

September 14, 2018

Vista Work Order No. 1802507

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 August 16, 2018 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. 1802507

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.

Two Laboratory Fortified Blanks (LFB/LFBD) 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/LFBD recoveries were within the method acceptance criteria.

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

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Sample Inventory Report

Vista Sample ID	Client Sample ID	Sampled	Received	Components/Containers
1802507-01	GWEF1808141630GSC	14-Aug-18 16:30	16-Aug-18 10:18	HDPE Bottle, 250 mL HDPE Bottle, 250 mL

ANALYTICAL RESULTS

Sample ID: LRB **EPA Method 537**

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Aqueous	Lab Sample:	B8H0145-BLK1	Column:	BEH C18
Project:	MDEQ State Municipal Sampling						

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	2		B8H0145	21-Aug-18	0.25 L	05-Sep-18 20:44	1
PFHxA	307-24-4	ND	2		B8H0145	21-Aug-18	0.25 L	05-Sep-18 20:44	1
PFHpA	375-85-9	ND	2		B8H0145	21-Aug-18	0.25 L	05-Sep-18 20:44	1
PFHxS	355-46-4	ND	2		B8H0145	21-Aug-18	0.25 L	05-Sep-18 20:44	1
PFOA	335-67-1	ND	2		B8H0145	21-Aug-18	0.25 L	05-Sep-18 20:44	1
PFNA	375-95-1	ND	2		B8H0145	21-Aug-18	0.25 L	05-Sep-18 20:44	1
PFOS	1763-23-1	ND	2		B8H0145	21-Aug-18	0.25 L	05-Sep-18 20:44	1
PFDA	335-76-2	ND	2		B8H0145	21-Aug-18	0.25 L	05-Sep-18 20:44	1
MeFOSAA	2355-31-9	ND	4		B8H0145	21-Aug-18	0.25 L	05-Sep-18 20:44	1
EtFOSAA	2991-50-6	ND	4		B8H0145	21-Aug-18	0.25 L	05-Sep-18 20:44	1
PFOA	2058-94-8	ND	4		B8H0145	21-Aug-18	0.25 L	05-Sep-18 20:44	1
PFDoA	307-55-1	ND	4		B8H0145	21-Aug-18	0.25 L	05-Sep-18 20:44	1
PFTeDA	72629-94-8	ND	4		B8H0145	21-Aug-18	0.25 L	05-Sep-18 20:44	1
PFTeDA	376-06-7	ND	4		B8H0145	21-Aug-18	0.25 L	05-Sep-18 20:44	1
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	111	70 - 130		B8H0145	21-Aug-18	0.25 L	05-Sep-18 20:44	1
13C2-PFDA	SURR	87	70 - 130		B8H0145	21-Aug-18	0.25 L	05-Sep-18 20:44	1
d5-EtFOSAA	SURR	93	70 - 130		B8H0145	21-Aug-18	0.25 L	05-Sep-18 20:44	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: LFBD

EPA Method 537

Name:	Merit Laboratories, Inc.	Lab Sample:	B8H0145-BS1/B8H0145-BSD1	Date Extracted:	21-Aug-18
Project:	MDEQ State Municipal Sampling	QC Batch:	B8H0145	Column:	BEH C18
Matrix:	Aqueous	Samp Size:	0.25/0.25 L		

Analyte	CAS Number	LFB (ng/L)	LFB Spike Amt	LFB % Rec	LFB Quals	LFBD (ng/L)	LFBD Spike Amt	LFBD % Rec	RPD	LFBD Quals	%Rec Limits	RPD Limits	LFB Analyzed	LFB Dil	LFBD Analyzed	LFBD Dil
PFBS	375-73-5	84	71	118		78	71	110	7		70-130		05-Sep-18 20:18	1	05-Sep-18 20:31	1
PFHxA	307-24-4	83	80	104		86	80	107	3		70-130		05-Sep-18 20:18	1	05-Sep-18 20:31	1
PFHpA	375-85-9	91	80	113		89	80	111	2		70-130		05-Sep-18 20:18	1	05-Sep-18 20:31	1
PFHxS	355-46-4	77	73	105		68	73	94	12		70-130		05-Sep-18 20:18	1	05-Sep-18 20:31	1
PFOA	335-67-1	79	80	99		77	80	96	3		70-130		05-Sep-18 20:18	1	05-Sep-18 20:31	1
PFNA	375-95-1	66	80	83		70	80	88	6		70-130		05-Sep-18 20:18	1	05-Sep-18 20:31	1
PFOS	1763-23-1	81	74	109		79	74	106	2		70-130		05-Sep-18 20:18	1	05-Sep-18 20:31	1
PFDA	335-76-2	69	80	86		72	80	90	5		70-130		05-Sep-18 20:18	1	05-Sep-18 20:31	1
MeFOSAA	2355-31-9	82	80	102		83	80	104	2		70-130		05-Sep-18 20:18	1	05-Sep-18 20:31	1
EtFOSAA	2991-50-6	73	80	91		73	80	91	0		70-130		05-Sep-18 20:18	1	05-Sep-18 20:31	1
PFUnA	2058-94-8	70	80	87		67	80	84	4		70-130		05-Sep-18 20:18	1	05-Sep-18 20:31	1
PFDaA	307-55-1	73	80	91		68	80	85	7		70-130		05-Sep-18 20:18	1	05-Sep-18 20:31	1
PFTrDA	72629-94-8	64	80	81		64	80	81	0		70-130		05-Sep-18 20:18	1	05-Sep-18 20:31	1
PFTeDA	376-06-7	58	80	73		59	80	74	1		70-130		05-Sep-18 20:18	1	05-Sep-18 20:31	1
Labeled Standards	Type			LFB % Rec	LFB Quals			LFBD % Rec		LFBD Quals	Limits		LFB Analyzed	LFB Dil	LFBD Analyzed	LFBD Dil
13C2-PFHxA	SURR			108				105			70-130		05-Sep-18 20:18	1	05-Sep-18 20:31	1
13C2-PFDA	SURR			95				97			70-130		05-Sep-18 20:18	1	05-Sep-18 20:31	1
d5-EtFOSAA	SURR			86				89			70-130		05-Sep-18 20:18	1	05-Sep-18 20:31	1

Data Reported per Michigan DEQ instructions.

Sample ID: GWEF1808141630GSC

EPA Method 537

Client Data				Laboratory Data			
Name:	Merit Laboratories, Inc.	Matrix:	Drinking Water	Lab Sample:	1802507-01	Column:	BEH C18
Project:	MDEQ State Municipal Sampling	Date Collected:	14-Aug-18 16:30	Date Received:	16-Aug-18 10:18		
Location:	REPUBLIC05660TP008						

Analyte	CAS Number	Conc. (ng/L)	RL	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
PFBS	375-73-5	ND	2		B8H0145	21-Aug-18	0.25 L	06-Sep-18 00:12	1
PFHxA	307-24-4	ND	2		B8H0145	21-Aug-18	0.25 L	06-Sep-18 00:12	1
PFHpA	375-85-9	ND	2		B8H0145	21-Aug-18	0.25 L	06-Sep-18 00:12	1
PFHxS	355-46-4	ND	2		B8H0145	21-Aug-18	0.25 L	06-Sep-18 00:12	1
PFOA	335-67-1	ND	2		B8H0145	21-Aug-18	0.25 L	06-Sep-18 00:12	1
PFNA	375-95-1	ND	2		B8H0145	21-Aug-18	0.25 L	06-Sep-18 00:12	1
PFOS	1763-23-1	ND	2		B8H0145	21-Aug-18	0.25 L	06-Sep-18 00:12	1
PFDA	335-76-2	ND	2		B8H0145	21-Aug-18	0.25 L	06-Sep-18 00:12	1
MeFOSAA	2355-31-9	ND	4		B8H0145	21-Aug-18	0.25 L	06-Sep-18 00:12	1
EtFOSAA	2991-50-6	ND	4		B8H0145	21-Aug-18	0.25 L	06-Sep-18 00:12	1
PFUnA	2058-94-8	ND	4		B8H0145	21-Aug-18	0.25 L	06-Sep-18 00:12	1
PFDaA	307-55-1	ND	4		B8H0145	21-Aug-18	0.25 L	06-Sep-18 00:12	1
PFTrDA	72629-94-8	ND	4		B8H0145	21-Aug-18	0.25 L	06-Sep-18 00:12	1
PFTeDA	376-06-7	ND	4		B8H0145	21-Aug-18	0.25 L	06-Sep-18 00:12	1
Labeled Standards	Type	% Recovery	Limits	Qualifiers	Batch	Extracted	Samp Size	Analyzed	Dilution
13C2-PFHxA	SURR	102	70 - 130		B8H0145	21-Aug-18	0.25 L	06-Sep-18 00:12	1
13C2-PFDA	SURR	83	70 - 130		B8H0145	21-Aug-18	0.25 L	06-Sep-18 00:12	1
d5-EtFOSAA	SURR	90	70 - 130		B8H0145	21-Aug-18	0.25 L	06-Sep-18 00:12	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
Q	Ion ratio outside of 70-130% of Standard Ratio. (DOD PFAS projects only)
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.

