



April 16, 2019

Vista Work Order No. 1900545

Ms. Maya Murshak
Merit Laboratories, Inc.
2680 East Lansing Drive
East Lansing, MI 48823

Dear Ms. Murshak,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on March 27, 2019 under your Project Name 'MDEQ State Municipal Sampling'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director



Vista Analytical Laboratory certifies that the report herein meets all the requirements set forth by NELAP for those applicable test methods. Results relate only to the samples as received by the laboratory. This report should not be reproduced except in full without the written approval of Vista.

Vista Work Order No. 1900545**Case Narrative****Sample Condition on Receipt:**

One drinking water sample was received in good condition and within the method temperature requirements. The sample was received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

Analytical Notes:**EPA Method 537, Rev. 1.1**

The sample was extracted and analyzed for a selected list of 14 PFAS using EPA Method 537, Rev. 1.1. The results have been reported following the conventions specified by the Michigan Department of Environmental Quality.

Holding Times

The sample was extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Laboratory Fortified Blank (LFB) and a Laboratory Reagent Blank (LRB) were extracted and analyzed with the preparation batch. No analytes were detected in the Laboratory Reagent Blank. The LFB recoveries were within the method acceptance criteria.

The surrogate recoveries for all QC and field samples were within the acceptance criteria.

TABLE OF CONTENTS

Case Narrative.....	1
Table of Contents.....	3
Sample Inventory.....	4
Analytical Results.....	5
Qualifiers.....	9
Certifications.....	10
Sample Receipt.....	13

Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1900545-01	GWEF1903251430KER	25-Mar-19 14:30	27-Mar-19 09:12	HDPE Bottle, 250 mL HDPE Bottle, 250 mL

ANALYTICAL RESULTS

Sample ID: LRB	EPA Method 537
-----------------------	-----------------------

Client Data Name: Merit Laboratories, Inc. Project: MDEQ State Municipal Sampling	Laboratory Data Matrix: Aqueous Lab Sample: B9D0010-BLK1 Column: BEH C18
--	--

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	2		B9D0010	02-Apr-19	0.25 L	04-Apr-19 19:00	1
PFHxA	307-24-4	ND	2		B9D0010	02-Apr-19	0.25 L	04-Apr-19 19:00	1
PFHpA	375-85-9	ND	2		B9D0010	02-Apr-19	0.25 L	04-Apr-19 19:00	1
PFHxS	355-46-4	ND	2		B9D0010	02-Apr-19	0.25 L	04-Apr-19 19:00	1
PFOA	335-67-1	ND	2		B9D0010	02-Apr-19	0.25 L	04-Apr-19 19:00	1
PFNA	375-95-1	ND	2		B9D0010	02-Apr-19	0.25 L	04-Apr-19 19:00	1
PFOS	1763-23-1	ND	2		B9D0010	02-Apr-19	0.25 L	04-Apr-19 19:00	1
PFDA	335-76-2	ND	2		B9D0010	02-Apr-19	0.25 L	04-Apr-19 19:00	1
MeFOSAA	2355-31-9	ND	4		B9D0010	02-Apr-19	0.25 L	04-Apr-19 19:00	1
EtFOSAA	2991-50-6	ND	4		B9D0010	02-Apr-19	0.25 L	04-Apr-19 19:00	1
PfUnA	2058-94-8	ND	4		B9D0010	02-Apr-19	0.25 L	04-Apr-19 19:00	1
PFDaA	307-55-1	ND	4		B9D0010	02-Apr-19	0.25 L	04-Apr-19 19:00	1
PFTDA	72629-94-8	ND	4		B9D0010	02-Apr-19	0.25 L	04-Apr-19 19:00	1
PFTeDA	376-06-7	ND	4		B9D0010	02-Apr-19	0.25 L	04-Apr-19 19:00	1
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	105	70 - 130		B9D0010	02-Apr-19	0.25 L	04-Apr-19 19:00	1
13C2-PFDA	SURR	107	70 - 130		B9D0010	02-Apr-19	0.25 L	04-Apr-19 19:00	1
d5-EtFOSAA	SURR	105	70 - 130		B9D0010	02-Apr-19	0.25 L	04-Apr-19 19:00	1

RL - Reporting limit

Results reported to RL.
Reporting convention specified by MI DEQ.

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

Sample ID: LFB						EPA Method 537					
Client Data Name: Merit Laboratories, Inc. Project: MDEQ State Municipal Sampling						Laboratory Data Lab Sample: B9D0010-BS1 Column: BEH C18					
Analyte	CAS Number	Amt Found (ng/L)	Spike Amt	% Rec	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	15	18	83	50 - 150		B9D0010	02-Apr-19	0.25 L	04-Apr-19 18:10	1
PFHxA	307-24-4	16	20	80	50 - 150		B9D0010	02-Apr-19	0.25 L	04-Apr-19 18:10	1
PFHpA	375-85-9	17	20	84	50 - 150		B9D0010	02-Apr-19	0.25 L	04-Apr-19 18:10	1
PFHxS	355-46-4	17	18	92	50 - 150		B9D0010	02-Apr-19	0.25 L	04-Apr-19 18:10	1
PFOA	335-67-1	19	20	96	50 - 150		B9D0010	02-Apr-19	0.25 L	04-Apr-19 18:10	1
PFNA	375-95-1	23	20	117	50 - 150		B9D0010	02-Apr-19	0.25 L	04-Apr-19 18:10	1
PFOS	1763-23-1	20	19	109	50 - 150		B9D0010	02-Apr-19	0.25 L	04-Apr-19 18:10	1
PFDA	335-76-2	25	20	126	50 - 150		B9D0010	02-Apr-19	0.25 L	04-Apr-19 18:10	1
MeFOSAA	2355-31-9	21	20	103	50 - 150		B9D0010	02-Apr-19	0.25 L	04-Apr-19 18:10	1
EtFOSAA	2991-50-6	19	20	97	50 - 150		B9D0010	02-Apr-19	0.25 L	04-Apr-19 18:10	1
PFUnA	2058-94-8	23	20	115	50 - 150		B9D0010	02-Apr-19	0.25 L	04-Apr-19 18:10	1
PFDaA	307-55-1	18	20	91	50 - 150		B9D0010	02-Apr-19	0.25 L	04-Apr-19 18:10	1
PFTTrDA	72629-94-8	16	20	79	50 - 150		B9D0010	02-Apr-19	0.25 L	04-Apr-19 18:10	1
PFTeDA	376-06-7	13	20	66	50 - 150		B9D0010	02-Apr-19	0.25 L	04-Apr-19 18:10	1
Labeled Standards	Type		% Rec		Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR		79		70- 130		B9D0010	02-Apr-19	0.25 L	04-Apr-19 18:10	1
13C2-PFDA	SURR		129		70- 130		B9D0010	02-Apr-19	0.25 L	04-Apr-19 18:10	1
d5-EtFOSAA	SURR		98		70- 130		B9D0010	02-Apr-19	0.25 L	04-Apr-19 18:10	1

Data Reported per Michigan DEQ instructions.

Sample ID: GWEF1903251430KER					EPA Method 537					
Client Data Name: Merit Laboratories, Inc. Matrix: Drinking Water Project: MDEQ State Municipal Sampling Date Collected: 25-Mar-19 14:30 Location: OTSEGO05060TP003					Laboratory Data Lab Sample: 1900545-01 Column: BEH C18 Date Received: 27-Mar-19 09:12					
Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
PFBS	375-73-5	14	2		B9D0010	02-Apr-19	0.24 L	04-Apr-19 20:14	1	
PFHxA	307-24-4	4	2		B9D0010	02-Apr-19	0.24 L	04-Apr-19 20:14	1	
PFHpA	375-85-9	ND	2		B9D0010	02-Apr-19	0.24 L	04-Apr-19 20:14	1	
PFHxS	355-46-4	ND	2		B9D0010	02-Apr-19	0.24 L	04-Apr-19 20:14	1	
PFOA	335-67-1	3	2		B9D0010	02-Apr-19	0.24 L	04-Apr-19 20:14	1	
PFNA	375-95-1	ND	2		B9D0010	02-Apr-19	0.24 L	04-Apr-19 20:14	1	
PFOS	1763-23-1	ND	2		B9D0010	02-Apr-19	0.24 L	04-Apr-19 20:14	1	
PFDA	335-76-2	ND	2		B9D0010	02-Apr-19	0.24 L	04-Apr-19 20:14	1	
MeFOSAA	2355-31-9	ND	4		B9D0010	02-Apr-19	0.24 L	04-Apr-19 20:14	1	
EtFOSAA	2991-50-6	ND	4		B9D0010	02-Apr-19	0.24 L	04-Apr-19 20:14	1	
PFUnA	2058-94-8	ND	4		B9D0010	02-Apr-19	0.24 L	04-Apr-19 20:14	1	
PFDoA	307-55-1	ND	4		B9D0010	02-Apr-19	0.24 L	04-Apr-19 20:14	1	
PFTrDA	72629-94-8	ND	4		B9D0010	02-Apr-19	0.24 L	04-Apr-19 20:14	1	
PFTeDA	376-06-7	ND	4		B9D0010	02-Apr-19	0.24 L	04-Apr-19 20:14	1	
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution	
13C2-PFHxA	SURR	99	70 - 130		B9D0010	02-Apr-19	0.24 L	04-Apr-19 20:14	1	
13C2-PFDA	SURR	96	70 - 130		B9D0010	02-Apr-19	0.24 L	04-Apr-19 20:14	1	
d5-EtFOSAA	SURR	95	70 - 130		B9D0010	02-Apr-19	0.24 L	04-Apr-19 20:14	1	

RL - Reporting limit

Results reported to RL.

Reporting convention specified by MI DEQ..

When reported, PFHxS, PFOA, PFOS, MeFOSAA and EtFOSAA include both linear and branched isomers. Only the linear isomer is reported for all other analytes.

DATA QUALIFIERS & ABBREVIATIONS

B	This compound was also detected in the method blank
Conc.	Concentration
D	Dilution
DL	Detection limit
E	The associated compound concentration exceeded the calibration range of the instrument
H	Recovery and/or RPD was outside laboratory acceptance limits
I	Chemical Interference
J	The amount detected is below the Reporting Limit/LOQ
LOD	Limits of Detection
LOQ	Limits of Quantitation
M	Estimated Maximum Possible Concentration (CA Region 2 projects only)
NA	Not applicable
ND	Not Detected
P	The reported concentration may include contribution from chlorinated diphenyl ether(s).
Q	The ion transition ratio is outside of the acceptance criteria.
TEQ	Toxic Equivalency
U	Not Detected (specific projects only)
*	See Cover Letter

Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.

Vista Analytical Laboratory Certifications

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	19-013-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Michigan Department of Environmental Quality	9932
Minnesota Department of Health	1521520
New Hampshire Environmental Accreditation Program	207718
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-010
Pennsylvania Department of Environmental Protection	015
Texas Commission on Environmental Quality	T104704189-19-10
Virginia Department of General Services	9618
Washington Department of Ecology	C584-19
Wisconsin Department of Natural Resources	998036160

Current certificates and lists of licensed parameters are located in the Quality Assurance office and are available upon request.

NELAP Accredited Test Methods

MATRIX: Air	
Description of Test	Method
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA 23
Determination of Polychlorinated p-Dioxins & Polychlorinated Dibenzofurans	EPA TO-9A

MATRIX: Biological Tissue	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Drinking Water	
Description of Test	Method
2,3,7,8-Tetrachlorodibenzo- p-dioxin (2,3,7,8-TCDD) GC/HRMS	EPA 1613/1613B
1,4-Dioxane (1,4-Diethyleneoxide) analysis by GC/HRMS	EPA 522
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	ISO 25101 2009

MATRIX: Non-Potable Water	
Description of Test	Method
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Dioxin by GC/HRMS	EPA 613
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

MATRIX: Solids	
Description of Test	Method
Tetra-Octa Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613
Tetra- through Octa-Chlorinated Dioxins and Furans by Isotope Dilution GC/HRMS	EPA 1613B
Brominated Diphenyl Ethers by HRGC/HRMS	EPA 1614A
Chlorinated Biphenyl Congeners in Water, Soil, Sediment, and Tissue by GC/HRMS	EPA 1668A/C
Pesticides in Water, Soil, Sediment, Biosolids, and Tissue by HRGC/HRMS	EPA 1699
Perfluorinated Alkyl Acids in Drinking Water by SPE and LC/MS/MS	EPA 537
Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans by GC/HRMS	EPA 8280A/B
Polychlorinated Dibenzodioxins (PCDDs) and Polychlorinated Dibenzofurans (PCDFs) by GC/HRMS	EPA 8290/8290A

Sample Log-In Checklist

1900545

Page # 1 of 1

Vista Work Order #: TAT std

Samples Arrival:	Date/Time 03/27/19 0912	Initials: JP	Location: WR-2
			Shelf/Rack: N/A
Logged In:	Date/Time 03/28/19 1335	Initials: KE	Location: WR-2
			Shelf/Rack: A3/E5
Delivered By:	<input checked="" type="checkbox"/> FedEx	<input type="checkbox"/> UPS	<input type="checkbox"/> On Trac
	<input type="checkbox"/> GSO	<input type="checkbox"/> DHL	<input type="checkbox"/> Hand Delivered
Preservation:	<input checked="" type="checkbox"/> Ice	<input type="checkbox"/> Blue Ice	<input type="checkbox"/> Dry Ice
	<input type="checkbox"/> None		
Temp °C: 2.8 (uncorrected)	Probe used: Y / (N)		Thermometer ID: IR-4
Temp °C: 2.7 (corrected)			

	YES	NO	NA
Adequate Sample Volume Received?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Holding Time Acceptable?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Container(s) Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Shipping Custody Seals Intact?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Shipping Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Airbill <u>—</u> Trk # <u>4894 8695 8011</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample Container Intact?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sample Custody Seals Intact?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Chain of Custody / Sample Documentation Present?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
COC Anomaly/Sample Acceptance Form completed?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
If Chlorinated or Drinking Water Samples, Acceptable Preservation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Preservation Documented:	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
	<input type="checkbox"/> Na ₂ S ₂ O ₃	<input checked="" type="checkbox"/> Trizma	<input type="checkbox"/> None
	<input type="checkbox"/> Other		
Shipping Container	<input type="checkbox"/> Vista	<input checked="" type="checkbox"/> Client	<input type="checkbox"/> Retain
	<input type="checkbox"/> Return	<input type="checkbox"/> Dispose	

Comments: