eurofins | Environment Testing America

PFAS: DECIPHERING A LABORATORY REPORT

Taryn McKnight,
PFAS Practice Leader
Eurofins Environment Testing America

The What, Where, How, & Why of PFAS

What are PFAS?

Carbon fluorine bonds
Persistent and resistant to degradation

What

How

How are we exposed to PFAS?

Industry discharges
Waste infrastructure
Consumer product usage

Where do PFAS come from?

Primary and Secondary Manufacturing
Industrial chemicals/products
Consumer products

Where

Why

Why is this a concern?

Ubiquitous
Long half lives
Negative health outcomes

eurofins | Environment Testing America

PFAS Lab Data

Presentation Topics / Outline

eurofins | Environment Testing America

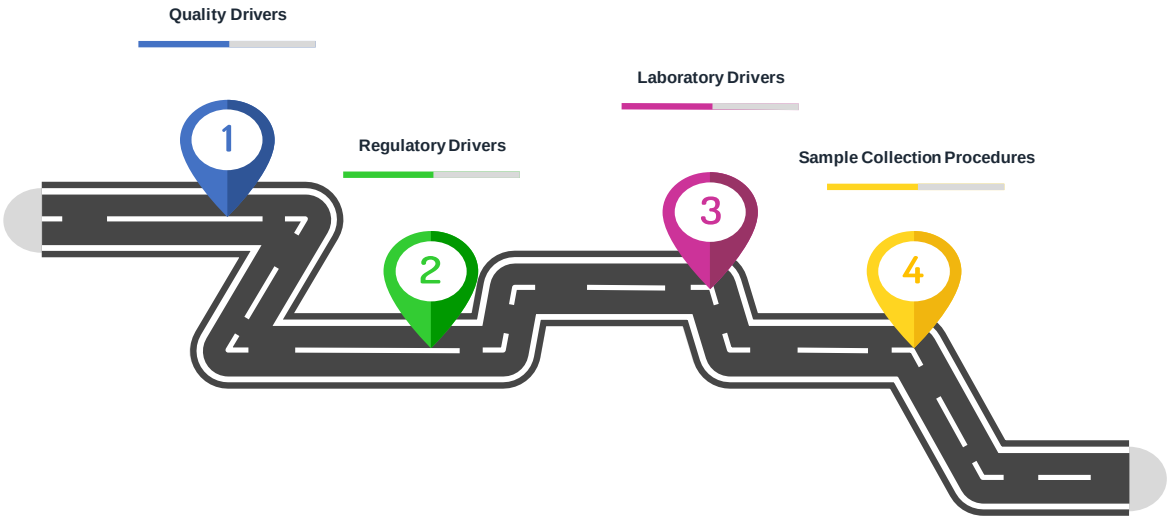
01

PRE-PROJECT PLANNING

Quality Drivers
Regulatory Drivers
Laboratory Drivers
Sample Collection Procedures

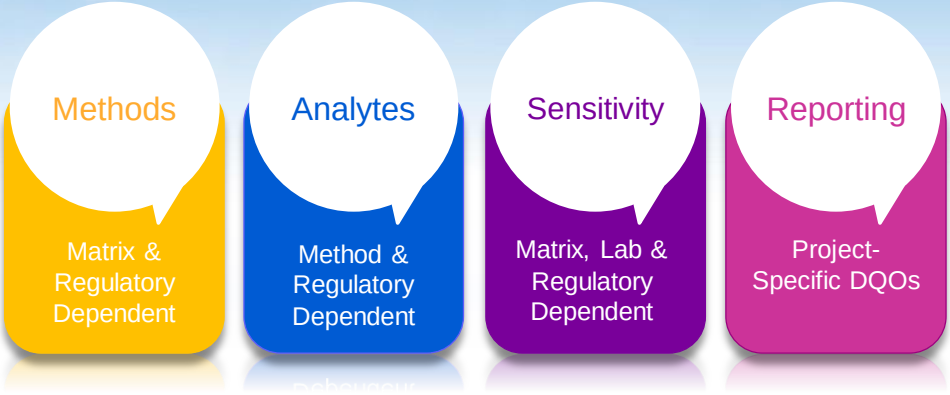
eurofins | Environment Testing America

Roadmap



5

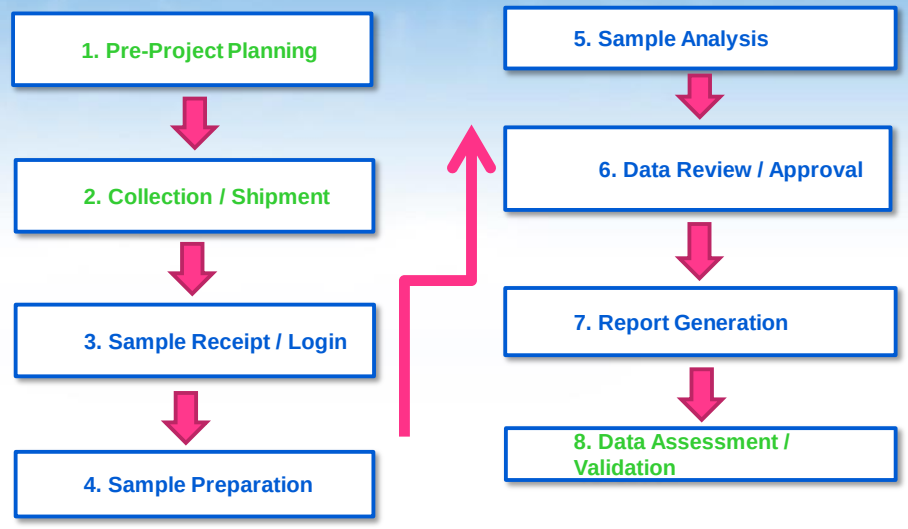
Laboratory Drivers



eurofins | Environment Testing America

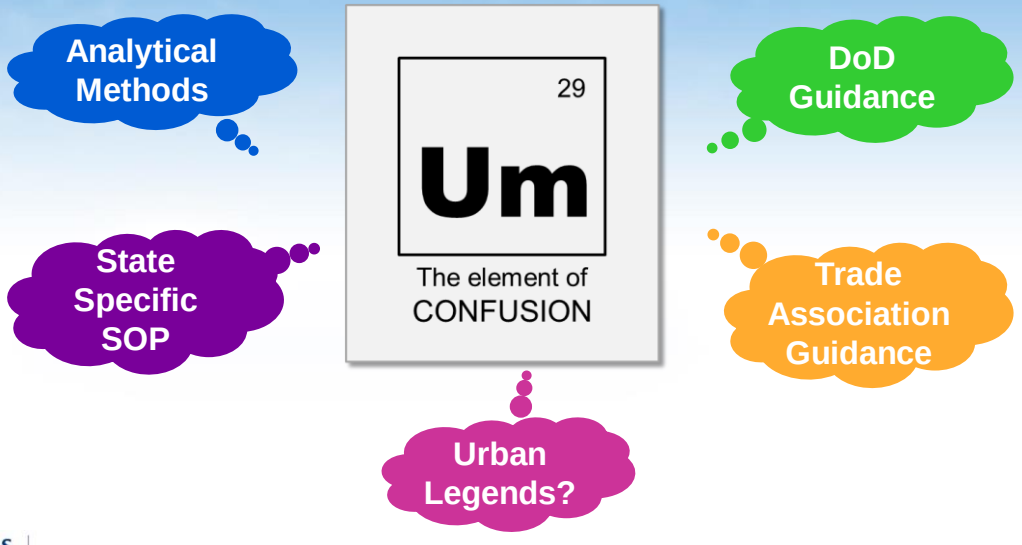
6

Your Data From A to Z



eurofins | Environment Testing America

Sampling Protocols



eurofins | Environment Testing America

Sampling Considerations Managing Artifacts

Field Crew:
personal care, clothing, food, visitors, notebooks, tarps

Sampling Equipment:
Has it been verified to be PFAS free?

Sample Collection:
wash hands, wear gloves, don't filter, include field QC

eurofins | Environment Testing America

Recommended Field QC

EB
Equipment Blank
Measures contribution from equipment

FRB
Field Reagent Blank
Measures contribution from environment/ personnel

FD
Field Duplicate
Measures precision in the field & lab

MS/D
Matrix Spike/ Duplicate
Measures matrix impacts

Field Measurement Tools

Analytical Measurement Tools

eurofins | Environment Testing America

01a KEY LABORATORY CONCEPTS

Holding Times
Reporting Limit (RL)
Method Detection Limit (MDL)
Analytical Batching
Accuracy & Precision

Holding Times

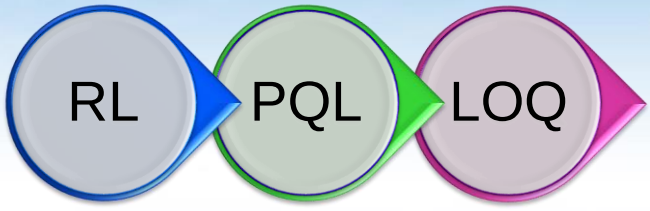
> "The maximum time that samples may be held prior to analyses and still be considered valid or not compromised"

WI Criteria: 28 / 30 days

537.1 & QSM	533	EPA Draft 8327	User-defined 537M
Extract: 14 days Analyze: 28 days	Extract: 28 days Analyze: 28 days	Extract: 28 days Analyze: 28 days	Extract: 14 days Analyze: 40 days

https://www.serdp-estcp.org/Program-Areas/Environmental-Restoration/Contaminated-Groundwater/Monitoring/ER19-1205

Reporting Limit (RL)



Reporting Limit

Practical Quantitation Limit

Limit of Quantitation

eurofins | Environment Testing America

> "The minimum, concentration, or quantity of a target analyte that can be reported with a specified degree of confidence."

Method Detection Limit (MDL)

RL

Estimated range

MDL

eurofins | Environment Testing America

> "The minimum measured quantity of a substance that can be reported with 99% confidence that the concentration is distinguishable from method blank results."

Analytical Batching

> Batch: Up to 20 environmental samples (and associated QC) of same matrix type prepared or analyzed together using the same procedures, personnel, and reagents.

eurofins | Environment Testing America

Accuracy

Agreement between observed value and known concentration

How close the darts are to the bulls-eye

Precision

How reproducible is the result?

How close the darts are to each other

QC SAMPLES & CRITERIA

02

Method Blank
Laboratory Control Spike (LCS)
Matrix Spike (MS)
Surrogates
Duplicates
Extracted Internal Standards (EIS)

Quality Control Samples

> Samples used to assess the performance of the analytical measurement system

- Taken through same procedures as field samples
- Processed with each batch to monitor the preparation and analytical process

eurofins | Environment Testing America

Copyright © 2021, Eurofins Environment Testing America . All rights reserved.

Method Blank

Show the preparation and/or analytical process is free from contamination (control for false positives)

Purpose

Consists of a blank matrix (reagent water, blank soil) taken through all of the preparation and analytical steps

Comp-osition

No target analytes present greater than laboratory reporting limit (RL)

Evaluation

eurofins | Environment Testing America

Laboratory Control Sample (LCS)

Purpose

To evaluate the effectiveness of the analytical process. Demonstrates laboratory can recover analytes in clean matrix. Serves as an indicator of laboratory accuracy and precision.

Comp-osition

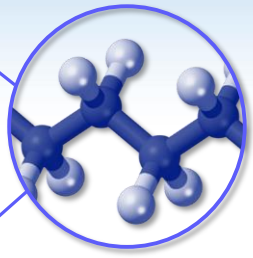
Prepared by adding a known concentration of target analytes to a known volume or weight of a blank matrix.

eurofins | Environment Testing America

Matrix Spike (MS) & Duplicate (MSD)

To evaluate the effectiveness of analytical process in actual client samples. Demonstrates how sample matrix affects recovery of the target analytes and serves as an indicator of laboratory precision

Purpose



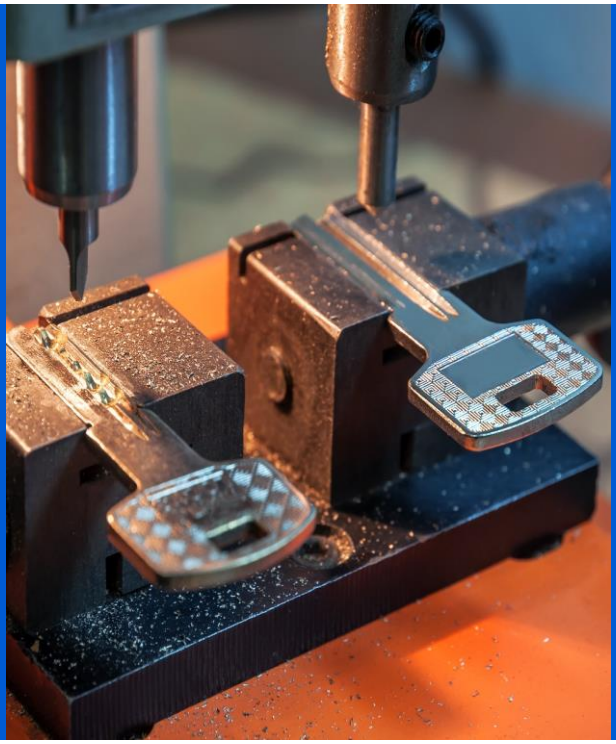
Prepared by adding a known concentration of target analytes to a known volume or weight of field sample

Composition

eurofins | Environment Testing America

Sample Duplicate

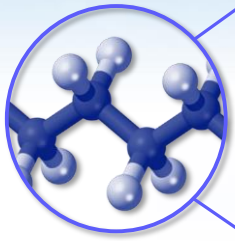
The analyses of two laboratory selected subsamples of the same sample to measure the method precision and sample homogeneity



Field Duplicate

The analyses of two field selected subsamples of the same sample to measure field precision and sample homogeneity

Surrogates



Definition

Organic compounds that are similar in chemical composition and behavior to the chemicals of concern in the sample

- These compounds are highly unlikely to naturally occur in environmental samples
- Known amount is spiked in the sample prior to preparation or analysis

Purpose

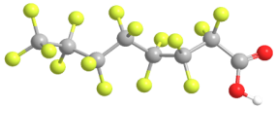
- Checks sample prep (spills, over/under concentrated)
- Checks analysis (dilution/injection error, instrument problems)
- Assists in measuring matrix interferences

eurofins | Environment Testing America

Isotope Dilution – Extracted Internal Standards (EIS)

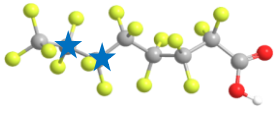
> "Whatever effects the native analyte in the sample, will equally effect the isotope"

The Parr Family = Native PFOS



\+ ∞ =

The Incredible Family = Labeled PFOS



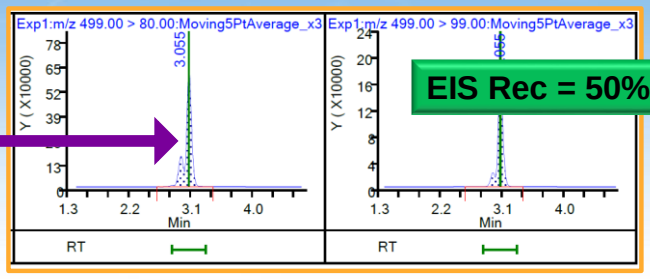
\+ ★ =

★ = ^{13}C

eurofins | Environment Testing America

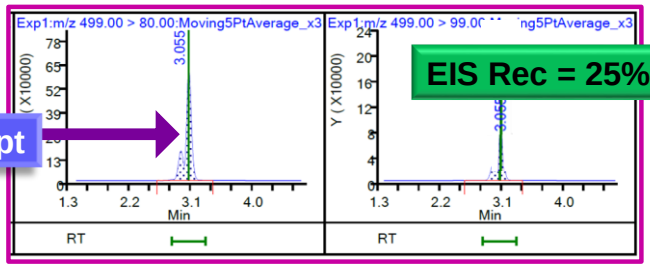
EIS response must be > 10:1 S/N

Native = 100 ppt



EIS Rec = 50%

Native = 100 ppt



EIS Rec = 25%

Sample Dilutions

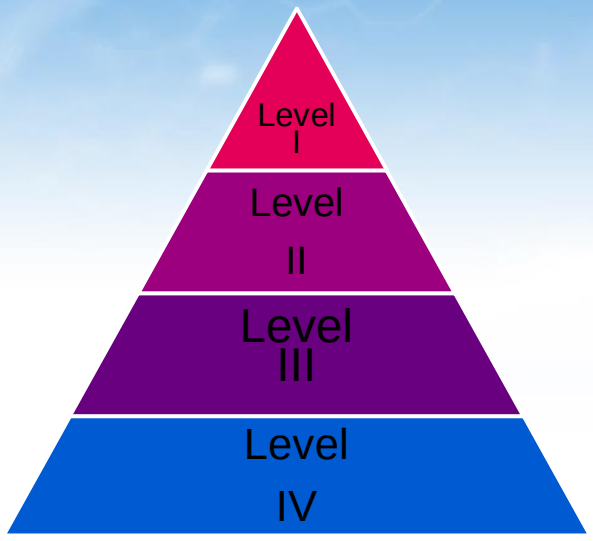
"Performed when the concentration of an analyte exceeds the upper limit of the calibration range of an instrument. Diluting a sample in the laboratory reduces the concentration of the sample, allowing it to be analyzed and quantified."

LABORATORY REPORT

data report 03

Deliverables
Case Narrative
Data Qualifiers
Sample and Method Summary
QC Results

Deliverables Hierarchy



Level I
- Consists of narrative, sample results, and qualifiers, and chain-of-custody.

Level II:
- Consists of Level I, plus batch QC results.

Level III
- Consists of Level II plus summary forms for batch and instrument QC.

Level IV
- Consists of Level III plus raw data. Can also include reagent traceability, bench sheets, etc.

Case Narrative

> Details any deficiencies, anomalies, or observations encountered during receipt, preparation, or analysis of the samples.

- Sample condition upon receipt
- Chain of Custody (CoC) discrepancies
- Sample preparation issues
- Unusual sample analysis issues

eurofins | Environment Testing America

Case Narrative

Client: TestAmerica Laboratories, Inc
Project/Site: TestAmerica

TestAmerica Job ID: 240-50351-1

Job ID: 240-50351-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: TestAmerica Laboratories, Inc

Project: TestAmerica

Report Number: 240-50351-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

The 903.0 Total Alpha Radium and 904.0 Radium-228 analyses were performed at the TestAmerica St. Louis Laboratory.

TestAmerica Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT
The samples were received on 5/7/2015 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 2.0° C.

TOTAL RECOVERABLE METALS (ICPMS)
Samples MW01 (240-50351-1), MW02 (240-50351-2), MW03 (240-50351-3), MW04 (240-50351-4) and FB (240-50351-5) were analyzed for total recoverable metals (ICPMS) in accordance with EPA Method 200.8. The samples were prepared on 05/13/2015 and 05/27/2015 and analyzed on 05/22/2015, 05/26/2015 and 05/28/2015.

Arsenic and Chromium were detected in method blank MB 240-180583/1-A at levels that were above the method detection limit but below the reporting limit. The values should be considered estimates, and have been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: TestAmerica Laboratories, Inc
Project/Site: TestAmerica

TestAmerica Job ID: 240-50351-1

Qualifiers

Metals

Qualifier	Qualifier Description
U	Indicates analyzed for but not detected.
B	Compound was found in the blank and sample.
J	Sample result is greater than the MDL but below the CRDL
N	Spiked sample recovery is not within control limits.

General Chemistry

Qualifier	Qualifier Description
HF	Field parameter with a holding time of 15 minutes. Test performed by laboratory at client's request.
N	Spiked sample recovery is not within control limits.
U	Indicates analyzed for but not detected.

Rad

Qualifier	Qualifier Description
*	LCS or LCSD is outside acceptance limits.
U	Result is less than the sample detection limit.

Glossary

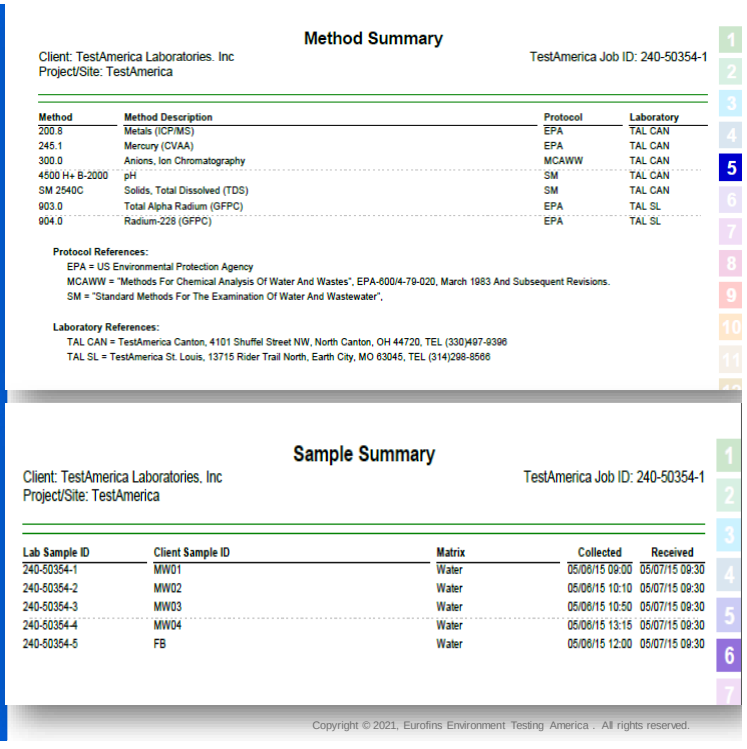
Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Data Qualifiers

> Qualifiers are appended to sample results and defined within the **definitions/glossary** section of the report.

Sample & Method Summary

The sample and method summary pages provide an overview of the samples received by the laboratory, the sample collection and receipt dates, and the requested analyses.



Method Summary

Client: TestAmerica Laboratories, Inc
Project/Site: TestAmerica

TestAmerica Job ID: 240-50354-1

Method	Method Description	Protocol	Laboratory
200.8	Metals (ICP/MS)	EPA	TAL CAN
245.1	Mercury (CVAA)	EPA	TAL CAN
300.0	Anions, Ion Chromatography	MCAWW	TAL CAN
4500 H+ B-2000	pH	SM	TAL CAN
SM 2540C	Solids, Total Dissolved (TDS)	SM	TAL CAN
903.0	Total Alpha Radium (GFPC)	EPA	TAL SL
904.0	Radium-228 (GFPC)	EPA	TAL SL

Protocol References:

EPA = US Environmental Protection Agency
MCAWW = "Methods For Chemical Analysis Of Water And Wastes", EPA-600/4-79-020, March 1983 And Subsequent Revisions.
SM = "Standard Methods For The Examination Of Water And Wastewater",

Laboratory References:

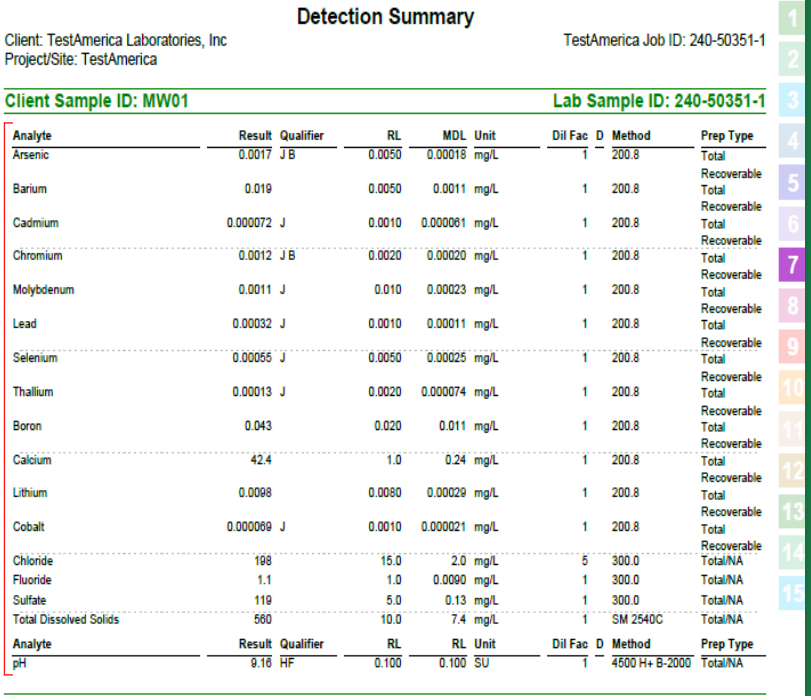
TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396
TAL SL = TestAmerica St. Louis, 13715 Rider Trail North, Earth City, MO 63045, TEL (314)298-8566

Sample Summary

Client: TestAmerica Laboratories, Inc
Project/Site: TestAmerica

TestAmerica Job ID: 240-50354-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-50354-1	MW01	Water	05/06/15 09:00	05/07/15 09:30
240-50354-2	MW02	Water	05/06/15 10:10	05/07/15 09:30
240-50354-3	MW03	Water	05/06/15 10:50	05/07/15 09:30
240-50354-4	MW04	Water	05/06/15 13:15	05/07/15 09:30
240-50354-5	FB	Water	05/06/15 12:00	05/07/15 09:30



Detection Summary

Client: TestAmerica Laboratories, Inc
Project/Site: TestAmerica

TestAmerica Job ID: 240-50351-1

Client Sample ID: MW01 — **Lab Sample ID: 240-50351-1**

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Arsenic	0.0017	J B	0.0050	0.00018	mg/L	1		200.8	Total Recoverable
Barium	0.019		0.0050	0.0011	mg/L	1		200.8	Total Recoverable
Cadmium	0.000072	J	0.0010	0.000061	mg/L	1		200.8	Total Recoverable
Chromium	0.0012	J B	0.0020	0.00020	mg/L	1		200.8	Total Recoverable
Molybdenum	0.0011	J	0.010	0.00023	mg/L	1		200.8	Total Recoverable
Lead	0.00032	J	0.0010	0.00011	mg/L	1		200.8	Total Recoverable
Selenium	0.00055	J	0.0050	0.00025	mg/L	1		200.8	Total Recoverable
Thallium	0.00013	J	0.0020	0.000074	mg/L	1		200.8	Total Recoverable
Boron	0.043		0.020	0.011	mg/L	1		200.8	Total Recoverable
Calcium	42.4		1.0	0.24	mg/L	1		200.8	Total Recoverable
Lithium	0.0098		0.0080	0.00029	mg/L	1		200.8	Total Recoverable
Cobalt	0.000069	J	0.0010	0.000021	mg/L	1		200.8	Total Recoverable
Chloride	198		15.0	2.0	mg/L	5		300.0	Total/NA
Fluoride	1.1		1.0	0.0090	mg/L	1		300.0	Total/NA
Sulfate	119		5.0	0.13	mg/L	1		300.0	Total/NA
Total Dissolved Solids	560		10.0	7.4	mg/L	1		SM 2540C	Total/NA
Analyte	**Result**	**Qualifier**	**RL**	**RL**	**Unit**	**Dil Fac**	**D**	**Method**	**Prep Type**
pH	9.16	HF	0.100	0.100	SU	1		4500 H+ B-2000	Total/NA

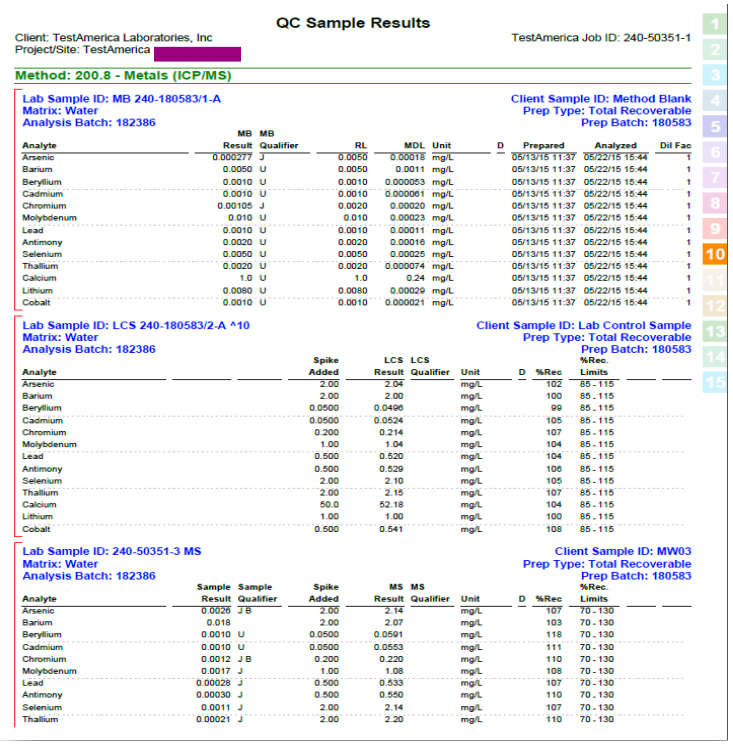
Detection Summary

The Detection Summary includes all analytes detected above the MDL or RL, dependent on project setup

QC Sample Results

QC results provide insights into the precision and accuracy of your data.

Sample results can be evaluated for batch-specific (via LCS/LCSD) or matrix effects (via the MS/MSD).



QC Sample Results

Client: TestAmerica Laboratories, Inc
Project/Site: TestAmerica [redacted]

TestAmerica Job ID: 240-50351-1

Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 240-180583/1-A
Matrix: Water
Analysis Batch: 182386

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 180583

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.000277	J	0.0050	0.00018	mg/L		05/13/15 11:37	05/22/15 15:44	1
Barium	0.0050	U	0.0050	0.0011	mg/L		05/13/15 11:37	05/22/15 15:44	1
Beryllium	0.0010	U	0.0010	0.000053	mg/L		05/13/15 11:37	05/22/15 15:44	1
Cadmium	0.0010	U	0.0010	0.000061	mg/L		05/13/15 11:37	05/22/15 15:44	1
Chromium	0.00105	J	0.0020	0.00020	mg/L		05/13/15 11:37	05/22/15 15:44	1
Molybdenum	0.010	U	0.010	0.00023	mg/L		05/13/15 11:37	05/22/15 15:44	1
Lead	0.0010	U	0.0010	0.00011	mg/L		05/13/15 11:37	05/22/15 15:44	1
Antimony	0.0020	U	0.0020	0.00016	mg/L		05/13/15 11:37	05/22/15 15:44	1
Selenium	0.0050	U	0.0050	0.00025	mg/L		05/13/15 11:37	05/22/15 15:44	1
Thallium	0.0020	U	0.0020	0.000074	mg/L		05/13/15 11:37	05/22/15 15:44	1
Calcium	1.0	U	1.0	0.24	mg/L		05/13/15 11:37	05/22/15 15:44	1
Lithium	0.0080	U	0.0080	0.00029	mg/L		05/13/15 11:37	05/22/15 15:44	1
Cobalt	0.0010	U	0.0010	0.000021	mg/L		05/13/15 11:37	05/22/15 15:44	1

Lab Sample ID: LCS 240-180583/2-A ^10
Matrix: Water
Analysis Batch: 182386

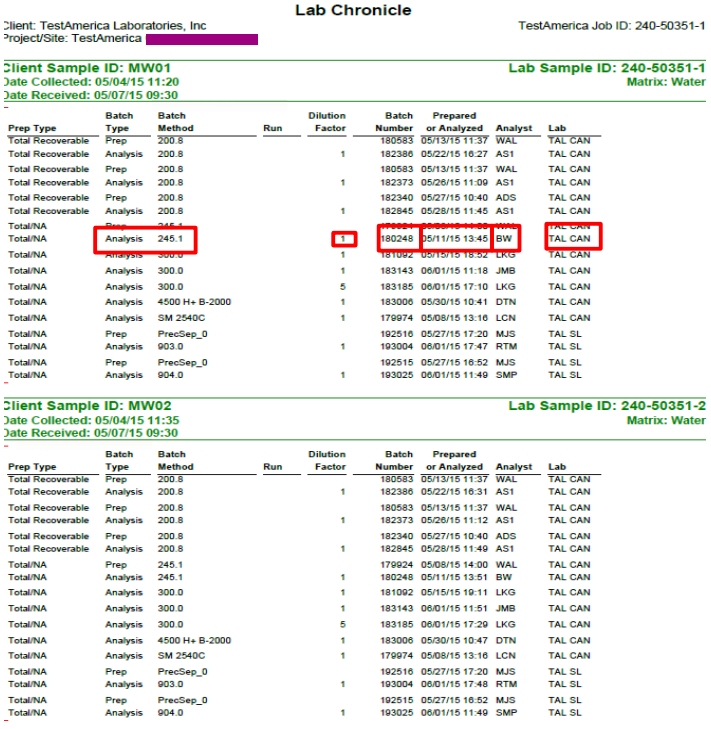
Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 180583

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	2.00	2.04		mg/L		102	85 - 115
Barium	2.00	2.00		mg/L		100	85 - 115
Beryllium	0.0500	0.0496		mg/L		99	85 - 115
Cadmium	0.0500	0.0524		mg/L		105	85 - 115
Chromium	0.200	0.214		mg/L		107	85 - 115
Molybdenum	1.00	1.04		mg/L		104	85 - 115
Lead	0.500	0.520		mg/L		104	85 - 115
Antimony	0.500	0.529		mg/L		106	85 - 115
Selenium	2.00	2.10		mg/L		105	85 - 115
Thallium	2.00	2.15		mg/L		107	85 - 115
Calcium	50.0	52.18		mg/L		104	85 - 115
Lithium	1.00	1.00		mg/L		100	85 - 115
Cobalt	0.500	0.541		mg/L		108	85 - 115

Lab Sample ID: 240-50351-3 MS
Matrix: Water
Analysis Batch: 182386

Client Sample ID: MW03
Prep Type: Total Recoverable
Prep Batch: 180583

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.0026	J B	2.00	2.14		mg/L		107	70 - 130
Barium	0.018		2.00	2.07		mg/L		103	70 - 130
Beryllium	0.0010	U	0.0500	0.0591		mg/L		118	70 - 130
Cadmium	0.0010	U	0.0500	0.0553		mg/L		111	70 - 130
Chromium	0.0012	J B	0.200	0.220		mg/L		110	70 - 130
Molybdenum	0.0017	J	1.00	1.08		mg/L		108	70 - 130
Lead	0.00028	J	0.500	0.533		mg/L		107	70 - 130
Antimony	0.00030	J	0.500	0.550		mg/L		110	70 - 130
Selenium	0.0011	J	2.00	2.14		mg/L		107	70 - 130
Thallium	0.00021	J	2.00	2.20		mg/L		110	70 - 130



Lab Chronicle

Client: TestAmerica Laboratories, Inc
Project/Site: TestAmerica [redacted]

TestAmerica Job ID: 240-50351-1

Client Sample ID: MW01
Date Collected: 05/04/15 11:20
Date Received: 05/07/15 09:30

Lab Sample ID: 240-50351-1
Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	200.8			180583	05/13/15 11:37	WAL	TAL CAN
Total Recoverable	Analysis	200.8		1	182386	05/22/15 16:27	AS1	TAL CAN
Total Recoverable	Prep	200.8			180583	05/13/15 11:37	WAL	TAL CAN
Total Recoverable	Analysis	200.8		1	182373	05/26/15 11:09	AS1	TAL CAN
Total Recoverable	Prep	200.8			182340	05/27/15 10:40	ADS	TAL CAN
Total Recoverable	Analysis	200.8		1	182845	05/28/15 11:45	AS1	TAL CAN
Total/NA	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]	[illegible]
Total/NA	Analysis	245.1		1	180248	05/11/15 13:45	BW	TAL CAN
Total/NA	[illegible]	[illegible]		1	181092	05/15/15 18:52	LKG	TAL CAN
Total/NA	Analysis	300.0		1	183143	06/01/15 11:18	JMB	TAL CAN
Total/NA	Analysis	300.0		5	183185	06/01/15 17:10	LKG	TAL CAN
Total/NA	Analysis	4500 H+ B-2000		1	183006	05/30/15 10:41	DTN	TAL CAN
Total/NA	Analysis	SM 2540C		1	179974	05/08/15 13:16	LCN	TAL CAN
Total/NA	Prep	PrecSep_0			192516	05/27/15 17:20	MJS	TAL SL
Total/NA	Analysis	903.0		1	193004	06/01/15 17:47	RTM	TAL SL
Total/NA	Prep	PrecSep_0			192515	05/27/15 16:52	MJS	TAL SL
Total/NA	Analysis	904.0		1	193025	06/01/15 11:49	SMP	TAL SL

Client Sample ID: MW02
Date Collected: 05/04/15 11:35
Date Received: 05/07/15 09:30

Lab Sample ID: 240-50351-2
Matrix: Water

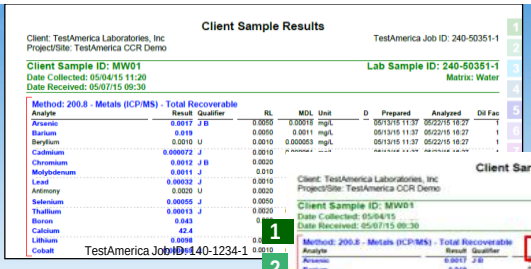
Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total Recoverable	Prep	200.8			180583	05/13/15 11:37	WAL	TAL CAN
Total Recoverable	Analysis	200.8		1	182386	05/22/15 16:31	AS1	TAL CAN
Total Recoverable	Prep	200.8			180583	05/13/15 11:37	WAL	TAL CAN
Total Recoverable	Analysis	200.8		1	182373	05/26/15 11:12	AS1	TAL CAN
Total Recoverable	Prep	200.8			182340	05/27/15 10:40	ADS	TAL CAN
Total Recoverable	Analysis	200.8		1	182845	05/28/15 11:49	AS1	TAL CAN
Total/NA	Prep	245.1			179924	05/08/15 14:00	WAL	TAL CAN
Total/NA	Analysis	245.1		1	180248	05/11/15 13:51	BW	TAL CAN
Total/NA	Analysis	300.0		1	181092	05/15/15 19:11	LKG	TAL CAN
Total/NA	Analysis	300.0		1	183143	06/01/15 11:51	JMB	TAL CAN
Total/NA	Analysis	300.0		5	183185	06/01/15 17:29	LKG	TAL CAN
Total/NA	Analysis	4500 H+ B-2000		1	183006	05/30/15 10:47	DTN	TAL CAN
Total/NA	Analysis	SM 2540C		1	179974	05/08/15 13:16	LCN	TAL CAN
Total/NA	Prep	PrecSep_0			192516	05/27/15 17:20	MJS	TAL SL
Total/NA	Analysis	903.0		1	193004	06/01/15 17:48	RTM	TAL SL
Total/NA	Prep	PrecSep_0			192515	05/27/15 16:52	MJS	TAL SL
Total/NA	Analysis	904.0		1	193025	06/01/15 11:49	SMP	TAL SL

Lab Chronicle

The Lab Chronicle provides the following sample specific information:

- Prep and analytical methods performed on each sample
- Dilution factors
- Batch numbers
- Prep and Analysis dates
- Initials of the Analyst performing the analysis
- Laboratory location that completed the analysis.

Sample Results


Client Sample Results

Client: TestAmerica Laboratories, Inc
Project/Site: TestAmerica CCR Demo

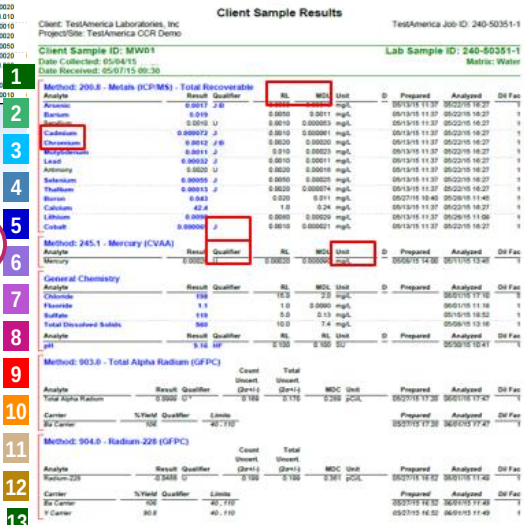
TestAmerica Job ID: 240-50351-1

Client Sample ID: MW01
Date Collected: 05/04/15 11:20
Date Received: 05/07/15 09:30

Lab Sample ID: 240-50351-1
Matrix: Water

Method: 200.8 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0017	J B	0.0050	0.00018	mg/L		05/13/15 11:37	05/22/15 16:27	1
Barium	0.019		0.0050	0.0011	mg/L		05/13/15 11:37	05/22/15 16:27	1
Beryllium	0.0010	U	0.0010	0.000053	mg/L		05/13/15 11:37	05/22/15 16:27	1
Cadmium	0.000072	J	0.0010						
Chromium	0.0012	J B	0.0020						
Molybdenum	0.0011	J	0.010						
Lead	0.00032	J	0.0010						
Antimony	0.0020	U	0.0020						
Selenium	0.00055	J	0.0050						
Thallium	0.00013	J	0.0020						
Boron	0.043		0.020						
Calcium	42.4		1.0						
Lithium	0.0098		0.010						
Cobalt	0.00006	J	0.0010						


Client Sample Results

Client: TestAmerica Laboratories, Inc
Project/Site: TestAmerica CCR Demo

TestAmerica Job ID: 240-50351-1

Client Sample ID: MW01
Date Collected: 05/04/15
Date Received: 05/07/15 09:30

Lab Sample ID: 240-50351-1
Matrix: Water

Method: 200.8 - Metals (ICP/MS) - Total Recoverable

Method: 245.1 - Mercury (CVAA)

General Chemistry

Method: 903.0 - Total Alpha Radium (GFPC)

Method: 904.0 - Radium-228 (GFPC)

Client Sample Results

Client: ABC Company
Project/Site: Monthly Air Sampling

TestAmerica Job ID: 140-1234-1

Client Sample ID: EFFLUENT AIR 2
Date Collected: 09/25/14 10:25
Date Received: 09/26/14 11:30
Sample Container: Summa Canister 1L

Lab Sample ID: 140-1234-2
Matrix: Air

Method: TO-15 - Volatile Organic Compounds in Ambient Air (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
n-Butylbenzene	ND		35	4.0	ug/m3			09/29/14 20:17	3.19
n-Heptane	89		33	3.1	ug/m3			09/29/14 20:17	3.19
n-Hexane	40		28	1.8	ug/m3			09/29/14 20:17	3.19
n-Propylbenzene	12	J	31	4.4	ug/m3			09/29/14 20:17	3.19
o-Xylene	780		14	4.2	ug/m3			09/29/14 20:17	3.19
Propylene	27		14	2.1	ug/m3			09/29/14 20:17	3.19
sec-Butylbenzene	ND		35	5.6	ug/m3			09/29/14 20:17	3.19
Styrene	9.2	J	14	3.9	ug/m3			09/29/14 20:17	3.19
Toluene	230		12	7.2	ug/m3			09/29/14 20:17	3.19
1,2,4-Trimethylbenzene	280		16	4.9	ug/m3			09/29/14 20:17	3.19
1,3,5-Trimethylbenzene	410		16	5.1	ug/m3			09/29/14 20:17	3.19
2,2,4-Trimethylpentane	17	J	37	2.9	ug/m3			09/29/14 20:17	3.19

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene (Surr)	103		60 - 140		09/29/14 20:17	3.19

eurofins | Environment Testing America

04

DATA ASSESSMENT & USABILITY

Items to Review
Data Qualifiers
Data Usability Assessment

eurofins | Environment Testing America

Items to Review / Consider

- Review Case Narrative.
  - Are data qualifiers addressed?
  - Are COC discrepancies reconciled?
- Are holding times met?
- Is batch QC present and acceptable?
- Do interparameter relationships makes sense?
- Do dilutions match?
- Does data concur with historical results?
- Is corrective action taken for failures?
- Were project-specific action limits met?

Wisconsin PFAS Aqueous (Non-Potable Water) and Non-Aqueous Matrices Method Expectations

- Version 12.16.2019 -

Per- and Polyfluorinated Alkyl Substances (PFAS) Analysis Using Isotope Dilution by LC/MS/MS

The purpose of this document is to provide the expectations that will help the Program determine if a laboratory's method is considered suitable for analysis of PFAS in aqueous (non-potable water) and non-aqueous matrices for Wisconsin.

The Program has the legal authority under NR 149.41 (2) to determine whether the method selected by a laboratory is suitable for the matrix, type of analyte, expected level of analyte, regulatory limit, and anticipated interferences in the sample, when methods are not prescribed by covered programs under NR 149 or permits issued by the department.

Once the EPA publishes their 1600 series isotope dilution method, the Program will defer to that method for certification.

Potable water samples are analyzed utilizing EPA 537.1.

{F} = when "{F}" is listed after an expectation and the expectation is not met, then qualify the associated results on the test report. The qualifier can refer the data user to the narrative where detail is provided that indicates what the non-conformance was, and if known, the possible effects on the sample results.

Definitions are provided in Section **X, "Definitions,"** of this document.

WI CRITERIA

eurofins | Environment Testing America

38

Data Qualifiers

Not necessarily a bad thing

Real world samples do not always behave well or within the laboratory's control.

eurofins | Environment Testing America

> "Data qualifiers, or flags, are applied to results so the end-user can determine data usability as it pertains to their project objectives"

B-Flag

METHOD BLANK

Applied to the method blank if detections are present

Indicates contamination may have been introduced during the analytical process

H-Flag

HOLDING TIME

Applied to sample result if holding time is exceeded

Typically a "do not pass go" situation. Data often rejected due to holding time violations

J-Flag

LOW CONCENTRATION

Applied to sample result if detected between the RL & MDL

Identification of the analyte is correct but the quantitation is estimated as it is below the laboratory's calibration range

E-Flag

HIGH CONCENTRATION

Applied to sample result if detected above calibration range

Identification of the analyte is correct but the quantitation is estimated as it is above the top of the calibration curve

*-Flag

QC FAILURE

Applied to the sample result if the LCS/LCSD or MS/MSD accuracy or precision does not meet criteria

Identification of the analyte is correct but the quantitation may be biased

Data Usability Assessment

- ✓ Method Blank detect and samples ND
- ✓ Method Blank < 1/10 sample concentration
- ✓ High Biased LCS and samples ND
- ✓ Low Biased LCS and samples >Action Limit
- ✓ Compounds of concern not impacted
- ✓ Sporadic Marginal Exceedances

eurofins | Environment Testing America

Taryn McKnight
PFAS Practice Leader
916.347.6815
taryn.mcknight@eurofinset.com

eurofins | Environment Testing America

THANK YOU FOR ATTENDING