CERTIFICATIONS

Accrediting Authority	Certificate Number
Alaska Department of Environmental Conservation	17-013
Arkansas Department of Environmental Quality	18-008-0
California Department of Health – ELAP	2892
DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005	3091.01
Florida Department of Health	E87777-18
Hawaii Department of Health	N/A
Louisiana Department of Environmental Quality	01977
Maine Department of Health	2018017
Minnesota Department of Health	1322288
New Hampshire Environmental Accreditation Program	207717
New Jersey Department of Environmental Protection	CA003
New York Department of Health	11411
Oregon Laboratory Accreditation Program	4042-009
Pennsylvania Department of Environmental Protection	014
Texas Commission on Environmental Quality	T104704189-18-8
Virginia Department of General Services	9077
Washington Department of Ecology	C584
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.



CHAIN OF CUSTODY

For Laboratory Use Only
 Work Order #: 1802507 Temp: 2.2 °C
 Storage ID: WR 2 Storage Secured: Yes No

Project ID: MDEQ STATE MUNICIPAL SAMPLING PO#: 60570309 Sampler: GARTH COUSINEAU
 (name)

TAT Standard: 21 days
 (check one): Rush (surcharge may apply)
 14 days 7 days Specify: _____

Invoice to: Name MIKE JURY Company MDEQ Address 401 KETCHUM ST, SUITE B City BAY CITY State MI Ph# 989-894-6255 Fax# 989-891-9237

Relinquished by (printed name and signature) Garth Cousineau Date 8/15/18 Time 1400 Received by (printed name and signature) B. Benedict Beth Bogdan Date 08/16/18 Time 1052

SHIP TO: Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 Ph: (916) 673-1520; Fax: (916) 673-0106				Method of Shipment:		Add Analysis(es) Requested										Comments	
ATTN: <u>Jennifer Miller</u>				Tracking No.:		Container(s)											
Sample ID	Date	Time	Location/Sample Description	Quantity	Type	Matrix	List of 21	List of 21 w/Isomers	List of 24	List of 24 w/Isomers	List of 28	Other: Please List Below	PFAS Isotope Dilution	USEPA Method 537			
<u>GWEF1808141630GSC</u>	<u>8/14/18</u>	<u>1630</u>	<u>REPUBLIC05660TP008</u>	<u>2</u>	<u>P</u>	<u>DW</u>								<input checked="" type="checkbox"/>			

Special Instructions/Comments: Send Results and Acknowledgements to the list provided by e-mail to Vista.

SEND DOCUMENTATION AND RESULTS TO:

Name: MIKE JURY
 Company: MDEQ
 Address: 401 KETCHUM ST, SUITE B
 City: BAY CITY State: MI Zip: 48708
 Phone: 989-894-6255 Fax: 989-891-9237
 Email: dorin.bogdan@aecom.com

Container Types: P= HDPE, PJ= HDPE Jar Bottle Preservation Type: T = Thiosulfate, TZ = Trizma
 Matrix Types: AQ = Aqueous, DW = Drinking Water, EF = Effluent, PP = Pulp/Paper, SD = Sediment, SL = Sludge, SO = Soil, WW = Wastewater, B = Blood/Serum, O = Other:

Sample Log-in Checklist

 Vista Work Order #: 1802507 TAT std

Samples Arrival:	Date/Time: 08/16/18 1018	Initials: RBB	Location: WR-2
			Shelf/Rack: NA
Logged In:	Date/Time: 08/17/18 0804	Initials: KE	Location: WR-2
			Shelf/Rack: A3/EB
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	<input type="checkbox"/> Other
Preservation:	<input checked="" type="checkbox"/> Ice	<input type="checkbox"/> Blue Ice	<input type="checkbox"/> Dry Ice
	<input type="checkbox"/> None		
Temp °C: 2.3 (uncorrected)	Time: 1051	Thermometer ID: IR-4	
Temp °C: 2.2 (corrected)	Probe used: Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		

		YES	NO	NA
Adequate Sample Volume Received?		KE		
Holding Time Acceptable?		KE		
Shipping Container(s) Intact?		RBB		
Shipping Custody Seals Intact?				RBB
Shipping Documentation Present?		RBB		
Airbill	Trk # 4377 0528 4795	RBB		
Sample Container Intact?		KE		
Sample Custody Seals Intact?				KE
Chain of Custody / Sample Documentation Present?		RBB		
COC Anomaly/Sample Acceptance Form completed?			KE	KE
If Chlorinated or Drinking Water Samples, Acceptable Preservation?		KE		
Preservation Documented:	Na ₂ S ₂ O ₃ <input checked="" type="checkbox"/> Trizma <input type="checkbox"/> None	<input checked="" type="checkbox"/> Yes	<input type="checkbox"/> No	<input type="checkbox"/> NA
Shipping Container	Vista <input checked="" type="checkbox"/> Client <input type="checkbox"/> Retain	<input checked="" type="checkbox"/> Return	<input type="checkbox"/> Dispose	

Comments: