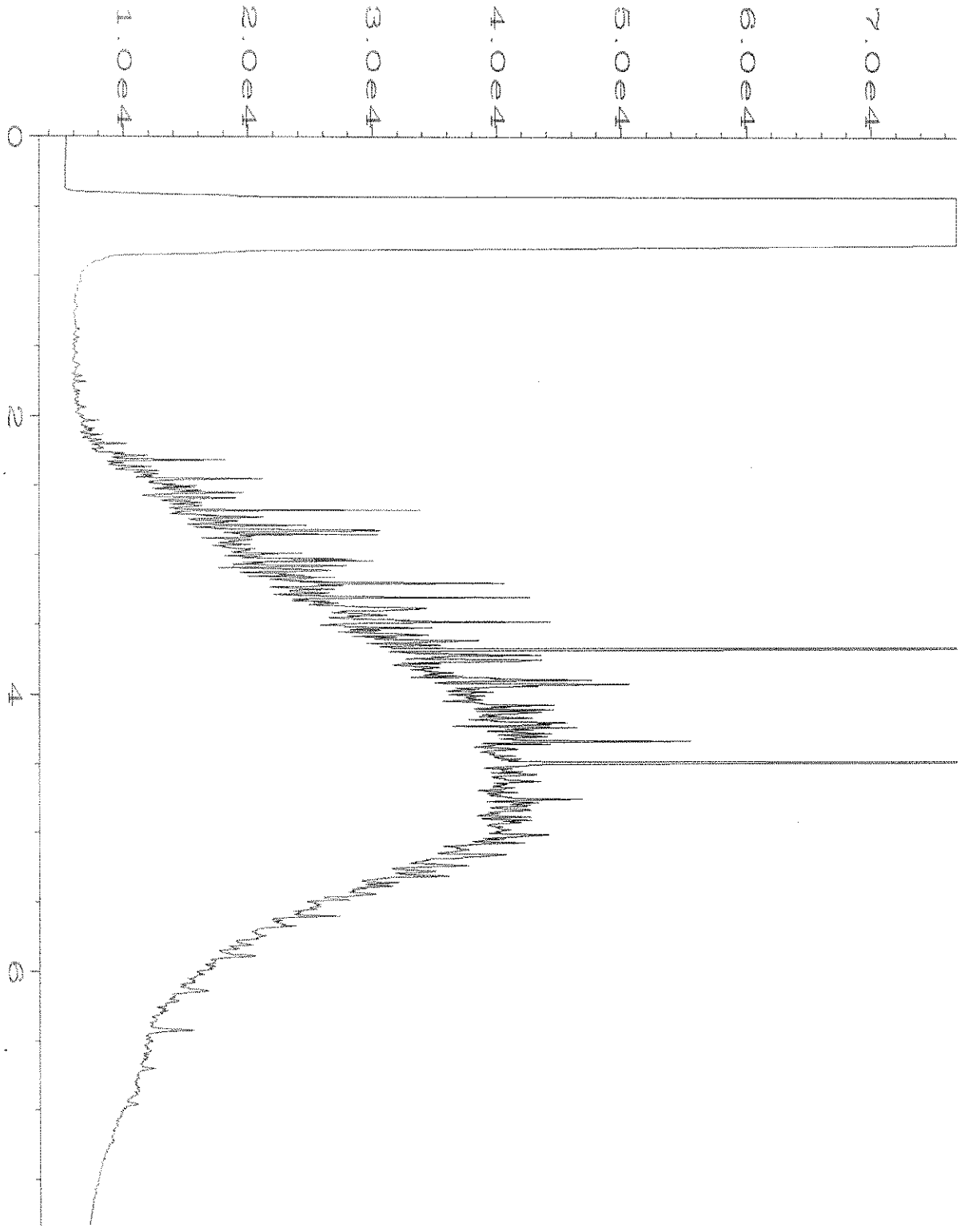


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Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 20
Sample Name	: 111347-04	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 3
Acquired on	: 19 Nov 21 12:36 PM	Instrument Method	: DX.MTH
Report Created on	: 22 Nov 21 08:34 AM	Analysis Method	: DEFAULT.MTH



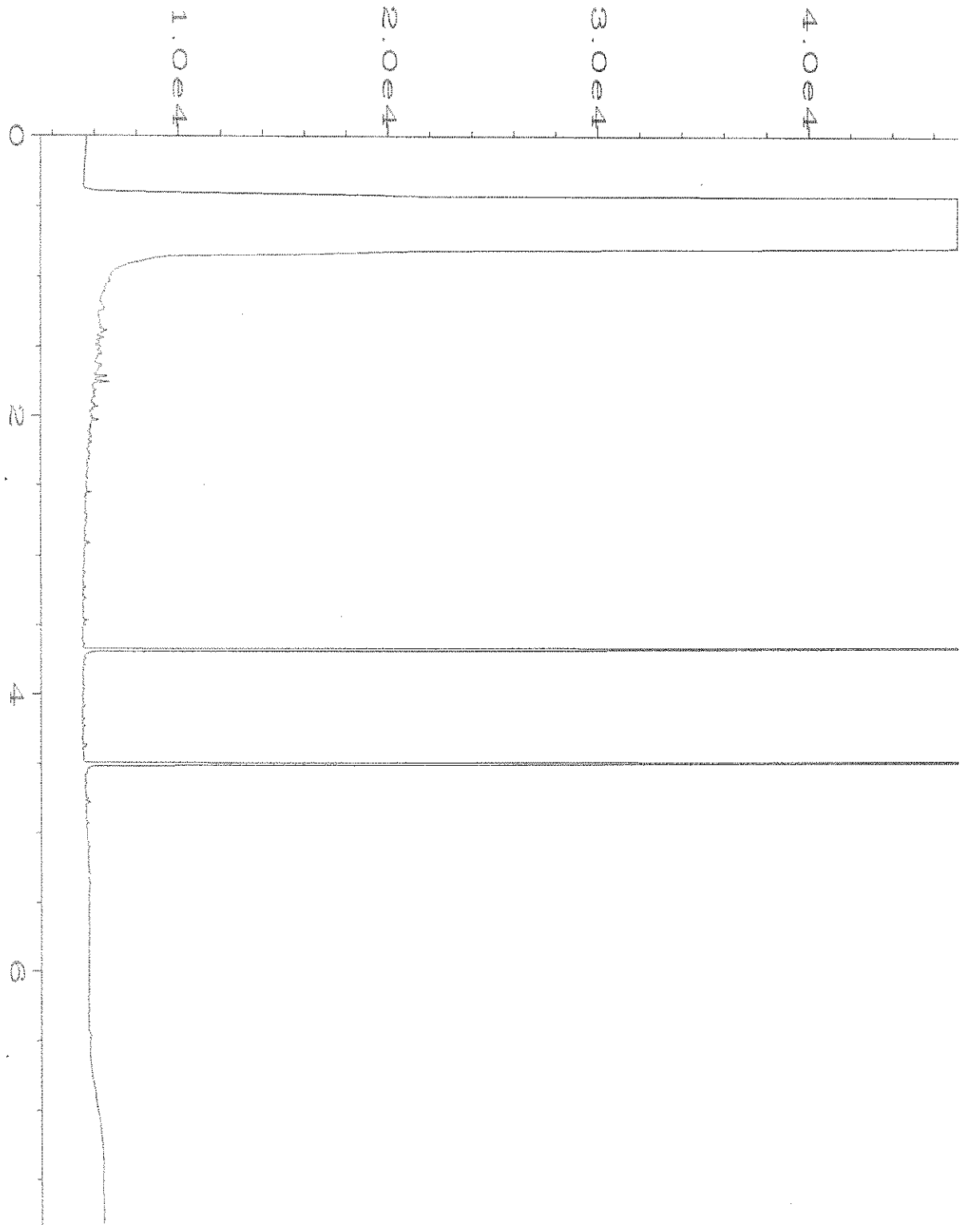
Data File Name : C:\HPCHEM\4\DATA\11-19-21\021F0301.D
Operator : TL
Instrument : GC#4
Sample Name : 111347-05
Run Time Bar Code:
Acquired on : 19 Nov 21 12:48 PM
Report Created on: 22 Nov 21 08:34 AM

Page Number : 1
Vial Number : 21
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



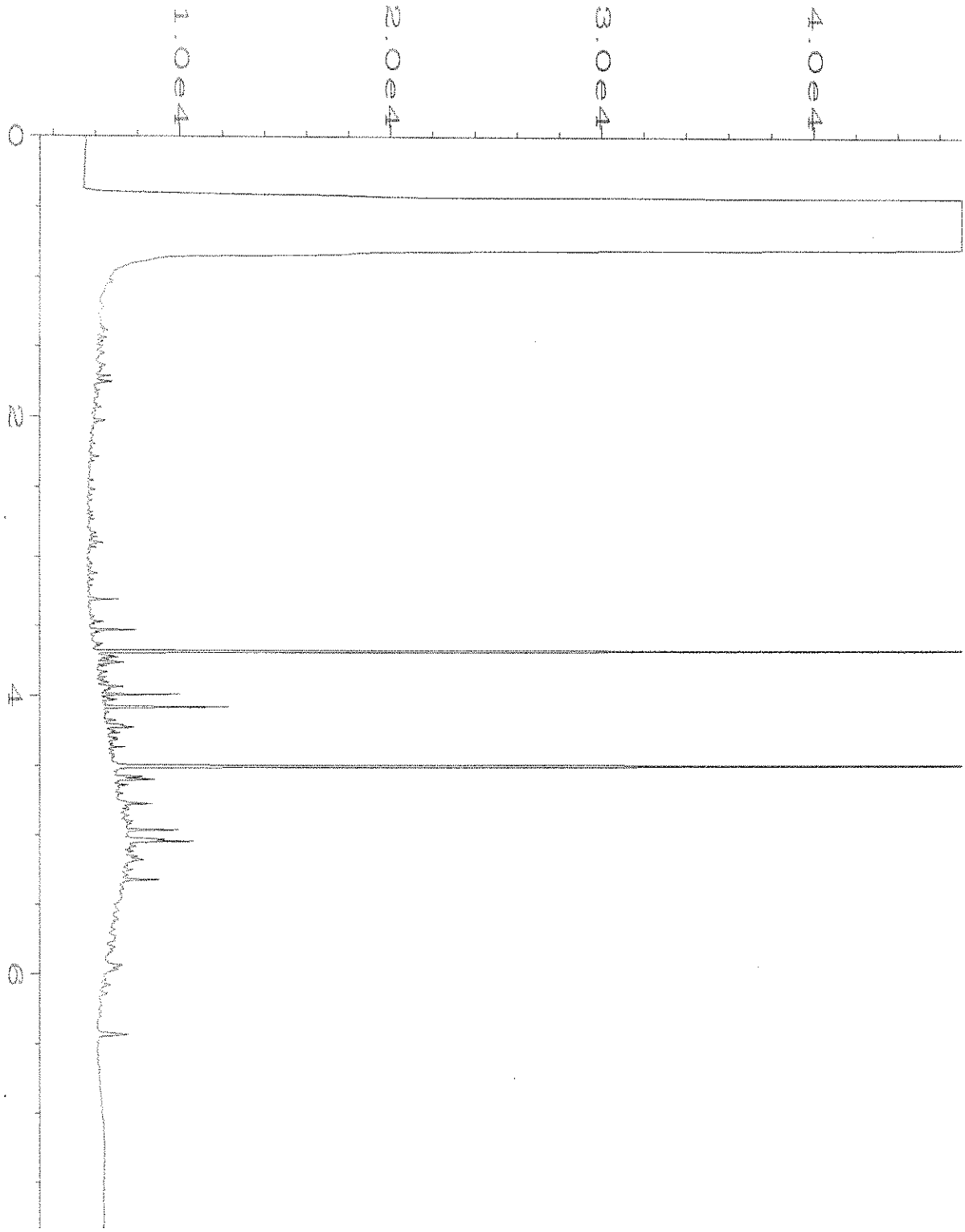
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Operator : TL
Instrument : GC#4
Sample Name : 111347-09
Run Time Bar Code:
Acquired on : 19 Nov 21 01:00 PM
Report Created on: 22 Nov 21 08:34 AM

Page Number : 1
Vial Number : 22
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

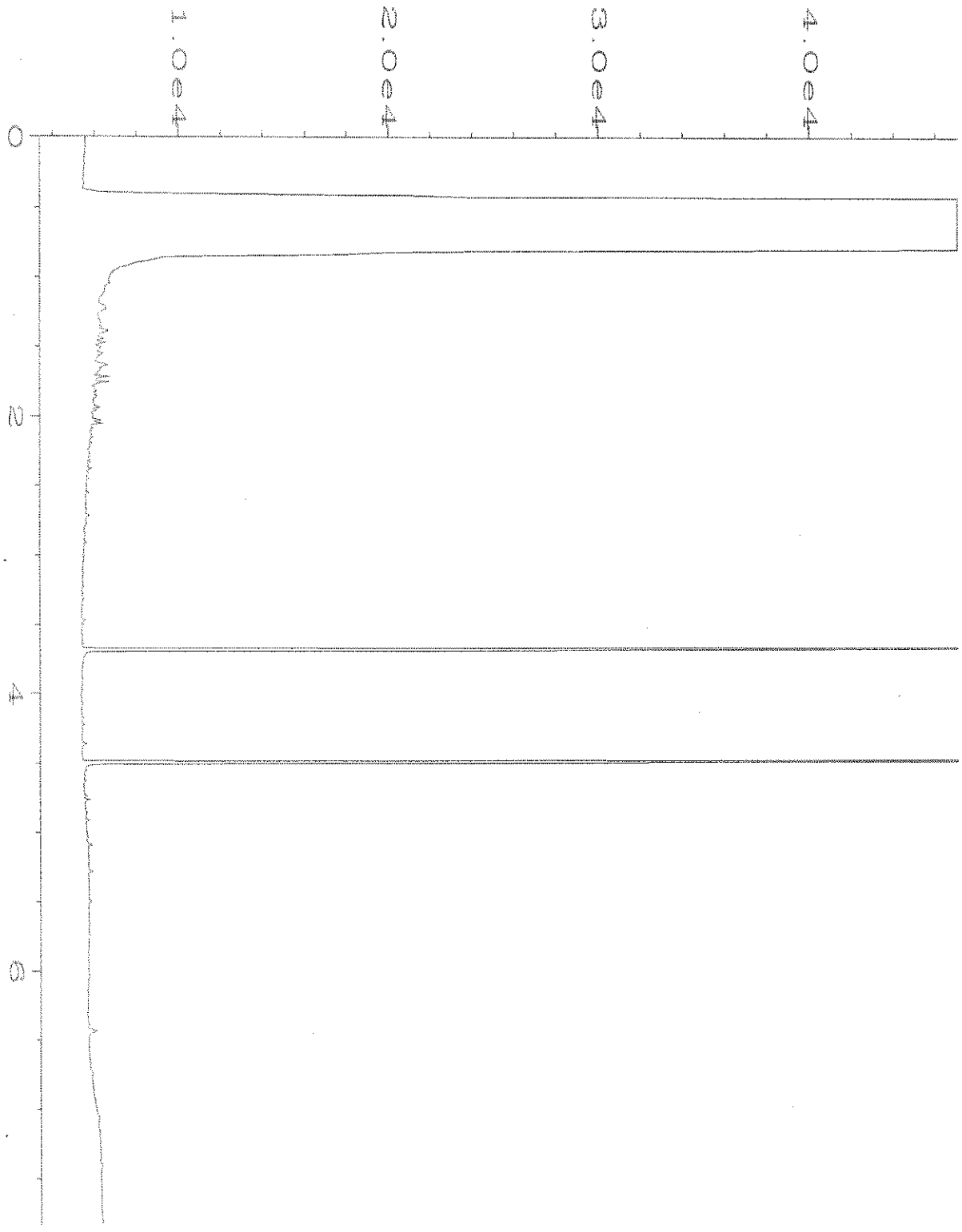


Data File Name : C:\HPCHEM\4\DATA\11-19-21\023F0601.D
Operator : TL
Instrument : GC#4
Sample Name : 111347-10
Run Time Bar Code:
Acquired on : 19 Nov 21 03:40 PM
Report Created on: 22 Nov 21 08:34 AM

Page Number : 1
Vial Number : 23
Injection Number : 1
Sequence Line : 6
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

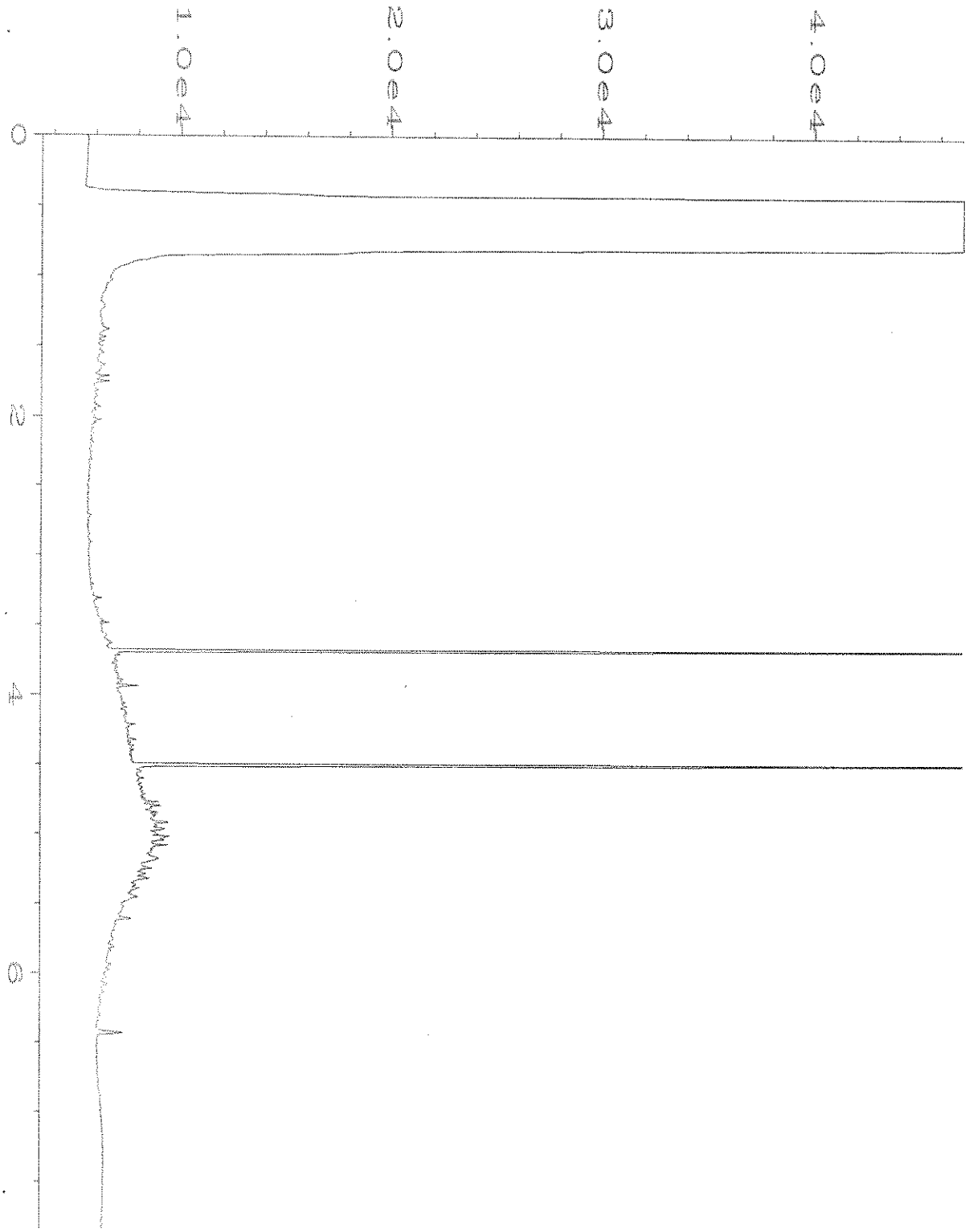


Data File Name	: C:\HPCHEM\4\DATA\11-19-21\024F0601.D		
Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 24
Sample Name	: 111347-11	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 6
Acquired on	: 19 Nov 21 03:50 PM	Instrument Method	: DX.MTH
Report Created on	: 22 Nov 21 08:35 AM	Analysis Method	: DEFAULT.MTH

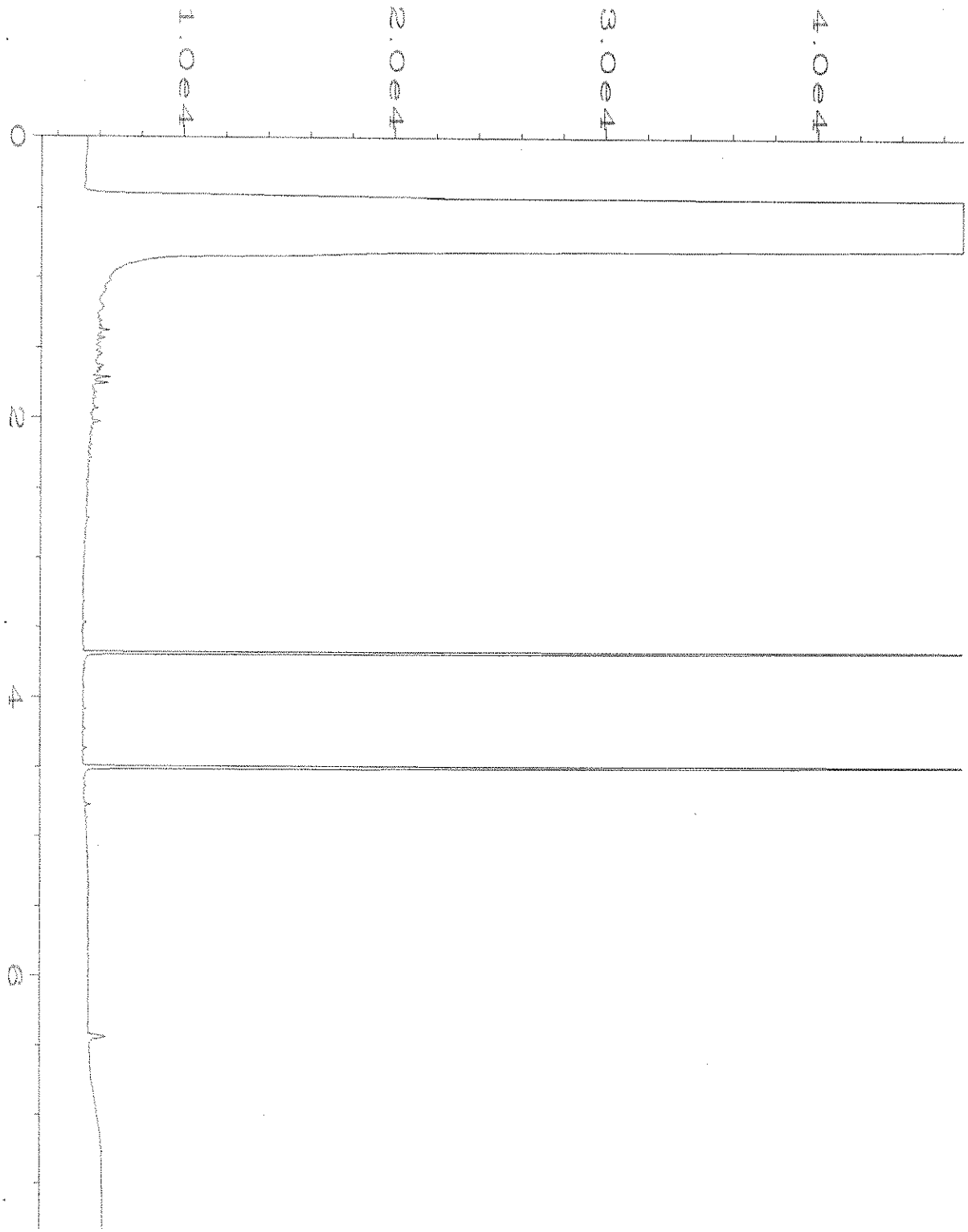


Data File Name : C:\HPCHEM\4\DATA\11-19-21\025F0601.D
Operator : TL
Instrument : GC#4
Sample Name : 111347-12
Run Time Bar Code:
Acquired on : 19 Nov 21 04:02 PM
Report Created on: 22 Nov 21 08:35 AM

Page Number : 1
Vial Number : 25
Injection Number : 1
Sequence Line : 6
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

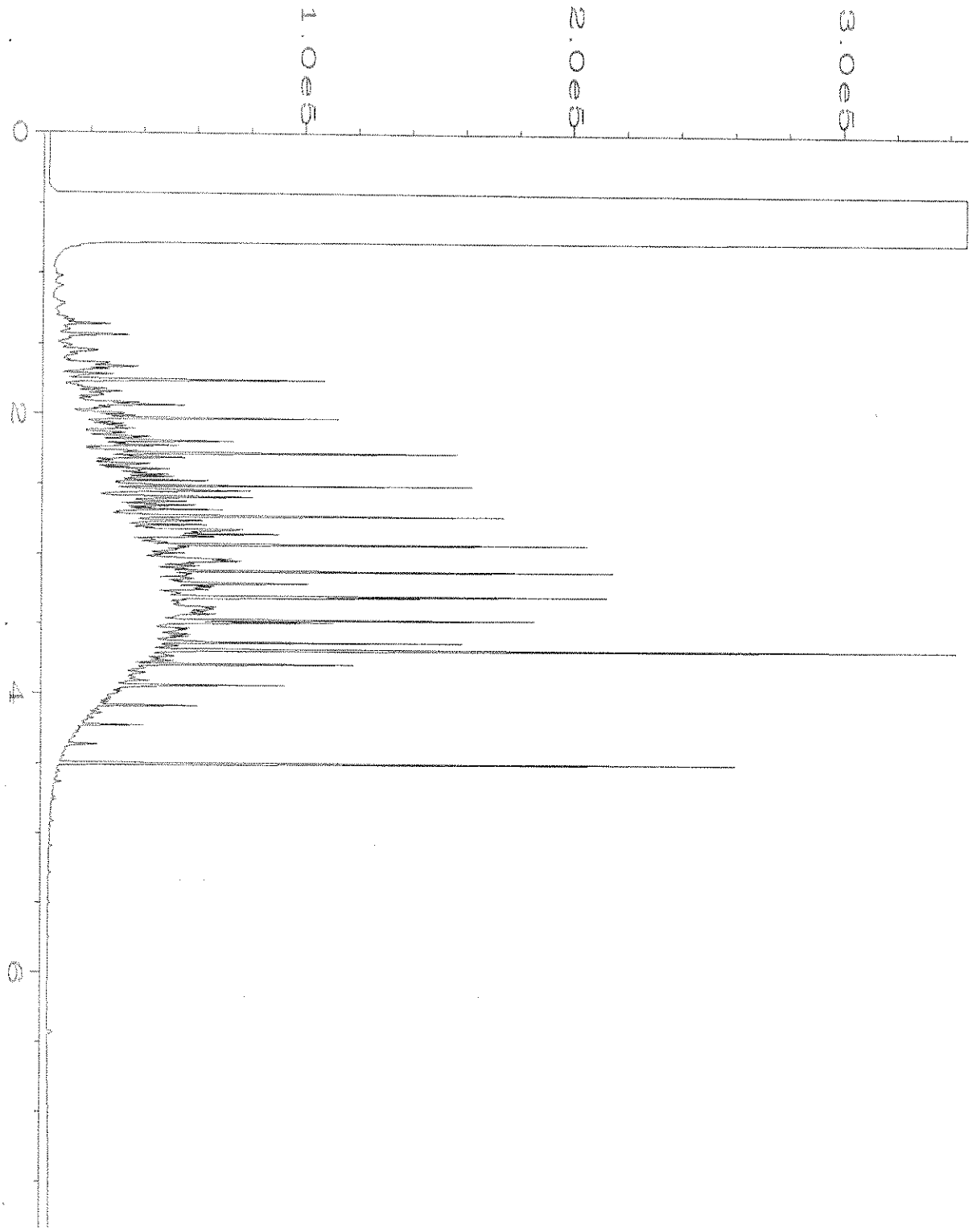


Data File Name	: C:\HPCHEM\4\DATA\11-19-21\026F0601.D		
Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 26
Sample Name	: 111347-13	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 6
Acquired on	: 19 Nov 21 04:14 PM	Instrument Method	: DX.MTH
Report Created on:	22 Nov 21 08:35 AM	Analysis Method	: DEFAULT.MTH



Data File Name : C:\HPCHEM\4\DATA\11-19-21\014F0301.D
Operator : TL
Instrument : GC#4
Sample Name : 01-2706 mb
Run Time Bar Code:
Acquired on : 19 Nov 21 11:24 AM
Report Created on: 22 Nov 21 08:35 AM

Page Number : 1
Vial Number : 14
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name	: C:\HPCHEM\4\DATA\11-19-21\003F0201.D		
Operator	: TL	Page Number	: 1
Instrument	: GC#4	Vial Number	: 3
Sample Name	: 500 Dx 64-13H	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 2
Acquired on	: 19 Nov 21 05:52 AM	Instrument Method	: DX.MTH
Report Created on	: 22 Nov 21 08:35 AM	Analysis Method	: DEFAULT.MTH

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

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Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

November 23, 2021

Chuck Cacek, Project Manager
Zipper Geo Associates, LLC
19019 36th Ave W, Suite E
Lynnwood, WA 98036

Dear Mr Cacek:

Included are the results from the testing of material submitted on November 18, 2021 from the Boeing Renton 2509.22, F&BI 111352 project. There are 22 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Kaelin Newman, Sean Donnan
ZGA1123R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on November 18, 2021 by Friedman & Bruya, Inc. from the Zipper Geo Associates, LLC Boeing Renton 2509.22, F&BI 111352 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Zipper Geo Associates, LLC
111352 -01	PB-102-20211118
111352 -02	PB-106-20211118
111352 -03	PB-202-20211118
111352 -04	PB-203-20211118
111352 -05	PB-201-20211118
111352 -06	Trip Blank

All quality control requirements were acceptable.

Date of Report: 11/23/21
Date Received: 11/18/21
Project: Boeing Renton 2509.22, F&BI 111352
Date Extracted: 11/19/21
Date Analyzed: 11/22/21

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
PB-102-20211118 111352-01	<100	97
PB-106-20211118 111352-02	<100	97
Method Blank 01-2634 MB	<100	91

Date of Report: 11/23/21
Date Received: 11/18/21
Project: Boeing Renton 2509.22, F&BI 111352
Date Extracted: 11/19/21
Date Analyzed: 11/19/21

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 51-134)
PB-102-20211118 111352-01	<50	<150	126
PB-106-20211118 111352-02	51 x	<150	123
PB-202-20211118 111352-03	<50	<150	112
PB-203-20211118 111352-04	60 x	<150	114
PB-201-20211118 111352-05 1/1.2	450 x	400 x	124
Method Blank 01-2708 MB	<50	<150	127

Date of Report: 11/23/21
Date Received: 11/18/21
Project: Boeing Renton 2509.22, F&BI 111352
Date Extracted: 11/19/21
Date Analyzed: 11/23/21

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx
Sample Extracts Passed Through a Silica Gel Column Prior to Analysis
Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 41-152)
PB-201-20211118 111352-05 1/1.2	<50	<150	136
Method Blank 01-2708 MB	<50	<150	143

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	PB-102-20211118	Client:	Zipper Geo Associates, LLC
Date Received:	11/18/21	Project:	2509.22, F&BI 111352
Date Extracted:	11/19/21	Lab ID:	111352-01
Date Analyzed:	11/19/21	Data File:	111352-01.116
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	45.5

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	PB-106-20211118	Client:	Zipper Geo Associates, LLC
Date Received:	11/18/21	Project:	2509.22, F&BI 111352
Date Extracted:	11/19/21	Lab ID:	111352-02
Date Analyzed:	11/19/21	Data File:	111352-02.117
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	53.9

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	PB-202-20211118	Client:	Zipper Geo Associates, LLC
Date Received:	11/18/21	Project:	2509.22, F&BI 111352
Date Extracted:	11/19/21	Lab ID:	111352-03
Date Analyzed:	11/19/21	Data File:	111352-03.118
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.60

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	PB-203-20211118	Client:	Zipper Geo Associates, LLC
Date Received:	11/18/21	Project:	2509.22, F&BI 111352
Date Extracted:	11/19/21	Lab ID:	111352-04
Date Analyzed:	11/19/21	Data File:	111352-04.119
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	1.93

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	PB-201-20211118	Client:	Zipper Geo Associates, LLC
Date Received:	11/18/21	Project:	2509.22, F&BI 111352
Date Extracted:	11/19/21	Lab ID:	111352-05
Date Analyzed:	11/19/21	Data File:	111352-05.120
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	3.31

Analysis For Dissolved Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Zipper Geo Associates, LLC
Date Received:	NA	Project:	2509.22, F&BI 111352
Date Extracted:	11/19/21	Lab ID:	I1-766 mb
Date Analyzed:	11/19/21	Data File:	I1-766 mb.042
Matrix:	Water	Instrument:	ICPMS2
Units:	ug/L (ppb)	Operator:	SP

Analyte:	Concentration ug/L (ppb)
Arsenic	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	PB-102-20211118	Client:	Zipper Geo Associates, LLC
Date Received:	11/18/21	Project:	2509.22, F&BI 111352
Date Extracted:	11/19/21	Lab ID:	111352-01
Date Analyzed:	11/22/21	Data File:	112209.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	78	126
Toluene-d8	99	87	115
4-Bromofluorobenzene	102	92	112

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	PB-106-20211118	Client:	Zipper Geo Associates, LLC
Date Received:	11/18/21	Project:	2509.22, F&BI 111352
Date Extracted:	11/19/21	Lab ID:	111352-02
Date Analyzed:	11/22/21	Data File:	112210.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	78	126
Toluene-d8	97	87	115
4-Bromofluorobenzene	105	92	112

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	PB-202-20211118	Client:	Zipper Geo Associates, LLC
Date Received:	11/18/21	Project:	2509.22, F&BI 111352
Date Extracted:	11/19/21	Lab ID:	111352-03
Date Analyzed:	11/22/21	Data File:	112211.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	105	78	126
Toluene-d8	98	87	115
4-Bromofluorobenzene	104	92	112

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	PB-203-20211118	Client:	Zipper Geo Associates, LLC
Date Received:	11/18/21	Project:	2509.22, F&BI 111352
Date Extracted:	11/19/21	Lab ID:	111352-04
Date Analyzed:	11/22/21	Data File:	112212.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	78	126
Toluene-d8	96	87	115
4-Bromofluorobenzene	103	92	112

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	PB-201-20211118	Client:	Zipper Geo Associates, LLC
Date Received:	11/18/21	Project:	2509.22, F&BI 111352
Date Extracted:	11/19/21	Lab ID:	111352-05
Date Analyzed:	11/22/21	Data File:	112213.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	78	126
Toluene-d8	95	87	115
4-Bromofluorobenzene	101	92	112

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Analysis For Volatile Compounds By EPA Method 8260D Dual Acquisition

Client Sample ID:	Method Blank	Client:	Zipper Geo Associates, LLC
Date Received:	Not Applicable	Project:	2509.22, F&BI 111352
Date Extracted:	11/19/21	Lab ID:	01-2598 mb
Date Analyzed:	11/19/21	Data File:	111927.D
Matrix:	Water	Instrument:	GCMS11
Units:	ug/L (ppb)	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	110	78	126
Toluene-d8	101	87	115
4-Bromofluorobenzene	100	92	112

Compounds:	Concentration ug/L (ppb)
Vinyl chloride	<0.02
Chloroethane	<1
1,1-Dichloroethene	<1
Methylene chloride	<5
trans-1,2-Dichloroethene	<1
1,1-Dichloroethane	<1
cis-1,2-Dichloroethene	<1
1,2-Dichloroethane (EDC)	<0.2
1,1,1-Trichloroethane	<1
Trichloroethene	<0.5
Tetrachloroethene	<1

Date of Report: 11/23/21
Date Received: 11/18/21
Project: Boeing Renton 2509.22, F&BI 111352

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 111327-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	ug/L (ppb)	1,000	102	69-134

Date of Report: 11/23/21
Date Received: 11/18/21
Project: Boeing Renton 2509.22, F&BI 111352

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	112	116	58-134	4

Date of Report: 11/23/21
Date Received: 11/18/21
Project: Boeing Renton 2509.22, F&BI 111352

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: Laboratory Control Sample Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	124	140	63-142	12

Date of Report: 11/23/21
Date Received: 11/18/21
Project: Boeing Renton 2509.22, F&BI 111352

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR DISSOLVED METALS USING EPA METHOD 6020B

Laboratory Code: 111327-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	ug/L (ppb)	10	4.46	94	92	75-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	ug/L (ppb)	10	89	80-120

Date of Report: 11/23/21
Date Received: 11/18/21
Project: Boeing Renton 2509.22, F&BI 111352

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260D

Laboratory Code: 111284-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Acceptance Criteria
Vinyl chloride	ug/L (ppb)	10	<0.02	82	50-150
Chloroethane	ug/L (ppb)	10	<1	96	50-150
1,1-Dichloroethene	ug/L (ppb)	10	<1	95	50-150
Methylene chloride	ug/L (ppb)	10	<5	103	50-150
trans-1,2-Dichloroethene	ug/L (ppb)	10	<1	95	50-150
1,1-Dichloroethane	ug/L (ppb)	10	<1	95	50-150
cis-1,2-Dichloroethene	ug/L (ppb)	10	<1	95	50-150
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	<0.2	99	50-150
1,1,1-Trichloroethane	ug/L (ppb)	10	<1	97	50-150
Trichloroethene	ug/L (ppb)	10	<0.5	93	50-150
Tetrachloroethene	ug/L (ppb)	10	<1	100	50-150

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Vinyl chloride	ug/L (ppb)	10	103	93	70-130	10
Chloroethane	ug/L (ppb)	10	121	108	70-130	11
1,1-Dichloroethene	ug/L (ppb)	10	109	100	70-130	9
Methylene chloride	ug/L (ppb)	10	103	96	43-134	7
trans-1,2-Dichloroethene	ug/L (ppb)	10	111	103	70-130	7
1,1-Dichloroethane	ug/L (ppb)	10	107	102	70-130	5
cis-1,2-Dichloroethene	ug/L (ppb)	10	108	103	70-130	5
1,2-Dichloroethane (EDC)	ug/L (ppb)	10	102	101	70-130	1
1,1,1-Trichloroethane	ug/L (ppb)	10	108	103	70-130	5
Trichloroethene	ug/L (ppb)	10	98	98	70-130	0
Tetrachloroethene	ug/L (ppb)	10	102	104	70-130	2

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

~~111354~~ 111352

SAMPLE CHAIN OF CUSTODY

ME 11/18/21 E03/A13/VM4

Page 1 of 1

Report To Chuck, Jean, Kaelin

Company ZGA

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME: Boeing Renton

PO #: 2509.22

REMARKS: Project specific RLs? - Yes / No

INVOICE TO

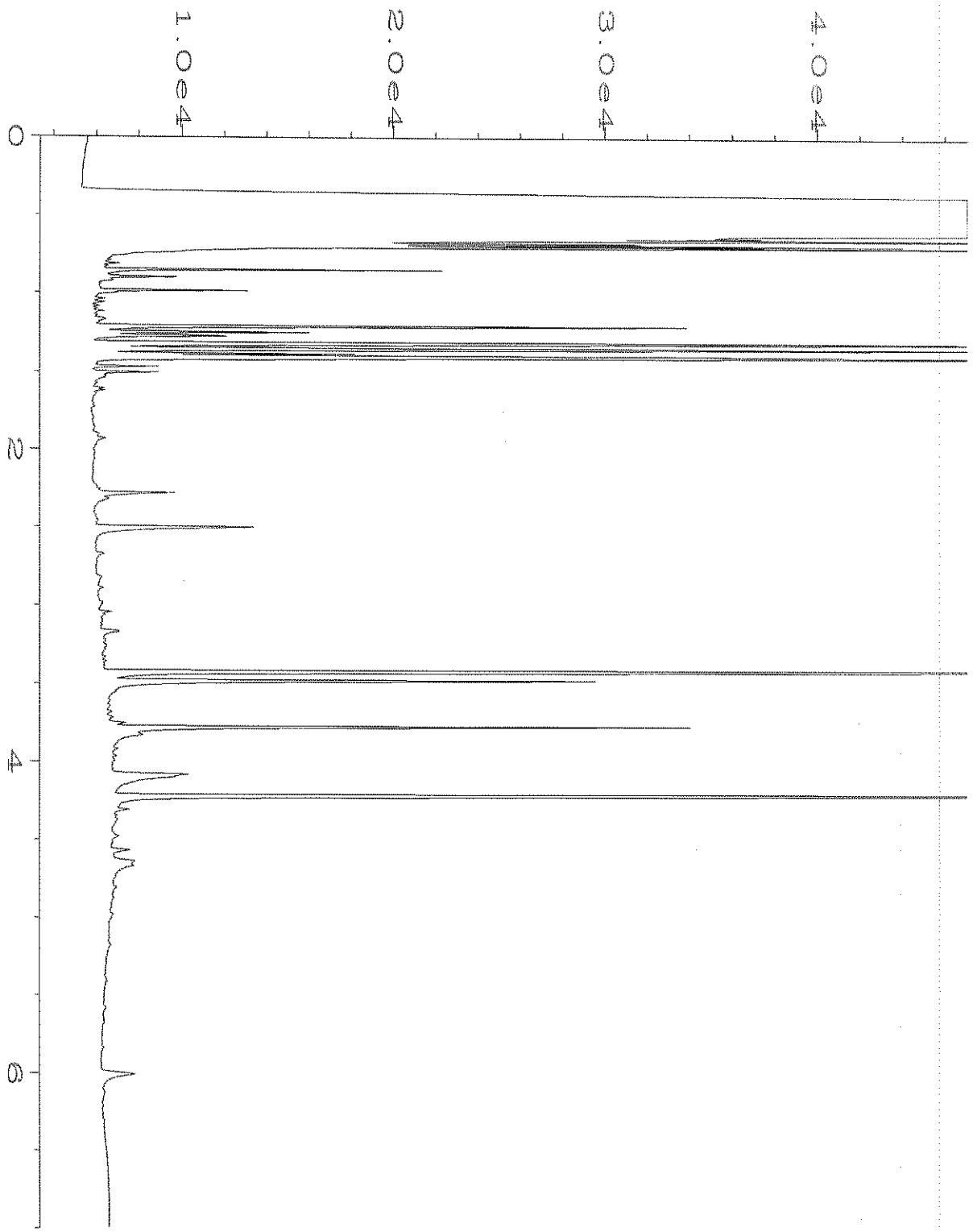
TURNAROUND TIME
- ☐ Standard turnaround
- ☒ RUSH verbals by Monday
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Archive samples
- ☐ Other
- Default: Dispose after 30 days

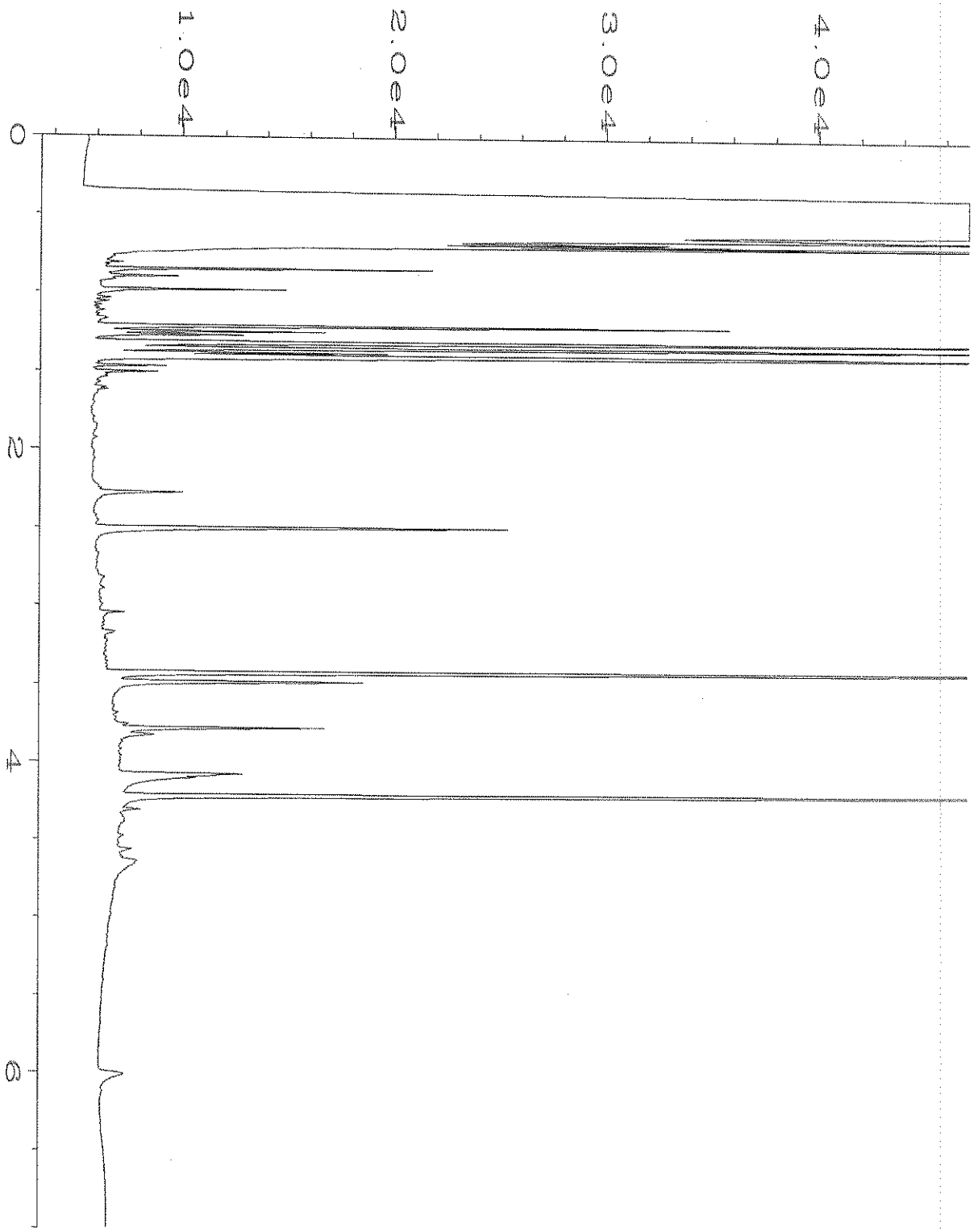
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Dissolved Fe by (ICP)MS	Dx w/SG		Notes
PB-102-20211118	01 AH	11/18/21	0836	GW	8	X	X			X			X			(X) perCC
PB-106-20211118	02	11/18/21	0955		8	X	X			X			X			11/22/21 ME
PB-202-20211118	03		1220		8	X				X			X			
PB-203-20211118	04		1325		8	X				X			X			
PB-201-20211118	05 AE		1511		~~5~~ 8	X				X			X	(X)		
Trip Blank	06 AB															Added at Lab

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Kaelin Newman	ZGA	11/18/21	1642
Received by:	Eric Hansen	F:B	11/18/21	1642
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

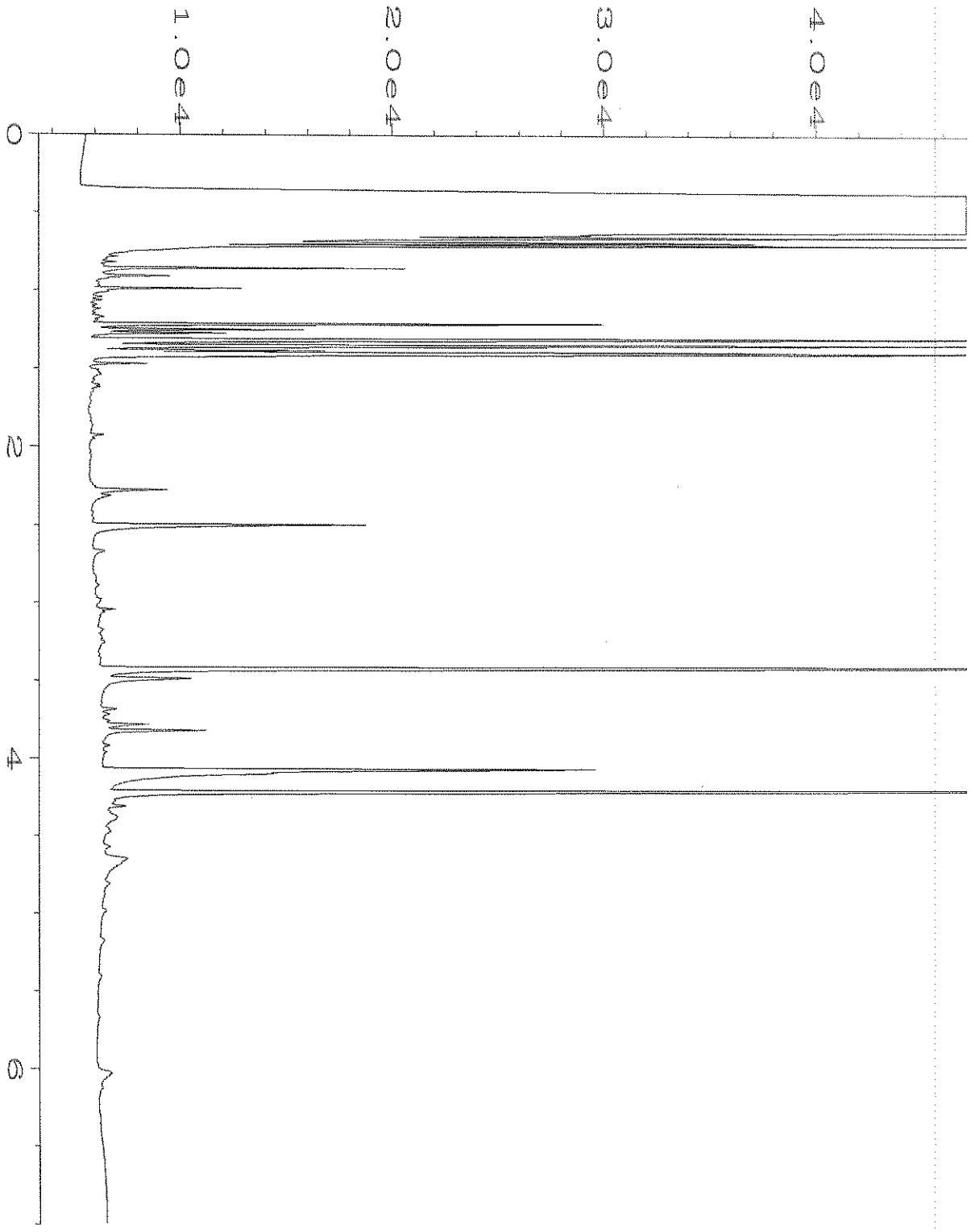


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Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 74
Sample Name	: 111352-01	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 21
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Report Created on	: 22 Nov 21 09:53 AM	Analysis Method	: DEFAULT.MTH

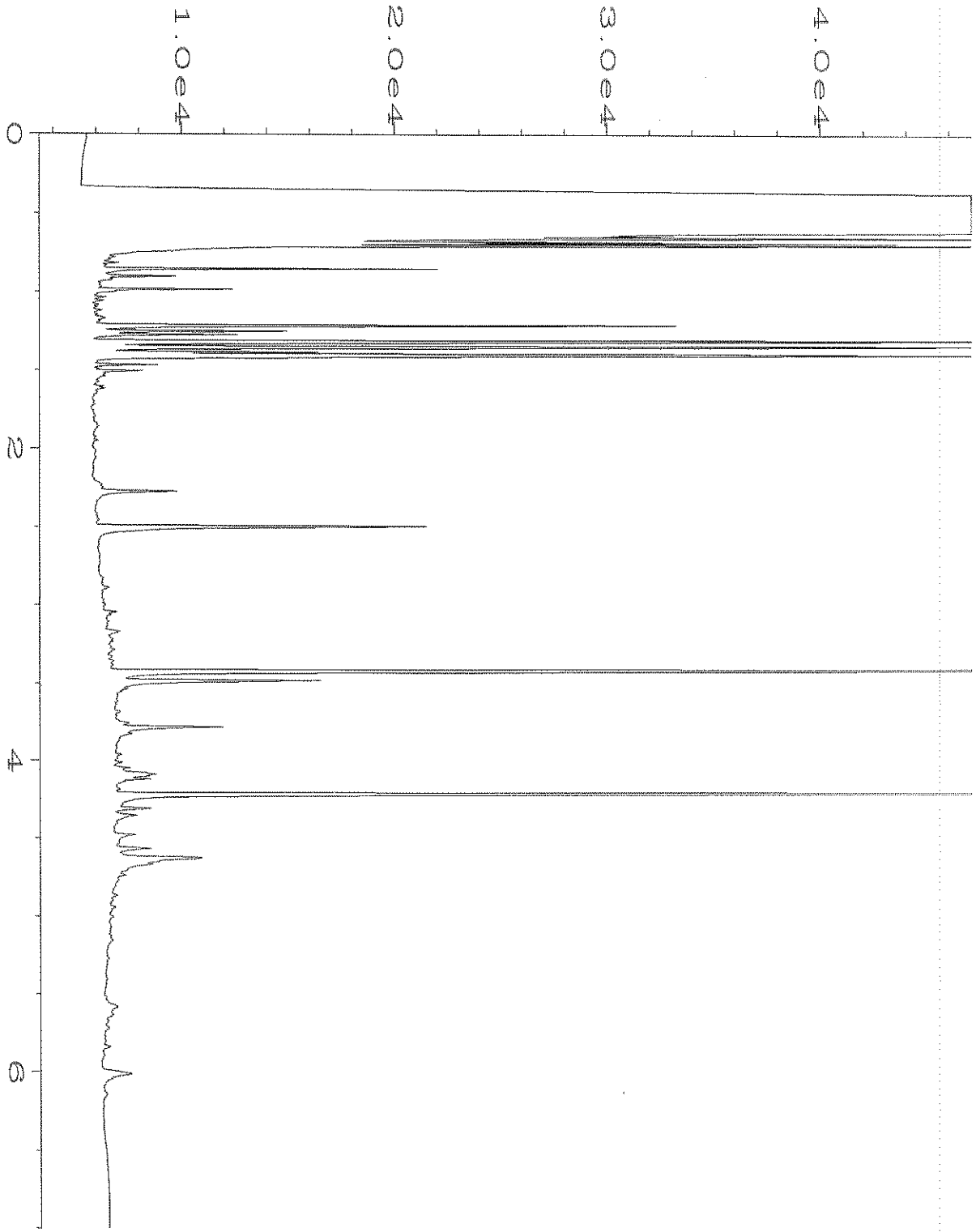


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Operator : TL
Instrument : GC6
Sample Name : 111352-02
Run Time Bar Code:
Acquired on : 19 Nov 21 10:45 PM
Report Created on: 22 Nov 21 09:54 AM

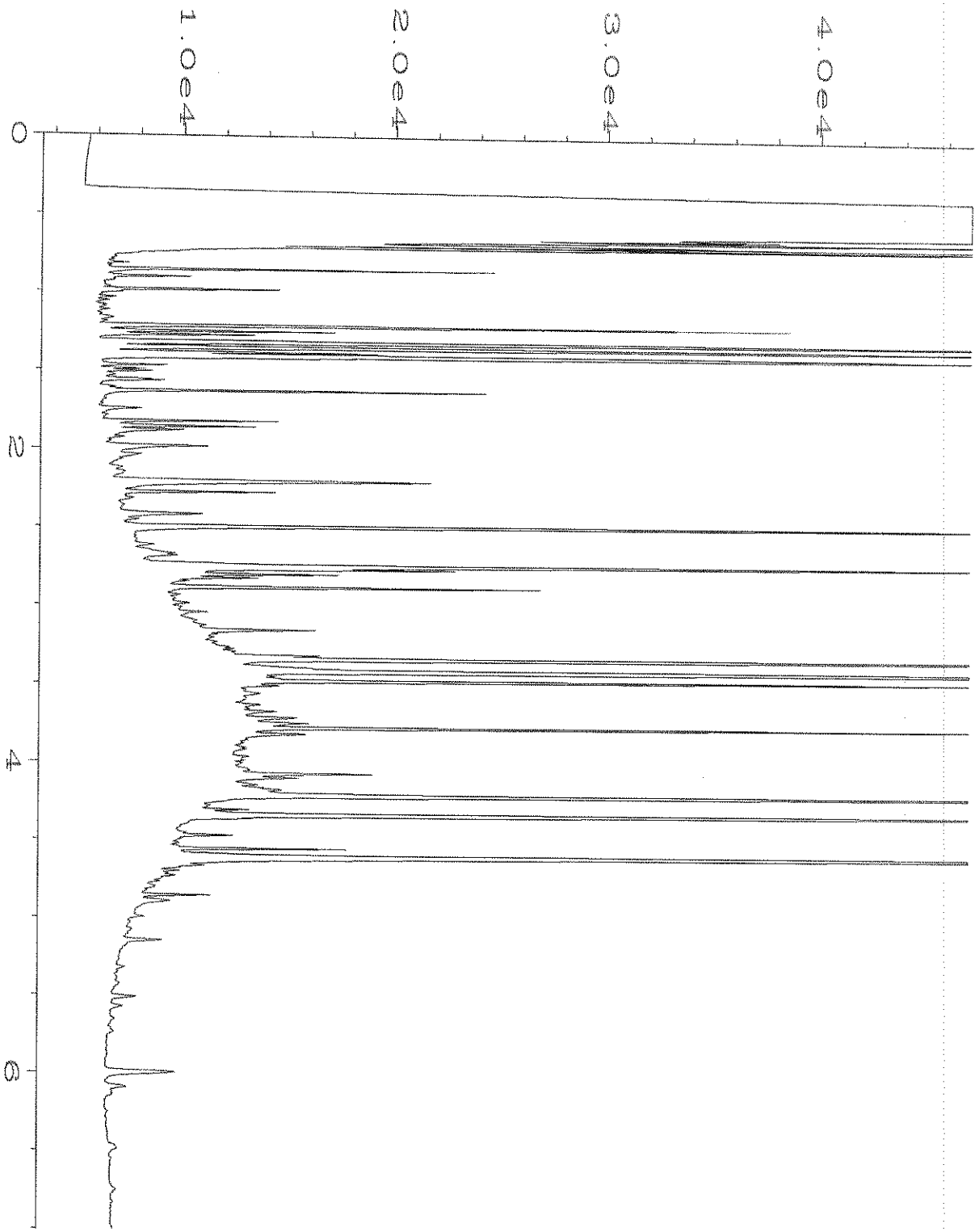
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Vial Number : 75
Injection Number : 1
Sequence Line : 21
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



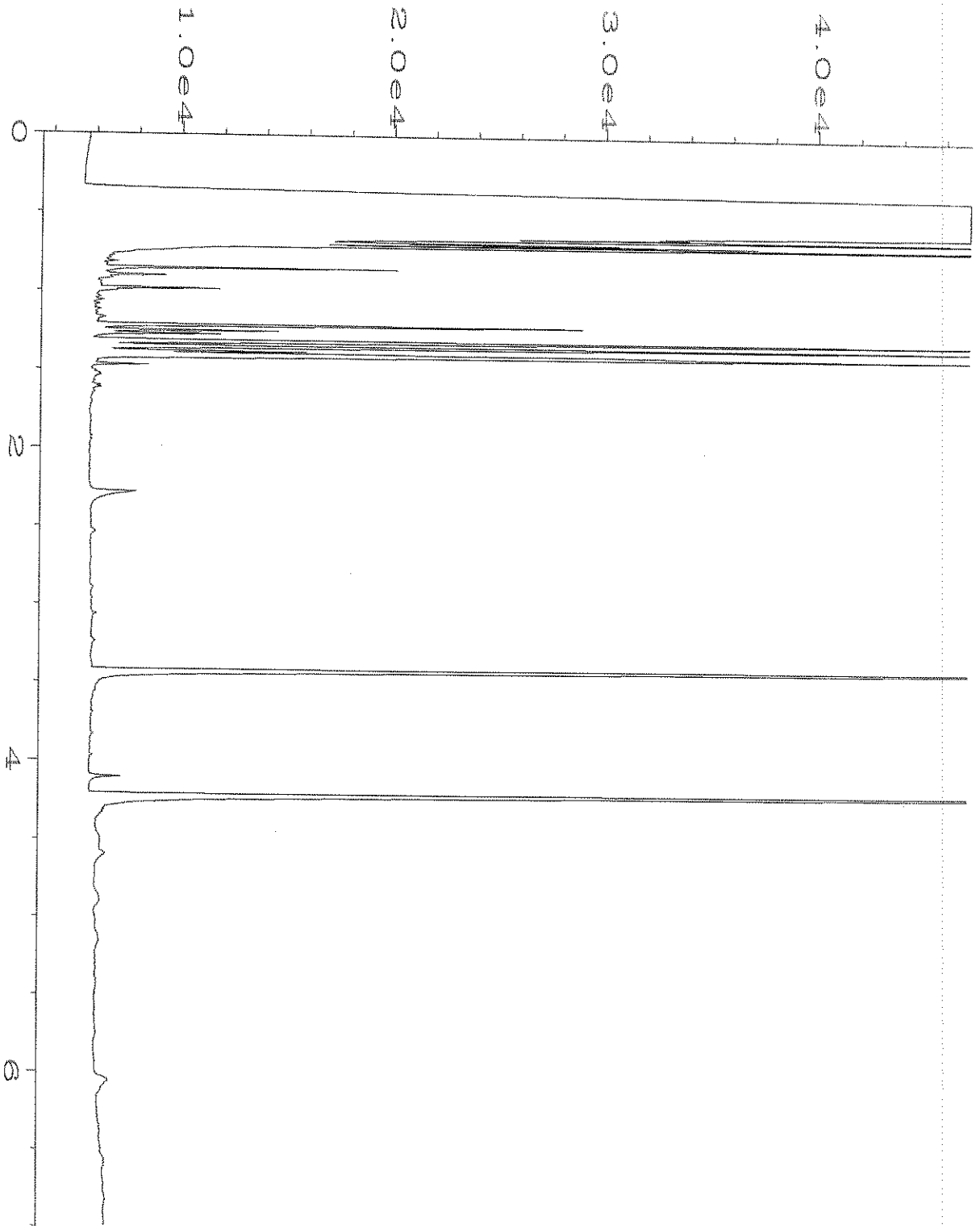
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Instrument	: GC6	Vial Number	: 76
Sample Name	: 111352-03	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 21
Acquired on	: 19 Nov 21 10:56 PM	Instrument Method	: DX.MTH
Report Created on:	22 Nov 21 09:54 AM	Analysis Method	: DEFAULT.MTH



Data File Name	: C:\HPCHEM\6\DATA\11-19-21\077F2101.D		
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 77
Sample Name	: 111352-04	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 21
Acquired on	: 19 Nov 21 11:06 PM	Instrument Method	: DX.MTH
Report Created on	: 22 Nov 21 09:54 AM	Analysis Method	: DEFAULT.MTH

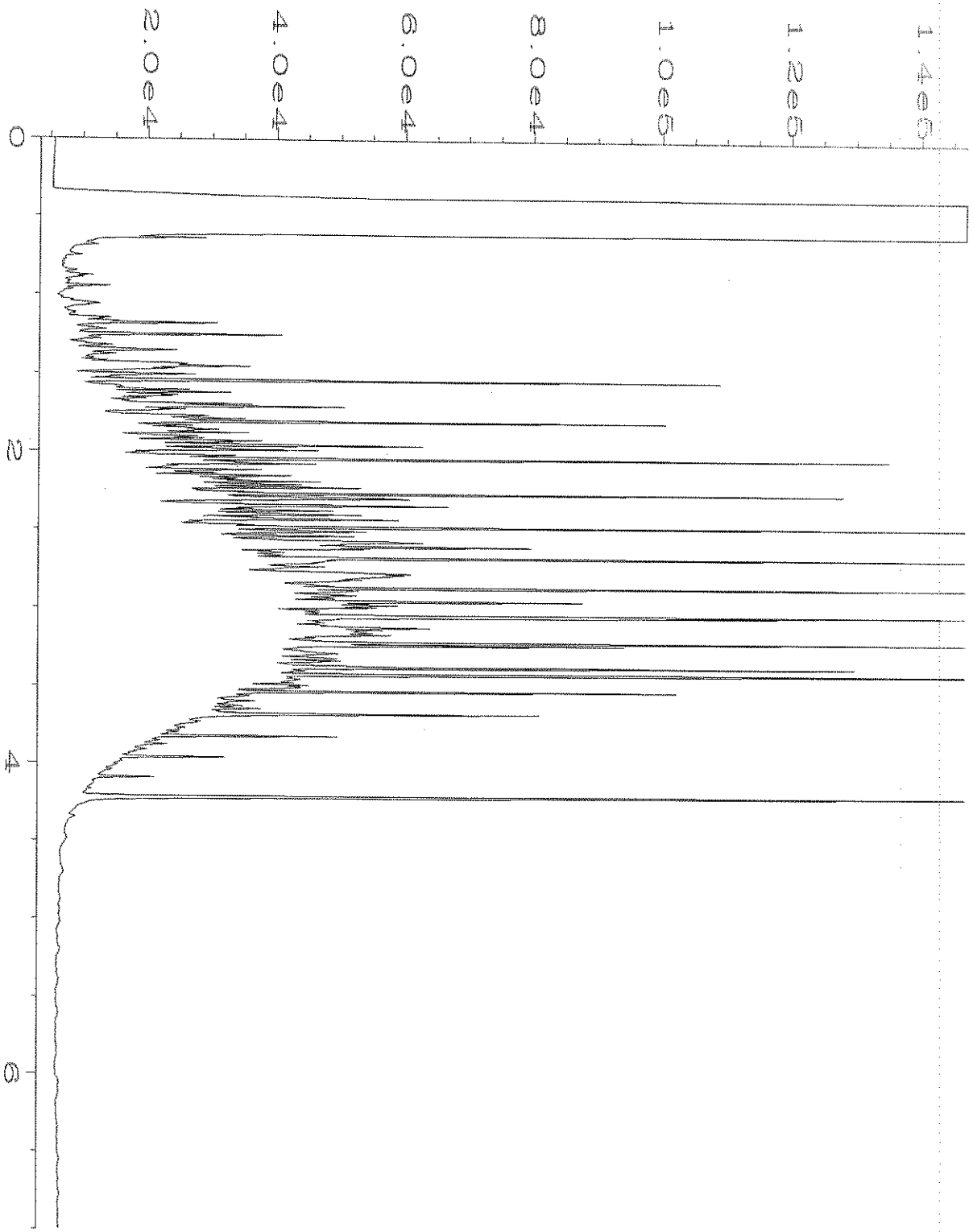


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Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 78
Sample Name	: 111352-05	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 21
Acquired on	: 19 Nov 21 11:17 PM	Instrument Method	: DX.MTH
Report Created on	: 22 Nov 21 09:54 AM	Analysis Method	: DEFAULT.MTH



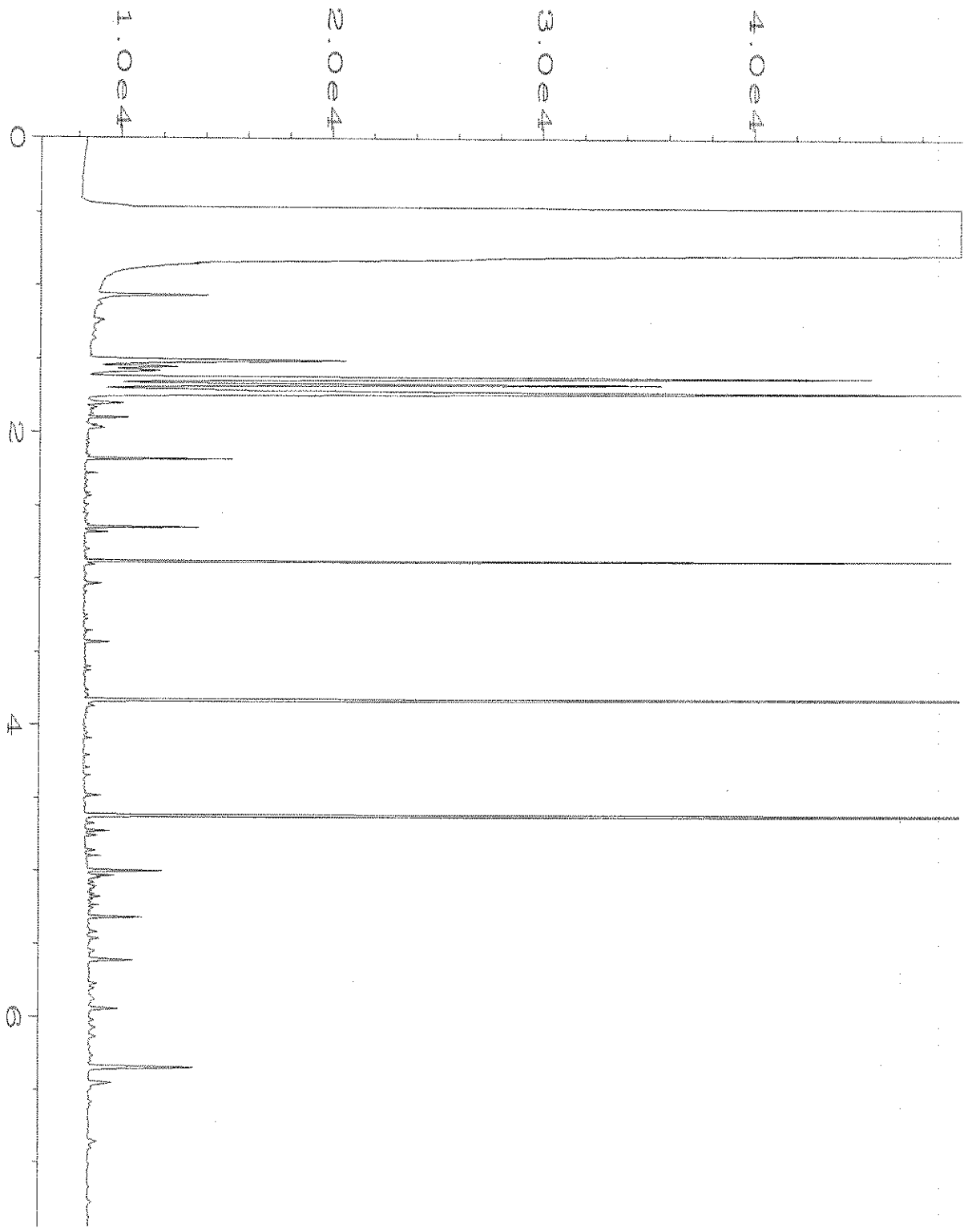
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Operator : TL
Instrument : GC6
Sample Name : 01-2708 mb
Run Time Bar Code:
Acquired on : 19 Nov 21 09:30 PM
Report Created on: 22 Nov 21 09:52 AM

Page Number : 1
Vial Number : 67
Injection Number : 1
Sequence Line : 20
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

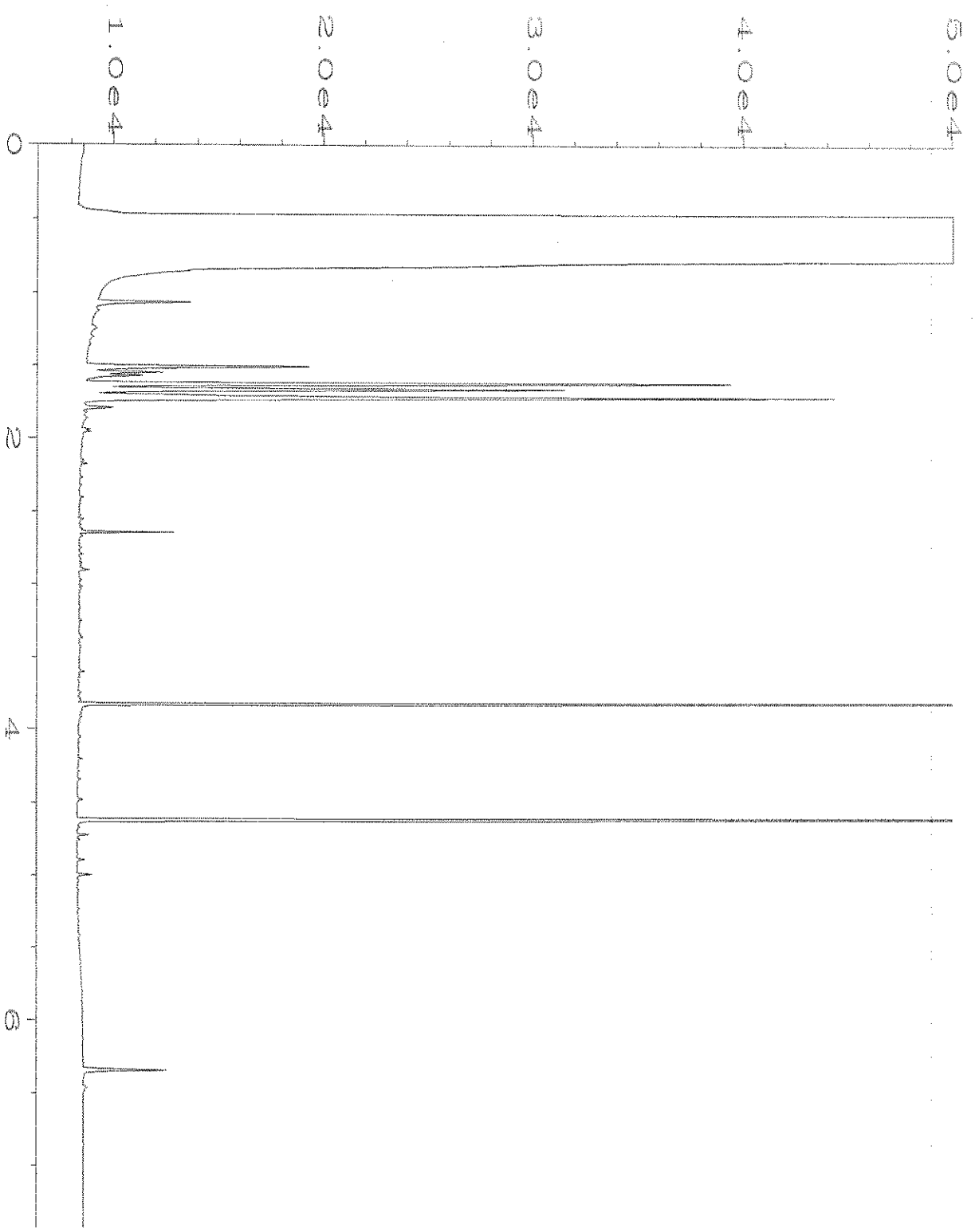


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Operator : TL
Instrument : GC6
Sample Name : 500 Dx 64-13H
Run Time Bar Code:
Acquired on : 19 Nov 21 07:32 PM
Report Created on: 22 Nov 21 09:50 AM

Page Number : 1
Vial Number : 3
Injection Number : 1
Sequence Line : 17
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

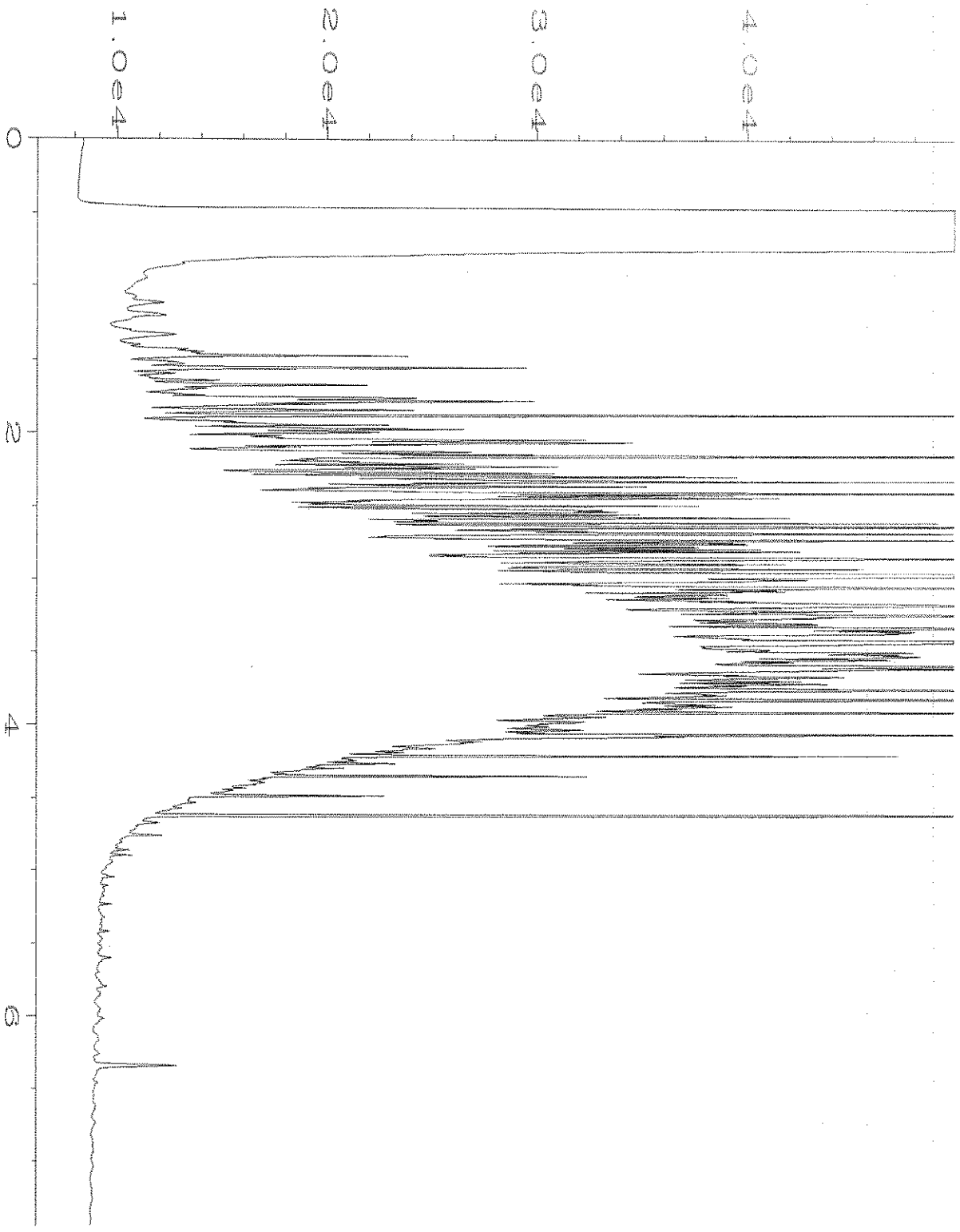


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Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 11
Sample Name	: 111352-05 sg	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 5
Acquired on	: 23 Nov 21 10:54 AM	Instrument Method	: DX.MTH
Report Created on	: 23 Nov 21 12:24 PM	Analysis Method	: DEFAULT.MTH



Data File Name : C:\HPCHEM\1\DATA\11-23-21\008F0501.D
Operator : TL
Instrument : GC1
Sample Name : 01-2708 mb sg
Run Time Bar Code:
Acquired on : 23 Nov 21 10:17 AM
Report Created on: 23 Nov 21 12:24 PM

Page Number : 1
Vial Number : 8
Injection Number : 1
Sequence Line : 5
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name	: C:\HPCHEM\1\DATA\11-23-21\003F0201.D		
Operator	: TL	Page Number	: 1
Instrument	: GC1	Vial Number	: 3
Sample Name	: 500 Dx 64-13H	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 2
Acquired on	: 23 Nov 21 06:07 AM	Instrument Method	: DX.MTH
Report Created on	: 23 Nov 21 12:24 PM	Analysis Method	: DEFAULT.MTH

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

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Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

November 23, 2021

Chuck Cacek, Project Manager
Zipper Geo Associates, LLC
19019 36th Ave W, Suite E
Lynnwood, WA 98036

Dear Mr Cacek:

Included are the results from the testing of material submitted on November 18, 2021 from the Boeing Renton 2509.22, F&BI 111353 project. There are 12 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Kaelin Newman, Sean Donnan
ZGA1123R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on November 18, 2021 by Friedman & Bruya, Inc. from the Zipper Geo Associates, LLC Boeing Renton 2509.22, F&BI 111353 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	Zipper Geo Associates, LLC
111353 -01	PB-102-02.0'
111353 -02	PB-102-06.0'
111353 -03	PB-106-02.0'
111353 -04	PB-106-06.0'
111353 -05	PB-202-01.0'
111353 -06	PB-202-06.0'
111353 -07	PB-203-01.0'
111353 -08	PB-203-06.0'
111353 -09	PB-201-03.0'
111353 -10	PB-201-05.5'

All quality control requirements were acceptable.

Date of Report: 11/23/21
Date Received: 11/18/21
Project: Boeing Renton 2509.22, F&BI 111353
Date Extracted: 11/19/21
Date Analyzed: 11/19/21

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
PB-102-02.0' 111353-01	<5	99
PB-106-02.0' 111353-03	<5	93
Method Blank 01-2635 MB	<5	97

Date of Report: 11/23/21
Date Received: 11/18/21
Project: Boeing Renton 2509.22, F&BI 111353
Date Extracted: 11/19/21
Date Analyzed: 11/19/21

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 53-144)
PB-102-02.0' 111353-01	<50	<250	92
PB-106-02.0' 111353-03	<50	<250	102
PB-202-06.0' 111353-06	<50	<250	99
PB-203-06.0' 111353-08	<50	<250	103
PB-201-03.0' 111353-09	<50	<250	105
Method Blank 01-2705 MB	<50	<250	92

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	PB-102-02.0'	Client:	Zipper Geo Associates, LLC
Date Received:	11/18/21	Project:	2509.22, F&BI 111353
Date Extracted:	11/19/21	Lab ID:	111353-01 1/5
Date Analyzed:	11/19/21	Data File:	111912.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	90	39	103
Phenol-d6	100	48	109
Nitrobenzene-d5	95	23	139
2-Fluorobiphenyl	98	50	150
2,4,6-Tribromophenol	95	40	127
Terphenyl-d14	108	50	150

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	PB-106-02.0'	Client:	Zipper Geo Associates, LLC
Date Received:	11/18/21	Project:	2509.22, F&BI 111353
Date Extracted:	11/19/21	Lab ID:	111353-03 1/5
Date Analyzed:	11/19/21	Data File:	111913.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	75	39	103
Phenol-d6	83	48	109
Nitrobenzene-d5	81	23	139
2-Fluorobiphenyl	82	50	150
2,4,6-Tribromophenol	78	40	127
Terphenyl-d14	86	50	150

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	PB-202-06.0'	Client:	Zipper Geo Associates, LLC
Date Received:	11/18/21	Project:	2509.22, F&BI 111353
Date Extracted:	11/19/21	Lab ID:	111353-06 1/5
Date Analyzed:	11/19/21	Data File:	111914.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	79	39	103
Phenol-d6	87	48	109
Nitrobenzene-d5	86	23	139
2-Fluorobiphenyl	89	50	150
2,4,6-Tribromophenol	81	40	127
Terphenyl-d14	94	50	150

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	PB-203-06.0'	Client:	Zipper Geo Associates, LLC
Date Received:	11/18/21	Project:	2509.22, F&BI 111353
Date Extracted:	11/19/21	Lab ID:	111353-08 1/5
Date Analyzed:	11/19/21	Data File:	111915.D
Matrix:	Soil	Instrument:	GCMS9
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	79	39	103
Phenol-d6	86	48	109
Nitrobenzene-d5	85	23	139
2-Fluorobiphenyl	86	50	150
2,4,6-Tribromophenol	82	40	127
Terphenyl-d14	85	50	150

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

Analysis For Semivolatile Compounds By EPA Method 8270E

Client Sample ID:	Method Blank	Client:	Zipper Geo Associates, LLC
Date Received:	Not Applicable	Project:	2509.22, F&BI 111353
Date Extracted:	11/19/21	Lab ID:	01-2707 mb 1/5
Date Analyzed:	11/19/21	Data File:	111909.D
Matrix:	Soil	Instrument:	GCMS12
Units:	mg/kg (ppm) Dry Weight	Operator:	VM

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
2-Fluorophenol	80	39	103
Phenol-d6	87	48	109
Nitrobenzene-d5	96	23	138
2-Fluorobiphenyl	91	50	150
2,4,6-Tribromophenol	88	40	127
Terphenyl-d14	92	50	150

Compounds:	Concentration mg/kg (ppm)
Benz(a)anthracene	<0.01
Chrysene	<0.01
Benzo(a)pyrene	<0.01
Benzo(b)fluoranthene	<0.01
Benzo(k)fluoranthene	<0.01
Indeno(1,2,3-cd)pyrene	<0.01
Dibenz(a,h)anthracene	<0.01

Date of Report: 11/23/21
Date Received: 11/18/21
Project: Boeing Renton 2509.22, F&BI 111353

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: 111353-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	95	71-131

Date of Report: 11/23/21
Date Received: 11/18/21
Project: Boeing Renton 2509.22, F&BI 111353

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 111323-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	150	81	81	64-133	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	90	58-147

Date of Report: 11/23/21
Date Received: 11/18/21
Project: Boeing Renton 2509.22, F&BI 111353

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR SEMIVOLATILES BY EPA METHOD 8270E

Laboratory Code: 111323-01 1/5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Benz(a)anthracene	mg/kg (ppm)	0.83	<0.01	89	90	50-150	1
Chrysene	mg/kg (ppm)	0.83	<0.01	90	91	50-150	1
Benzo(a)pyrene	mg/kg (ppm)	0.83	<0.01	95	95	50-150	0
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	<0.01	95	96	50-150	1
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	<0.01	90	89	50-150	1
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	<0.01	92	92	50-150	0
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	<0.01	87	91	50-150	4

Laboratory Code: Laboratory Control Sample 1/5

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benz(a)anthracene	mg/kg (ppm)	0.83	92	64-116
Chrysene	mg/kg (ppm)	0.83	95	66-119
Benzo(a)pyrene	mg/kg (ppm)	0.83	96	62-116
Benzo(b)fluoranthene	mg/kg (ppm)	0.83	96	61-118
Benzo(k)fluoranthene	mg/kg (ppm)	0.83	94	65-119
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	0.83	94	64-130
Dibenz(a,h)anthracene	mg/kg (ppm)	0.83	93	67-131

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

111353

SAMPLE CHAIN OF CUSTODY

ME 11/18/21 A04 / VS-D4

Page # 1 of 1

Report To Chuck, Sean, Kaelin

Company ZGA

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME: Boeing Renton

PO #: 2509.22

REMARKS

Project specific RLs? - Yes / No

INVOICE TO

TURNAROUND TIME

☐ Standard turnaround

☒ RUSH Verbals by Monday

Rush charges authorized by:

SAMPLE DISPOSAL

☐ Archive samples

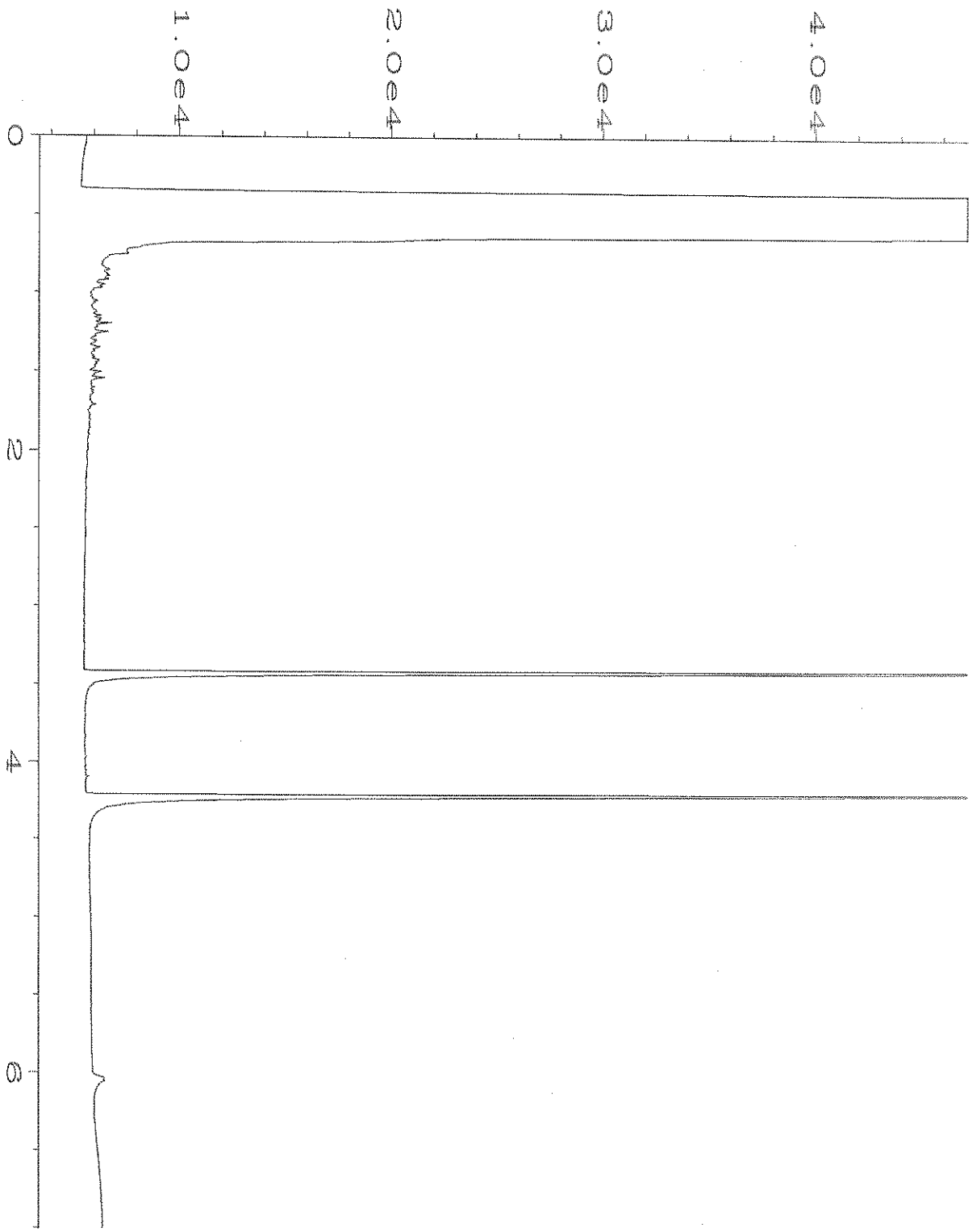
☐ Other

Default: Dispose after 30 days

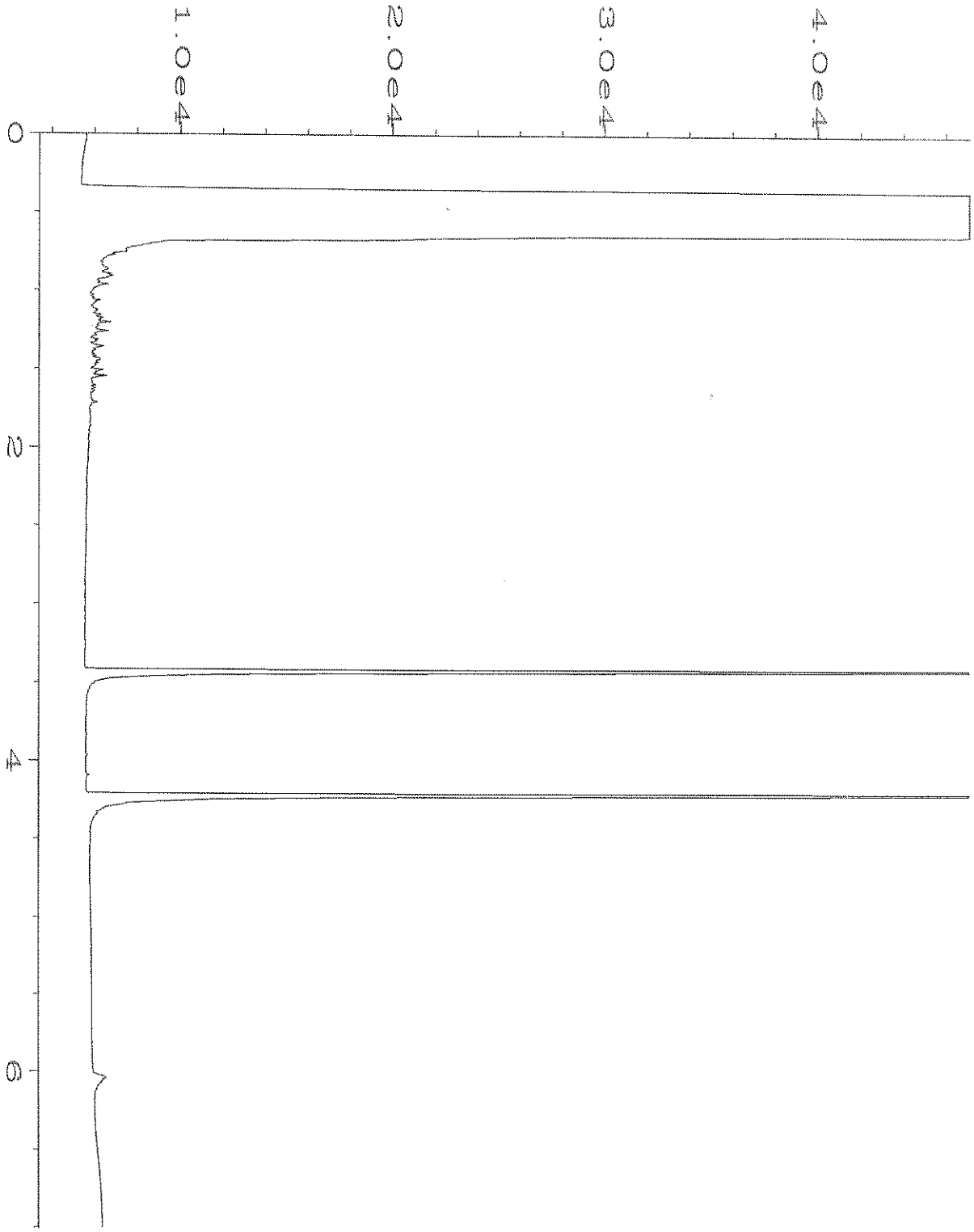
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						ANALYSES REQUESTED											
PB-102-02.0'	01 A.F	11/18/21	Soil	0831	6	X	X				X						
PB-102-06.0'	02			0834	6		X										
PB-106-02.0'	03			0947	6	X	X				X						
PB-106-06.0'	04			0957	6												
PB-202-01.0'	05 A.B			1134	2	X					X						HOLD per 11/18
PB-202-06.0'	06			1157	2	X					X						
PB-203-01.0'	07			1302	2												
PB-203-06.0'	08			1316	2	X					X						
PB-201-03.0'	09 A.F			1452	6	X											
PB-201-05.5'	10* A.B			1503	2												

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Kaelin Newman	ZGA	11/18/21	1642
Received by:		Eric Young	FB	11/18/21	1642
Relinquished by:					
Received by:					

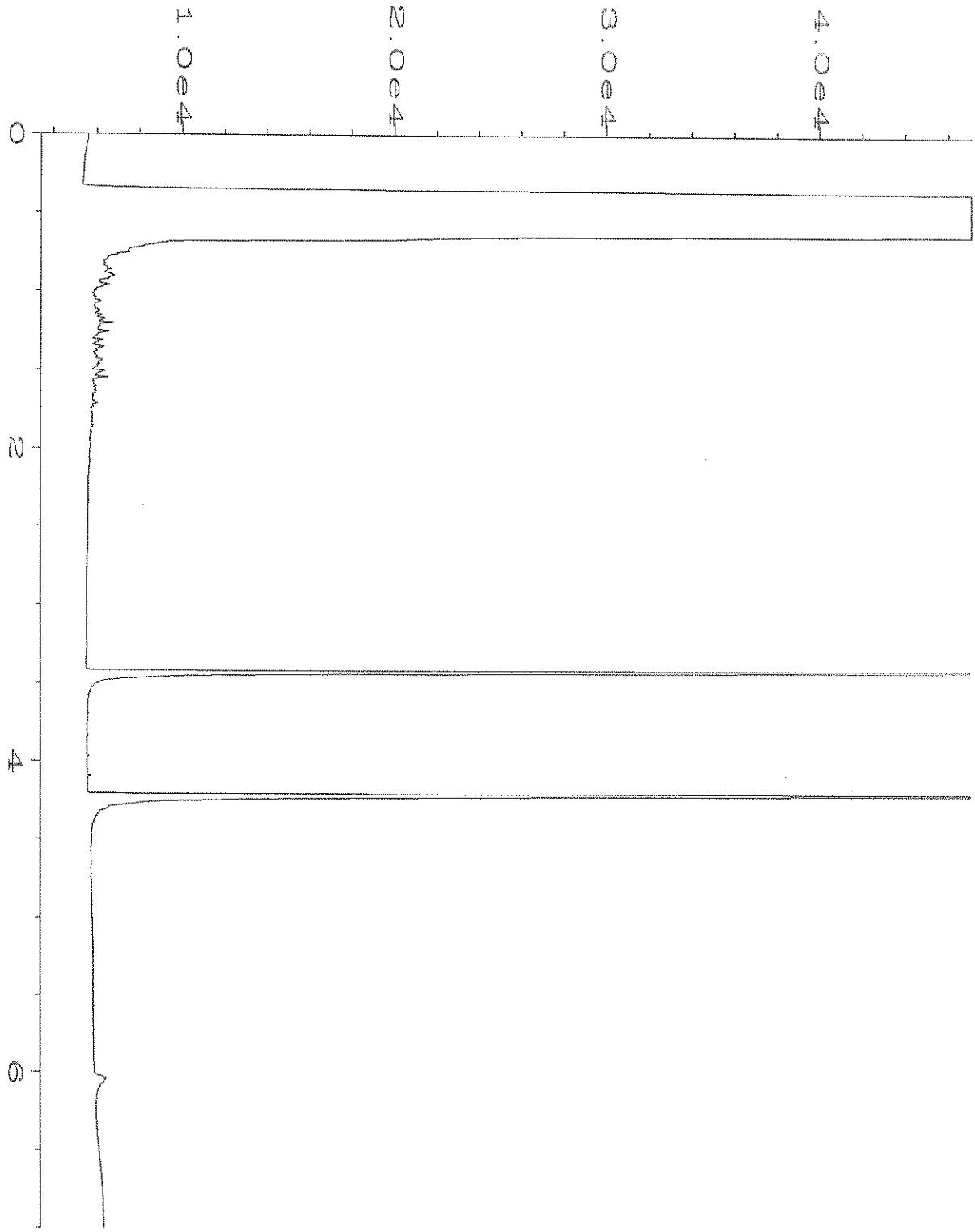
Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282



Data File Name	: C:\HPCHEM\6\DATA\11-19-21\013F0301.D		
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 13
Sample Name	: 111353-01	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 3
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Report Created on	: 22 Nov 21 09:49 AM	Analysis Method	: DEFAULT.MTH

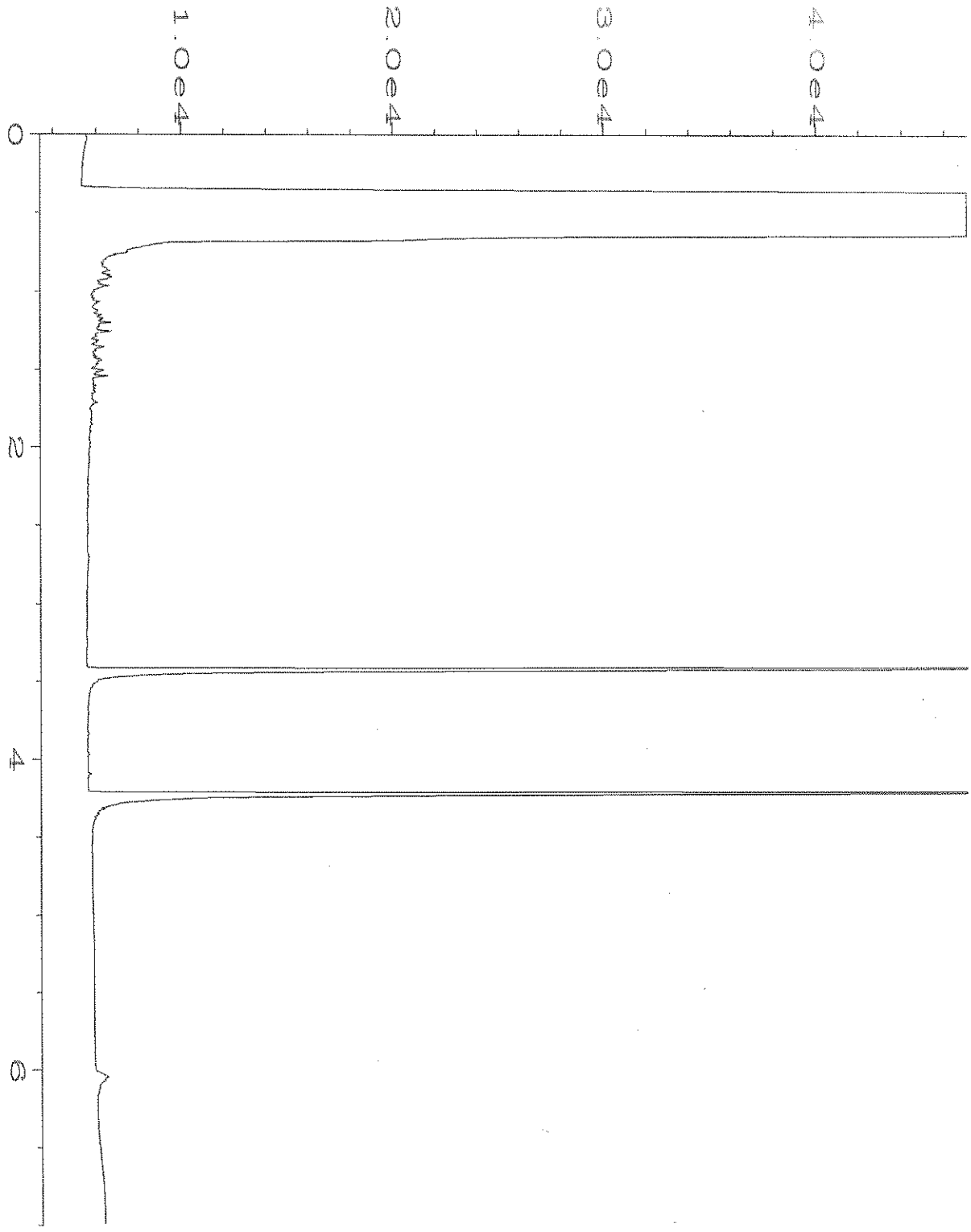


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Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 14
Sample Name	: 111353-03	Injection Number	: 1
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Report Created on	: 22 Nov 21 09:49 AM	Analysis Method	: DEFAULT.MTH



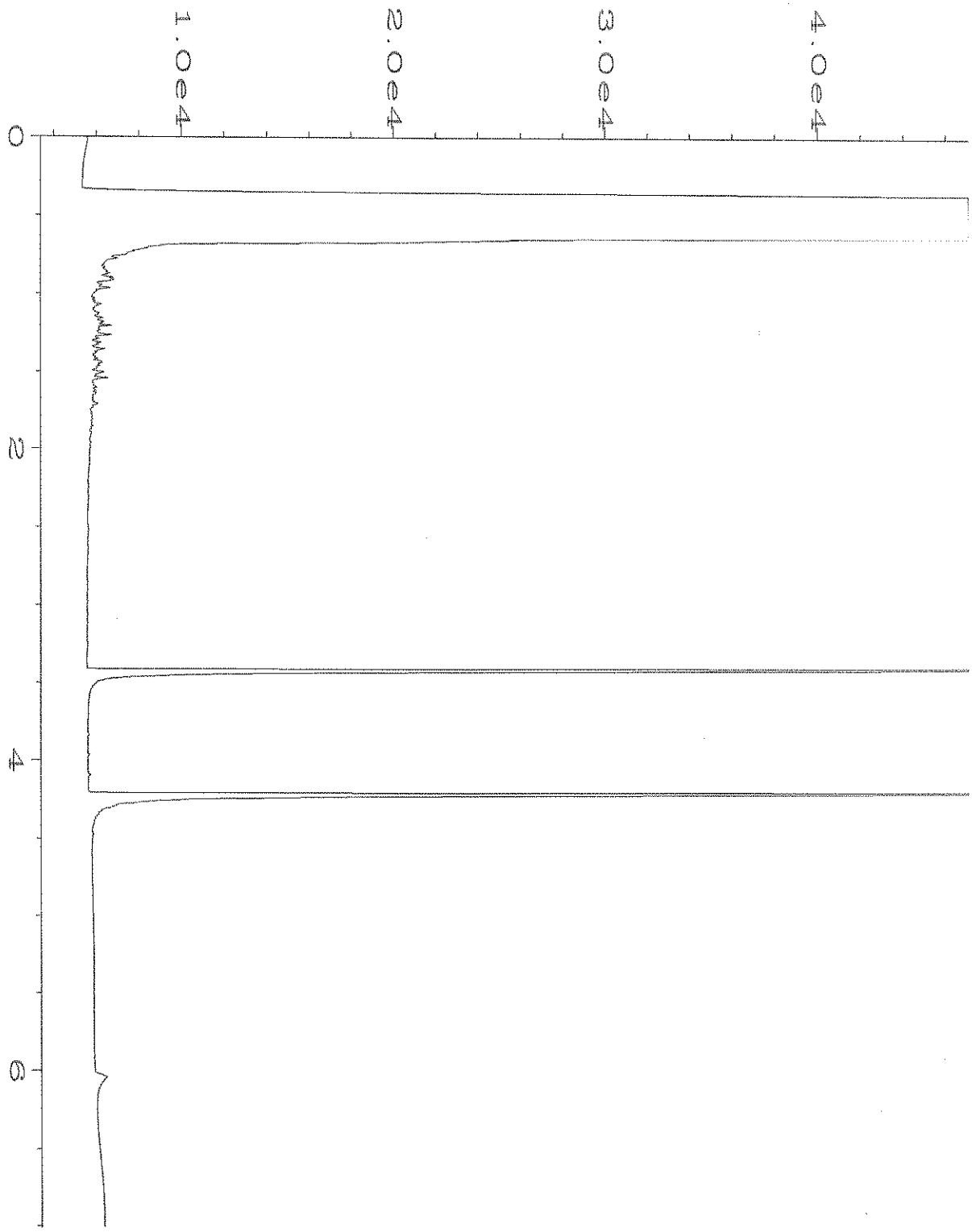
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Operator : TL
Instrument : GC6
Sample Name : 111353-06
Run Time Bar Code:
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Report Created on: 22 Nov 21 09:49 AM

Page Number : 1
Vial Number : 15
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

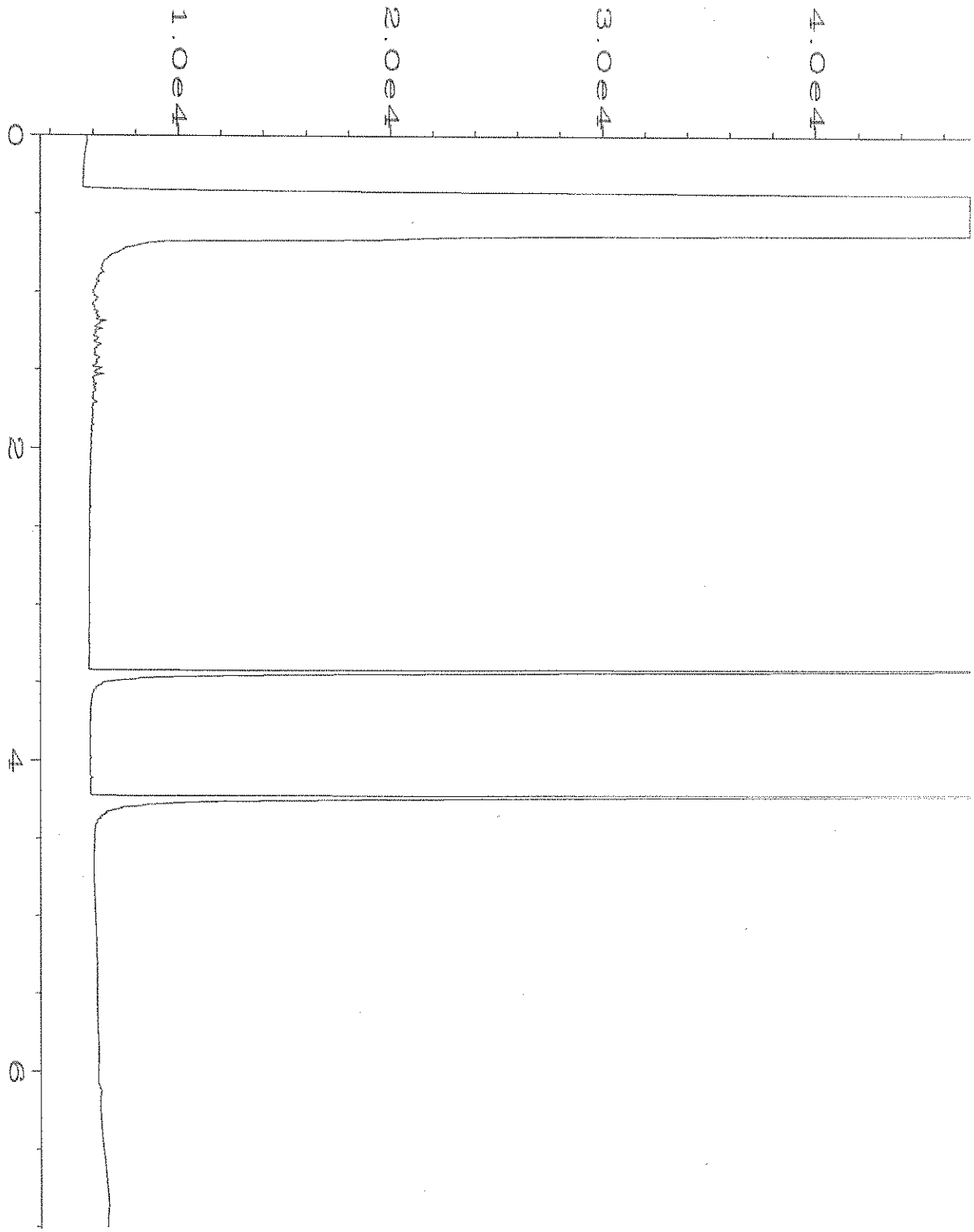


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Operator : TL
Instrument : GC6
Sample Name : 111353-08
Run Time Bar Code:
Acquired on : 19 Nov 21 09:57 AM
Report Created on: 22 Nov 21 09:49 AM

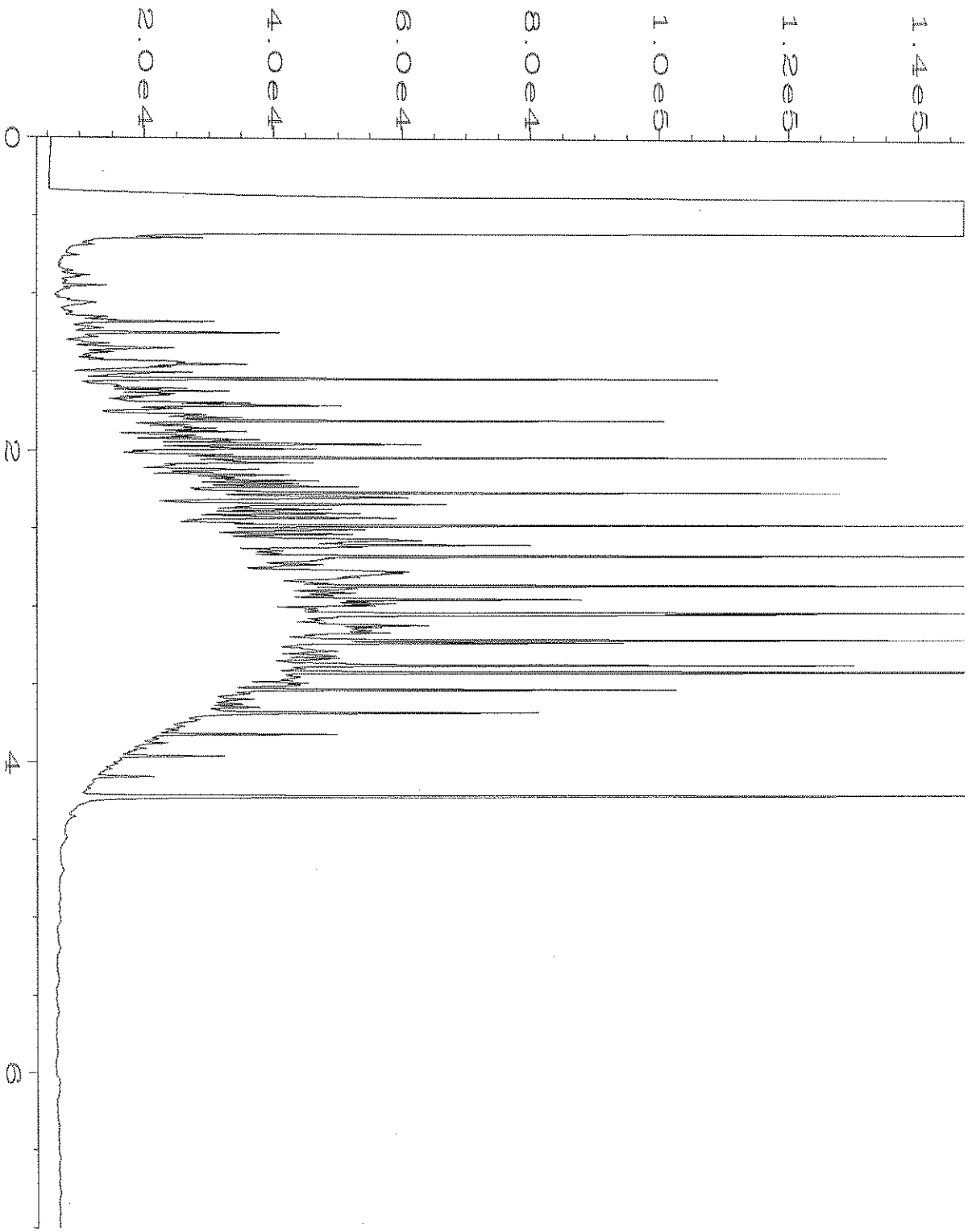
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Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name	: C:\HPCHEM\6\DATA\11-19-21\017F0301.D		
Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 17
Sample Name	: 111353-09	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 3
Acquired on	: 19 Nov 21 10:08 AM	Instrument Method	: DX.MTH
Report Created on	: 22 Nov 21 09:50 AM	Analysis Method	: DEFAULT.MTH



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Operator	: TL	Page Number	: 1
Instrument	: GC6	Vial Number	: 8
Sample Name	: 01-2705 mb	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 3
Acquired on	: 19 Nov 21 08:34 AM	Instrument Method	: DX.MTH
Report Created on:	22 Nov 21 09:50 AM	Analysis Method	: DEFAULT.MTH



Data File Name : C:\HPCHEM\6\DATA\11-19-21\003F1701.D
Operator : TL
Instrument : GC6
Sample Name : 500 Dx 64-13H
Run Time Bar Code:
Acquired on : 19 Nov 21 07:32 PM
Report Created on: 22 Nov 21 09:50 AM

Page Number : 1
Vial Number : 3
Injection Number : 1
Sequence Line : 17
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH