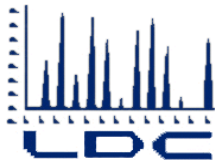




Groundwater Sample Results, Data Validation Report, and the Sample Location Report, SDG BSI22

*Marine Corps Ballistics Base Barstow
Barstow, California*

November 2019



LABORATORY DATA CONSULTANTS, INC.

2701 Loker Ave. West, Suite 220, Carlsbad, CA 92010 Bus: 760-827-1100 Fax: 760-827-1099

Gutierrez Canales Engineering, P.C.
2655 Camino del Rio North, Suite 100
San Diego, CA 92108
ATTN: Mr. Jesse MacNeill

February 5, 2019

SUBJECT: REVISED Barstow Site Inspection, Data Validation

Dear Mr. MacNeill

Enclosed are the revised validation reports for the fraction listed below. These SDGs were received on January 10, 2019. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #44154_RV1:

SDG

Fraction

BSI20/2010255, BSI21/2010258
BSI22/2012436, BSI23/2014748
BSI24/2015917, BSI27/2017387
SBI22/2011587, SBI23/2011591

Perfluoroalkyl & Polyfluoroalkyl Substances

The data validation was performed under Stage 2B & 4 guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Field Sampling and Analysis Plan for Site Inspection Per- and Polyfluoroalkyl Substances, Nebo Main Base and Yermo Annex, Marine Corps Logistics Base, Barstow, CA; October 2018
- U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.1; 2017
- USEPA National Functional Guidelines for Organic Superfund Methods Data Review; January 2017

Please feel free to contact us if you have any questions.

Sincerely,

Pei Geng
pgeng@lab-data.com
Project Manager/Senior Chemist

80/20 - NEDD - 2B/4 **LDC #44154 (Gutierrez Canales Engineering, P.C. - San Diego, CA / Barstow)**

LDC	SDG#	DATE REC'D	(3) DATE DUE	PFAs (537M)		W		S		W		S		W		S		W		S		W		S		W		S		W		S		W		S		W		S	
				W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
Matrix:	Water/Soil																																								
A	BSI20/2010255	01/10/19	01/30/19	7	0																																				
B	BSI21/2010258	01/10/19	01/30/19	10	0																																				
C	BSI22/2012436	01/10/19	01/30/19	7	0																																				
D	BSI23/2014748	01/10/19	01/30/19	14	0																																				
E	BSI24/2015917	01/10/19	01/30/19	9	0																																				
F	BSI27/2017387	01/10/19	01/30/19	12	0																																				
G	SBI22/2011587	01/10/19	01/30/19	17	0																																				
H	SBI23/2011591	01/10/19	01/30/19	10	0																																				
Total	J/PG			86	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	86	

Shaded cells indicate Stage 4 validation (all other cells are Stage 2B review). These sample counts do not include MS, MSD, or DUP's.

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Barstow Site Inspection

LDC Report Date: January 22, 2019

Parameters: Perfluoroalkyl & Polyfluoroalkyl Substances

Validation Level: Stage 4

Laboratory: Eurofins

Sample Delivery Group (SDG): BSI20/2010255

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OU1-NNE-14-01	9903613	Water	11/14/18
OU1-NNE-14-W-01	9903614	Water	11/14/18
OU1-NNE-14-W-02	9903615	Water	11/14/18
OU1-NNE-17-01	9903616	Water	11/14/18
OU1-9N1W12L05-01	9903617	Water	11/14/18
OU1-NEP-2-01	9903618	Water	11/14/18
OU1-NRF-1-01	9903619	Water	11/14/18
OU1-NRF-1-01MS	9903620MS	Water	11/14/18
OU1-NRF-1-01MSD	9903621MSD	Water	11/14/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Field Sampling and Analysis Plan for Site Inspection Per- and Polyfluoroalkyl Substances, Nebo Main Base and Yermo Annex, Marine Corps Logistics Base, Barstow, CA (October 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) by Environmental Protection Agency (EPA) Method 537 Modified

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked and the requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990.

For each calibration standard, all compounds were within 70-130% of their true value.

The signal to noise (S/N) ratio was within validation criteria for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

The signal to noise (S/N) ratio was within validation criteria for all compounds.

The percent differences (%D) of the instrument sensitivity check (ISC) were less than or equal to 30.0% for all compounds.

All compound concentrations were at the limit of quantitation (LOQ) for the ISC standard.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample OU1-NNE-14-W-01 was identified as an equipment blank. No contaminants were found.

Sample OU1-NNE-14-W-02 was identified as a source blank. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
OU1-NRF-1-01MS/MSD (OU1-NRF-1-01)	Perfluoroundecanoic acid	-	79 (83-132)	UJ (all non-detects)	A

For OU1-NRF-1-01MS/MSD, no data were qualified for Perfluorooctanoic acid percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits with the following exceptions:

Sample	Labeled Compound	%R (Limits)	Affected Compound	Flag	A or P
OU1-NNE-14-01	13C2-Perfluorododecanoic acid	35 (50-150)	Perfluorododecanoic acid Perfluorotridecanoic acid	UJ (all non-detects) UJ (all non-detects)	P

XI. Compound Quantitation

All compound quantitations met validation criteria.

The laboratory indicated that PFAS are currently being reported as the sum of the branched and linear isomers so both peaks were integrated.

XII. Target Compound Identifications

All target compound identifications met validation criteria.

XIII. System Performance

The system performance was acceptable.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to MS/MSD %R and labeled compound %R, data were qualified as estimated in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

**Barstow Site Inspection
 Perfluoroalkyl & Polyfluoroalkyl Substances - Data Qualification Summary - SDG
 BSI20/2010255**

Sample	Compound	Flag	A or P	Reason
OU1-NRF-1-01	Perfluoroundecanoic acid	UJ (all non-detects)	A	Matrix spike/Matrix spike duplicate (%R)
OU1-NNE-14-01	Perfluorododecanoic acid Perfluorotridecanoic acid	UJ (all non-detects) UJ (all non-detects)	P	Labeled compounds (%R)

**Barstow Site Inspection
 Perfluoroalkyl & Polyfluoroalkyl Substances - Laboratory Blank Data Qualification
 Summary - SDG BSI20/2010255**

No Sample Data Qualified in this SDG

**Barstow Site Inspection
 Perfluoroalkyl & Polyfluoroalkyl Substances - Field Blank Data Qualification
 Summary - SDG BSI20/2010255**

No Sample Data Qualified in this SDG

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description: OU1-NNE-14-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9903613
ELLE Group #: 2010255
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/16/2018 11:40
Collection Date/Time: 11/14/2018 09:00
SDG#: BSI20-01

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.92	2.2	2.8	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.92	2.2	2.8	1
14434	Perfluorobutanesulfonate	375-73-5	14	0.28	1.0	1.8	1
14434	Perfluorodecanoic acid	335-76-2	1.7 J	0.46	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D. US	0.46	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	14	0.37	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	83	0.37	1.0	1.8	1
14434	Perfluorohexanoic acid	307-24-4	54	0.46	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	1.8 J	0.37	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	36	0.46	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	58	0.46	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.55	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D. US	0.55	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.46	1.1	1.8	1

The recovery for labeled compound 13C2-PFDoDA is outside of QC acceptance limits as noted on the QC Summary.

Sufficient sample was not available to repeat the analysis.

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18323012	11/26/2018 23:32	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18323012	11/19/2018 15:00	Danielle D McCully	1

*=This limit was used in the evaluation of the final result

11/26/18

Sample Description: OU1-NNE-14-W-01 Grab Water
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9903614
ELLE Group #: 2010255
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/16/2018 11:40
Collection Date/Time: 11/14/2018 10:15
SDG#: BSI20-02BL

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.91	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.91	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	1.0	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	1.0	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18323012	11/26/2018 23:41	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18323012	11/19/2018 15:00	Danielle D McCully	1

11/26/18 &

*=This limit was used in the evaluation of the final result

2425 New Holland Pike, Lancaster, PA 17601 • 717-666-2300 • Fax: 717-656-6786 • www.EurofinsUS.com/LancLabEnv

Sample Description: OU1-NNE-14-W-02 Grab Water
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9903615
ELLE Group #: 2010255
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/16/2018 11:40
Collection Date/Time: 11/14/2018 10:20
SDG#: BSI20-03BL

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.88	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.88	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.97	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.35	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.35	0.97	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.44	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.44	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.44	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18323012	11/26/2018 23:50	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18323012	11/19/2018 15:00	Danielle D McCully	1

1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NNE-17-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9903616
ELLE Group #: 2010255
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/16/2018 11:40
Collection Date/Time: 11/14/2018 11:14
SDG#: BSI20-04

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NETFOSAA NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.96	2.3	2.9	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.96	2.3	2.9	1
14434	Perfluorobutanesulfonate	375-73-5	16	0.29	1.1	1.9	1
14434	Perfluorodecanoic acid	335-76-2	1.2 J	0.48	1.2	1.9	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.48	1.2	1.9	1
14434	Perfluoroheptanoic acid	375-85-9	21	0.38	1.2	1.9	1
14434	Perfluorohexanesulfonate	355-46-4	130	0.38	1.1	1.9	1
14434	Perfluorohexanoic acid	307-24-4	74	0.48	1.2	1.9	1
14434	Perfluorononanoic acid	375-95-1	1.7 J	0.38	1.2	1.9	1
14434	Perfluoro-octanesulfonate	1763-23-1	51	0.48	1.2	1.9	1
14434	Perfluorooctanoic acid	335-67-1	99	0.48	1.2	1.9	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.58	1.2	1.9	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.58	1.2	1.9	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.48	1.2	1.9	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18323012	11/26/2018 23:59	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18323012	11/19/2018 15:00	Danielle D McCully	1

1/26/19

*=This limit was used in the evaluation of the final result

2425 New Holland Pike, Lancaster, PA 17601 • 717-666-2300 • Fax: 717-666-6786 • www.EurofinsUS.com/LancLabsEnv

Sample Description: OU1-9N1W12L05-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9903617
ELLE Group #: 2010255
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/16/2018 11:40
Collection Date/Time: 11/14/2018 12:36
SDG#: BSI20-05

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NETFOSAA NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.90	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.90	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	5.1	0.27	0.99	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	16	0.36	0.99	1.8	1
14434	Perfluorohexanoic acid	307-24-4	0.87 J	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	6.1	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	0.76 J	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18323012	11/27/2018 00:08	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18323012	11/19/2018 15:00	Danielle D McCully	1

4/26/19 8

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NEP-2-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9903618
ELLE Group #: 2010255
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/16/2018 11:40
Collection Date/Time: 11/14/2018 14:30
SDG#: BSI20-06

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NETFOSAA NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.90	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.90	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	20	0.27	0.99	1.8	1
14434	Perfluorodecanoic acid	335-76-2	0.63 J	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	11	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	69	0.36	0.99	1.8	1
14434	Perfluorohexanoic acid	307-24-4	97	4.5	11	18	10
14434	Perfluorononanoic acid	375-95-1	1.2 J	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	49	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	62	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18323012	11/27/2018 00:17	Marissa C Drexinger	1
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18323012	11/28/2018 10:24	Joshua P Trost	10
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18323012	11/19/2018 15:00	Danielle D McCully	1

1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NRF-1-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9903619
ELLE Group #: 2010255
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/16/2018 11:40
Collection Date/Time: 11/14/2018 16:25
SDG#: BSI20-07BKG

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15				ng/l	ng/l	ng/l	ng/l
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.87	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.87	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	18	0.26	0.95	1.7	1
14434	Perfluorodecanoic acid	335-76-2	2.2	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	3.0	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	21	0.35	0.95	1.7	1
14434	Perfluorohexanoic acid	307-24-4	7.3	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	3.8	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	44	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	23	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18323012	11/27/2018 00:26	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18323012	11/19/2018 15:00	Danielle D McCully	1

*=This limit was used in the evaluation of the final result

1/26/19

LDC #: 44154A96
 SDG #: BSI20/2010255
 Laboratory: Eurofins

VALIDATION COMPLETENESS WORKSHEET

Stage 2B, A

Date: 1/24/19
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537M)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A A	RSO ≤ 20%. Y ² . TML/ICV ≤ 30%
IV.	Continuing calibration/ISC	A	eev/ISC ≤ 30%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB = 2. SB = 2
VII.	Matrix spike/Matrix spike duplicates	W	
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Labeled Compounds	W	
XI.	Compound quantitation RL/LOQ/LODs	A	
XII.	Target compound identification	A	
XIII.	System performance	A	
XIV.	Overall assessment of data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
 N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
 SW = See worksheet FB = Field blank EB = Equipment blank

	Client ID	Lab ID	Matrix	Date
1	OU1-NNE-14-01	9903613	Water	11/14/18
2	OU1-NNE-14-W-01	9903614	Water	11/14/18
3	OU1-NNE-14-W-02	9903615	Water	11/14/18
4	OU1-NNE-17-01	9903616	Water	11/14/18
5	OU1-9N1W12L05-01	9903617	Water	11/14/18
6	OU1-NEP-2-01	9903618	Water	11/14/18
7	OU1-NRF-1-01	9903619	Water	11/14/18
8	OU1-NRF-1-01MS	9903620MS	Water	11/14/18
9	OU1-NRF-1-01MSD	9903621MSD	Water	11/14/18
10				
11				

Notes:

<u>EB=3 SB=2</u>				

Method: LCMS (EPA Method 537 Modified)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was cooler temperature criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the validation criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent relative standard deviations (%RSD) \leq 20%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of > 0.990 ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all analytes within 70-130% or percent differences (%D) \leq 30% of their true value for each calibration standard?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) $< 30\%$?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) of the continuing calibration $< 30\%$?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) of the Instrument Sensitivity Check $< 30\%$?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a laboratory blank analyzed for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the laboratory blanks?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VI. Field blanks				
Were field blanks identified in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were target compounds detected in the field blanks?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VIII. Matrix spike/Matrix spike duplicates				
Were matrix spike (MS) and matrix spike duplicate (MSD) analyzed in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
IX. Laboratory control samples				
Was an LCS analyzed per extraction batch for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

VALIDATION FINDINGS CHECKLIST

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were target compounds detected in the field duplicates?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
XI. Labeled compounds				
Were labeled compound percent recoveries (%R) within the QC limits?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
XII. Compound quantitation				
Did the laboratory reporting limits (RL) meet the QAPP RLs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Did reported results include both branched and linear isomers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the correct ion transition, labeled compound and relative response factor (RRF) used to quantitate the compound?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XIII. Target compound identification				
Were two transitions and the ion transition ratio per analyte monitored and documented with the exception of PFBA and PFPeA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XIV. System performance				
System performance was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. NEtFOSAA			
B. NMeFOSAA			
C. Perfluorobutanesulfonate			
D. Perfluorobutanoic acid			
E. Perfluorodecanesulfonate			
F. Perfluorodecanoic acid			
G. Perfluorododecanoic acid			
H. Perfluoroheptanoic acid			
I. Perfluorohexanesulfonate			
J. Perfluorohexanoic acid			
K. Perfluorononanoic acid			
L. Perfluorooctanesulfonamide			
M. Perfluoro-octanesulfonate			
N. Perfluorooctanoic acid			
O. Perfluoropentanoic acid			
P. Perfluorotetradecanoic acid			
Q. Perfluorotridecanoic acid			
R. Perfluoroundecanoic acid			

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

METHOD: LC/MS PFAS (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

- N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) or duplicate sample analyzed for each matrix in this SDG?
 N N/A Was a MS/MSD analyzed every 20 samples of each matrix?
 Y N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?
 Y N N/A Were all duplicate sample relative percent differences (RPD) or differences within QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		<u>8/9</u>	<u>FR</u>	()	<u>T9 (83-132)</u>	()	<u>T (NO)</u>	<u>N/A</u>
			<u>N</u>	()	<u>1ST (70-136)</u>	()		<u>NO dual > 4x</u>
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		

VALIDATION FINDINGS WORKSHEET
Labeled Compounds

METHOD: LC/MS PFAS (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y/N N/A Were all labeled compound recoveries within the QC criteria?

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		1 (ND)	13C-PFDoDA	35 (50-150)	Y/N/A (E, Q)
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	

Method: PFACs (EPA Method 537)

Calibration Date	Analyte	Standard	(Y) Concentration	(X) Area
11/26/2018	PFOA	1	0.040	0.0410393
		2	0.120	0.1035112
		3	0.400	0.4268136
		4	1.600	1.4766669
		5	4.000	3.8556006
		6	10.000	8.9604514
		7	20.000	17.4262605

Linear through the origin

	<i>calculated</i>	<i>Reported</i>
Constant	0.000000	0.0000
X Coefficient(s)	0.87925184	0.892990
Correlation Coefficient	0.999777	0.99927
Coefficient of Determination (r ²)	0.999555	

Method: PFACs (EPA Method 537)

Calibration Date	Analyte	Standard	(Y) Concentration	(X) Area
11/26/2018	PFOS	1	0.039	0.0433728
		2	0.116	0.1149304
		3	0.387	0.4449716
		4	1.548	1.5784137
		5	3.870	4.3035052
		6	9.686	10.5549627
		7	19.372	22.0735376

Linear through the origin

	<i>calculated</i>	<i>Reported</i>
Constant	0.000000	0.0000
X Coefficient(s)	1.12840566	1.116930
Correlation Coefficient	0.999823	0.99961
Coefficient of Determination (r ²)	0.999647	

VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = $100 * (\text{ave. RRF} - \text{RRF}) / \text{ave. RRF}$
 $\text{RRF} = (A_x)(C_{is}) / (A_{is})(C_x)$

Where: ave. RRF = initial calibration average RRF
 RRF = continuing calibration RRF
 A_x = Area of compound, A_{is} = Area of associated internal standard
 C_x = Concentration of compound, C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported	Recalculated	Reported	Recalculated
					RRF (CC)	RRF (CC)	%D	%D
1	CV2-CA23	11/26/18	PFOA (1st internal standard)	2.00	2.38	2.38	18.77	18.77
			PFOS (2nd internal standard)	1.85	1.97	1.97	6.23	6.23
			(3rd internal standard)					
2	CV3-CA44	11/26/18	↓ (1st internal standard)	8.00	9.02	9.02	12.79	12.79
			(2nd internal standard)	7.40	6.91	6.91	6.56	6.56
			(3rd internal standard)					
3			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
4			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the matrix spike and matrix spike duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SSC - SC)/SA

Where: SSC = Spiked sample concentration
 SA = Spike added

SC = Sample concentration

RPD = |MSC - MSC| * 2 / (MSC + MSDC)

MSC = Matrix spike concentration

MSDC = Matrix spike duplicate concentration

MS/MSD samples: 3/9

Compound	Spike Added (US/L)		Sample Concentration (US/L)	Spiked Sample Concentration (US/L)		Matrix Spike		Matrix Spike Duplicate		MS/MSD	
	MS	MSD		MS	MSD	Percent Recovery		Percent Recovery		RPD	
						Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFOA	4.77	4.84	23.33	29.72	30.95	134	134	157	157	4	4
PFOS	4.56	4.63	43.57	48.1	48.58	102	100	109	109	1	1

Comments: Refer to Matrix Spike/Matrix Spike Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA)

Where: SSC = Spike concentration
 SA = Spike added

RPD = |LCSC - LCSDC| * 2 / (LCSC + LCSDC)

LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: LCS 3230128

Compound	Spike Added (NS/L)		Spike Concentration (U/D)		LCS		LCSD		LCS/LCSD	
	LCS	LCSD	LCS	LCSD	Percent Recovery		Percent Recovery		RPD	
					Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFOA	5.14	NA	5.31	NA	98	98				
PFOS	5.20	↓	379	↓	73	73				

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A
Y N N/A

Were all reported results recalculated and verified for all level IV samples?
Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

$$\text{Concentration} = \frac{(A_x)(I_s)(V_i)(DF)(2.0)}{(A_{is})(RRF)(V_o)(V_i)(\%S)}$$

- A_x = Area of the characteristic ion (EICP) for the compound to be measured
- A_{is} = Area of the characteristic ion (EICP) for the specific internal standard
- I_s = Amount of internal standard added in nanograms (ng)
- V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).
- V_i = Volume of extract injected in microliters (ul)
- V_t = Volume of the concentrated extract in microliters (ul)
- Df = Dilution Factor.
- %S = Percent solids, applicable to soil and solid matrices only.
- 2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. 1, PFOA:

$$\text{Conc.} = \frac{(281900) (5.00) (1)}{(106297) (0.8947) (0.2153) () ()}$$

$$= 57.71 \text{ ng/L}$$

#	Sample ID	Compound	Reported Concentration (<u>115A</u>)	Calculated Concentration ()	Qualification
	<u>1</u>	<u>PFOA</u>	<u>58</u>		

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Barstow Site Inspection

LDC Report Date: January 22, 2019

Parameters: Perfluoroalkyl & Polyfluoroalkyl Substances

Validation Level: Stage 2B

Laboratory: Eurofins

Sample Delivery Group (SDG): BSI21/2010258

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OU1-GW-10-01	9903630	Water	11/13/18
OU1-GW-10-W-01	9903633	Water	11/13/18
OU1-GW-10-W-02	9903634	Water	11/13/18
OU1-MW-A-01	9903635	Water	11/13/18
OU1-MW-A-02	9903636	Water	11/13/18
OU1-NPZ-16-01	9903637	Water	11/13/18
OU1-NPZ-8-01	9903638	Water	11/13/18
OU1-NPZ-7-01	9903639	Water	11/13/18
OU1-NWP-6-01	9903640	Water	11/13/18
OU1-NWP-6-02	9903641	Water	11/13/18
OU1-GW-10-01MS	9903631MS	Water	11/13/18
OU1-GW-10-01MSD	9903632MSD	Water	11/13/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Field Sampling and Analysis Plan for Site Inspection Per- and Polyfluoroalkyl Substances, Nebo Main Base and Yermo Annex, Marine Corps Logistics Base, Barstow, CA (October 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) by Environmental Protection Agency (EPA) Method 537 Modified

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked and the requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990.

For each calibration standard, all compounds were within 70-130% of their true value.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

The percent differences (%D) of the instrument sensitivity check (ISC) were less than or equal to 30.0% for all compounds.

All compound concentrations were at the limit of quantitation (LOQ) for the ISC standard.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample OU1-GW-10-W-01 was identified as an equipment blank. No contaminants were found.

Sample OU1-GW-10-W-02 was identified as a source blank. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. For OU1-GW-10-01MS/MSD, no data were qualified for percent recoveries (%R) and relative percent differences (RPD) outside the QC limits since the MS/MSD was analyzed at greater than or equal to a 5X dilution.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples OU1-MW-A-01 and OU1-MW-A-02 and samples OU1-NWP-6-01 and OU1-NWP-6-02 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ng/L)		RPD (Limits)	Flag	A or P
	OU1-MW-A-01	OU1-MW-A-02			
NEtFOSAA	2.6	2.8	7 (≤30)	-	-
NMeFOSAA	1.5	1.3	14 (≤30)	-	-
Perfluorobutanesulfonate	17	18	6 (≤30)	-	-
Perfluorodecanoic acid	4.9	4.7	4 (≤30)	-	-
Perfluoroheptanoic acid	2.4	2.4	0 (≤30)	-	-
Perfluorohexanesulfonate	15	15	0 (≤30)	-	-
Perfluorohexanoic acid	6.7	6.4	5 (≤30)	-	-
Perfluorononanoic acid	4.0	4.2	5 (≤30)	-	-
Perfluoro-octanesulfonate	47	53	12 (≤30)	-	-
Perfluorooctanoic acid	22	22	0 (≤30)	-	-

Compound	Concentration (ng/L)		RPD (Limits)	Flag	A or P
	OU1-NWP-6-01	OU1-NWP-6-02			
NEtFOSAA	1.0	1.3	26 (≤30)	-	-
Perfluorobutanesulfonate	19	24	23 (≤30)	-	-
Perfluorodecanoic acid	4.7	5.4	14 (≤30)	-	-
Perfluoroheptanoic acid	2.9	3.6	22 (≤30)	-	-
Perfluorohexanesulfonate	21	25	17 (≤30)	-	-
Perfluorohexanoic acid	6.7	7.9	16 (≤30)	-	-
Perfluorononanoic acid	6.1	6.8	11 (≤30)	-	-
Perfluoro-octanesulfonate	79	94	17 (≤30)	-	-
Perfluorooctanoic acid	27	33	20 (≤30)	-	-

X. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits.

XI. Compound Quantitation

The laboratory indicated that PFAS are currently being reported as the sum of the branched and linear isomers so both peaks were integrated.

Raw data were not reviewed for Stage 2B validation.

XII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIII. System Performance

Raw data were not reviewed for Stage 2B validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

**Barstow Site Inspection
Perfluoroalkyl & Polyfluoroalkyl Substances - Data Qualification Summary - SDG
BSI21/2010258**

No Sample Data Qualified in this SDG

**Barstow Site Inspection
Perfluoroalkyl & Polyfluoroalkyl Substances - Laboratory Blank Data Qualification
Summary - SDG BSI21/2010258**

No Sample Data Qualified in this SDG

**Barstow Site Inspection
Perfluoroalkyl & Polyfluoroalkyl Substances - Field Blank Data Qualification
Summary - SDG BSI21/2010258**

No Sample Data Qualified in this SDG

Sample Description: OU1-GW-10-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9903630
ELLE Group #: 2010258
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/16/2018 11:40
Collection Date/Time: 11/13/2018 09:00
SDG#: BSI21-01BKG

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NETFOSAA NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	8.8	21	27	10
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	8.8	21	27	10
14434	Perfluorobutanesulfonate	375-73-5	6,400	27	97	180	100
14434	Perfluorodecanoic acid	335-76-2	N.D.	4.4	11	18	10
14434	Perfluorododecanoic acid	307-55-1	N.D.	4.4	11	18	10
14434	Perfluoroheptanoic acid	375-85-9	2,000	35	110	180	100
14434	Perfluorohexanesulfonate	355-46-4	6,400	35	97	180	100
14434	Perfluorohexanoic acid	307-24-4	32,000	440	1,100	1,800	1000
14434	Perfluorononanoic acid	375-95-1	N.D.	3.5	11	18	10
14434	Perfluoro-octanesulfonate	1763-23-1	31	4.4	11	18	10
14434	Perfluorooctanoic acid	335-67-1	1,500	4.4	11	18	10
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	5.3	11	18	10
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	5.3	11	18	10
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	4.4	11	18	10

The recovery for labeled compound used as extraction standard 13C5-PFHxA is outside of QC acceptance limits as noted on the QC Summary. The recovery for labeled compound used as extraction standard 13C5-PFHxA is also outside of QC acceptance limits in the associated matrix spike and duplicate samples, indicating a matrix effect.

Reporting limits were raised due to interference from the sample matrix.

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/28/2018 10:42	Joshua P Trost	10
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/28/2018 10:51	Joshua P Trost	100
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/28/2018 12:16	Joshua P Trost	1000
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/20/2018 16:00	Anthony C Polaski	1

11/28/18 J

*=This limit was used in the evaluation of the final result

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6786 • www.EurofinsUS.com/LancLabsEnv

Sample Description: OU1-GW-10-W-01 Grab Water
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9903633
ELLE Group #: 2010258
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/16/2018 11:40
Collection Date/Time: 11/13/2018 09:15
SDG#: BSI21-02BL

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.91	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.91	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	1.0	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	1.0	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.55	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.55	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/27/2018 13:37	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/20/2018 16:00	Anthony C Polaski	1

11/26/19 Y

*=This limit was used in the evaluation of the final result

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6786 • www.EurofinsUS.com/LancLaboEnv

Sample Description: OU1-GW-10-W-02 Grab Water
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9903634
ELLE Group #: 2010258
Matrix: Water

Project Name: Barstow Site Inspection

Submission Date/Time: 11/16/2018 11:40
Collection Date/Time: 11/13/2018 09:20
SDG#: BSI21-03BL

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.84	2.0	2.5	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.84	2.0	2.5	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.25	0.93	1.7	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.42	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.42	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.34	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.34	0.93	1.7	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.42	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.34	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.42	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.42	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.51	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.51	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.42	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/27/2018 13:46	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/20/2018 16:00	Anthony C Polaski	1

11/26/19 *[Signature]*

*=This limit was used in the evaluation of the final result

Sample Description: OU1-MW-A-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9903635
ELLE Group #: 2010258
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/16/2018 11:40
Collection Date/Time: 11/13/2018 10:44
SDG#: BSI21-04

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	2.6	0.88	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	1.5 J	0.88	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	17	0.26	0.97	1.8	1
14434	Perfluorodecanoic acid	335-76-2	4.9	0.44	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	2.4	0.35	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	15	0.35	0.97	1.8	1
14434	Perfluorohexanoic acid	307-24-4	6.7	0.44	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	4.0	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	47	0.44	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	22	0.44	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/27/2018 13:55	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/20/2018 16:00	Anthony C Polaski	1

1/26/19 Q

*=This limit was used in the evaluation of the final result

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description: OU1-MW-A-02 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9903636
ELLE Group #: 2010258
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/16/2018 11:40
Collection Date/Time: 11/13/2018 10:45
SDG#: BSI21-05

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	2.8	0.89	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	1.3 J	0.89	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	18	0.27	0.98	1.8	1
14434	Perfluorodecanoic acid	335-76-2	4.7	0.44	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	2.4	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	15	0.36	0.98	1.8	1
14434	Perfluorohexanoic acid	307-24-4	6.4	0.44	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	4.2	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	53	0.44	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	22	0.44	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/27/2018 14:04	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/20/2018 16:00	Anthony C Polaski	1

1/26/19 8

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NPZ-16-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9903637
ELLE Group #: 2010258
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/16/2018 11:40
Collection Date/Time: 11/13/2018 12:13
SDG#: BSI21-06

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.89	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.89	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	24	0.27	0.98	1.8	1
14434	Perfluorodecanoic acid	335-76-2	4.0	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	1.8	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	18	0.36	0.98	1.8	1
14434	Perfluorohexanoic acid	307-24-4	4.6	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	4.7	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	50	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	24	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/27/2018 14:13	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/20/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6786 • www.EurofinsUS.com/LancLabsEnv

Sample Description: OU1-NPZ-8-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9903638
ELLE Group #: 2010258
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/16/2018 11:40
Collection Date/Time: 11/13/2018 13:34
SDG#: BSI21-07

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NETFOSAA NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.87	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.87	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	19	0.26	0.96	1.7	1
14434	Perfluorodecanoic acid	335-76-2	2.6	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	3.1	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	15	0.35	0.96	1.7	1
14434	Perfluorohexanoic acid	307-24-4	6.3	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	4.3	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	47	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	24	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/27/2018 14:22	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/20/2018 16:00	Anthony C Polaski	1

1/26/19 ✓

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NPZ-7-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9903639
ELLE Group #: 2010258
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/16/2018 11:40
Collection Date/Time: 11/13/2018 15:01
SDG#: BSI21-08

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.87	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.87	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	6.9	0.26	0.96	1.7	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	4.4	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	46	0.35	0.96	1.7	1
14434	Perfluorohexanoic acid	307-24-4	26	0.44	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	4.9	0.44	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	41	0.44	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/27/2018 14:31	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/20/2018 16:00	Anthony C Polaski	1

1/26/19 J

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NWP-6-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9903640
ELLE Group #: 2010258
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/16/2018 11:40
Collection Date/Time: 11/13/2018 16:36
SDG#: BSI21-09

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	1.0 J	0.87	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.87	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	19	0.26	0.96	1.7	1
14434	Perfluorodecanoic acid	335-76-2	4.7	0.44	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	2.9	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	21	0.35	0.96	1.7	1
14434	Perfluorohexanoic acid	307-24-4	6.7	0.44	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	6.1	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	79	0.44	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	27	0.44	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/27/2018 14:40	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/20/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NWP-6-02 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9903641
ELLE Group #: 2010258
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/16/2018 11:40
Collection Date/Time: 11/13/2018 16:37
SDG#: BSI21-10

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	1.3 J	0.85	2.0	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.85	2.0	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	24	0.26	0.94	1.7	1
14434	Perfluorodecanoic acid	335-76-2	5.4	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	3.6	0.34	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	25	0.34	0.94	1.7	1
14434	Perfluorohexanoic acid	307-24-4	7.9	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	6.8	0.34	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	94	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	33	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.51	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.51	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/27/2018 14:58	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18324013	11/20/2018 16:00	Anthony C Polaski	1

11/16/19

*=This limit was used in the evaluation of the final result

LDC #: 44154B96
 SDG #: BSI21/2010258
 Laboratory: Eurofins

VALIDATION COMPLETENESS WORKSHEET
 Stage 2B

Date: 1/21/19
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537M)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A, A	$ESD < 20\%$, TME/ICV $\leq 30\%$
IV.	Continuing calibration/ISC	A	CCV/ISC $\leq 30\%$
V.	Laboratory Blanks	A	
VI.	Field blanks	NB	EB = 2, SB = 3.
VII.	Matrix spike/Matrix spike duplicates	M	11/12 = 70% and 100% out > 5x of
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	M	D = 4+5, 9+10
X.	Labeled Compounds	M	
XI.	Compound quantitation RL/LOQ/LODs	N	
XII.	Target compound identification	N	
XIII.	System performance	N	
XIV.	Overall assessment of data	A	

Note: A = Acceptable
 N = Not provided/applicable
 SW = See worksheet
 ND = No compounds detected
 R = Rinsate
 FB = Field blank
 D = Duplicate
 TB = Trip blank
 EB = Equipment blank
 SB = Source blank
 OTHER:

	Client ID	Lab ID	Matrix	Date
1	OU1-GW-10-01	9903630	Water	11/13/18
2	OU1-GW-10-W-01	9903633	Water	11/13/18
3	OU1-GW-10-W-02	9903634	Water	11/13/18
4	OU1-MW-A-01	9903635	Water	11/13/18
5	OU1-MW-A-02	9903636	Water	11/13/18
6	OU1-NPZ-16-01	9903637	Water	11/13/18
7	OU1-NPZ-8-01	9903638	Water	11/13/18
8	OU1-NPZ-7-01	9903639	Water	11/13/18
9	OU1-NWP-6-01	9903640	Water	11/13/18
10	OU1-NWP-6-02	9903641	Water	11/13/18
11	OU1-GW-10-01MS	9903631MS	Water	11/13/18
12	OU1-GW-10-01MSD	9903632MSD	Water	11/13/18
13				
14				
15				

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. NEtFOSAA			
B. NMeFOSAA			
C. Perfluorobutanesulfonate			
D. Perfluorobutanoic acid			
E. Perfluorodecanesulfonate			
F. Perfluorodecanoic acid			
G. Perfluorododecanoic acid			
H. Perfluoroheptanoic acid			
I. Perfluorohexanesulfonate			
J. Perfluorohexanoic acid			
K. Perfluorononanoic acid			
L. Perfluorooctanesulfonamide			
M. Perfluoro-octanesulfonate			
N. Perfluorooctanoic acid			
O. Perfluoropentanoic acid			
P. Perfluorotetradecanoic acid			
Q. Perfluorotridecanoic acid			
R. Perfluoroundecanoic acid			

VALIDATION FINDINGS WORKSHEET
Field Duplicates

METHOD: LC MS PFCs (EPA Method 537-Mod)

Y/N/NA Were field duplicate pairs identified in this SDG?

Y/N/NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ng/L)		RPD (≤30%)	Qualifications (Parent Only)
	4	5		
A	2.6	2.8	7	
B	1.5	1.3	14	
C	17	18	6	
F	4.9	4.7	4	
H	2.4	2.4	0	
I	15	15	0	
J	6.7	6.4	5	
K	4.0	4.2	5	
M	47	53	12	
N	22	22	0	

Compound	Concentration (ng/L)		RPD (≤30%)	Qualifications (Parent Only)
	9	10		
A	1.0	1.3	26	
C	19	24	23	
F	4.7	5.4	14	
H	2.9	3.6	22	
I	21	25	17	
J	6.7	7.9	16	
K	6.1	6.8	11	
M	79	94	17	
N	27	33	20	

VALIDATION FINDINGS WORKSHEET
Labeled Compounds

METHOD: LC/MS PFAS (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N / N/A Were all labeled compound recoveries within the QC criteria?

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		1	1305-PH/xA	42 (50-150)	(5) 9
		11 (MS)	↓	40 (50-150)	No Anal
		12 (MSD)	↓	41 (↓)	↓
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Barstow Site Inspection
LDC Report Date: January 22, 2019
Parameters: Perfluoroalkyl & Polyfluoroalkyl Substances
Validation Level: Stage 2B
Laboratory: Eurofins
Sample Delivery Group (SDG): BSI22/2012436

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OU2N-TIM3-01	9913119	Water	11/20/18
OU1-NSP-2-01	9913120	Water	11/20/18
OU1-NS7-4-01	9913121	Water	11/21/18
OU1-NS7-4-W-01	9913122	Water	11/21/18
OU1-NS7-4-W-02	9913123	Water	11/21/18
OU1-NS7-8-01	9913124	Water	11/21/18
OU1-NS7-3-01	9913125	Water	11/21/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Field Sampling and Analysis Plan for Site Inspection Per- and Polyfluoroalkyl Substances, Nebo Main Base and Yermo Annex, Marine Corps Logistics Base, Barstow, CA (October 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) by Environmental Protection Agency (EPA) Method 537 Modified

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked and the requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990.

For each calibration standard, all compounds were within 70-130% of their true value.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

The percent differences (%D) of the instrument sensitivity check (ISC) were less than or equal to 30.0% for all compounds.

All compound concentrations were at the limit of quantitation (LOQ) for the ISC standard.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Sample OU1-NS7-4-W-01 was identified as an equipment blank. No contaminants were found.

Sample OU1-NS7-4-W-02 was identified as a source blank. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits with the following exceptions:

Sample	Labeled Compound	%R (Limits)	Affected Compound	Flag	A or P
OU2N-TIM3-01	13C2-Perfluorotetradecanoic acid	46 (50-150)	Perfluorotetradecanoic acid	UJ (all non-detects)	P

XI. Compound Quantitation

The laboratory indicated that PFAS are currently being reported as the sum of the branched and linear isomers so both peaks were integrated.

Raw data were not reviewed for Stage 2B validation.

XII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIII. System Performance

Raw data were not reviewed for Stage 2B validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to labeled compound %R, data were qualified as estimated in one samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

**Barstow Site Inspection
 Perfluoroalkyl & Polyfluoroalkyl Substances - Data Qualification Summary - SDG
 BSI22/2012436**

Sample	Compound	Flag	A or P	Reason
OU2N-TIM3-01	Perfluorotetradecanoic acid	UJ (all non-detects)	P	Labeled compounds (%R)

**Barstow Site Inspection
 Perfluoroalkyl & Polyfluoroalkyl Substances - Laboratory Blank Data Qualification
 Summary - SDG BSI22/2012436**

No Sample Data Qualified in this SDG

**Barstow Site Inspection
 Perfluoroalkyl & Polyfluoroalkyl Substances - Field Blank Data Qualification
 Summary - SDG BSI22/2012436**

No Sample Data Qualified in this SDG

Sample Description: OU2N-TIM3-01 Grab Groundwater
MCLB Barstow

Gutierrez Canales Engineering
ELLE Sample #: GW 9913119
ELLE Group #: 2012436
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/27/2018 11:15
Collection Date/Time: 11/20/2018 12:57
SDG#: BSI22-01

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NETFOSAA NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	2.2 J	0.85	2.0	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.85	2.0	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	20	0.26	0.94	1.7	1
14434	Perfluorodecanoic acid	335-76-2	6.0	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	2.8	0.34	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	16	0.34	0.94	1.7	1
14434	Perfluorohexanoic acid	307-24-4	8.2	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	5.6	0.34	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	60	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	24	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D. <i>UJ</i>	0.51	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.51	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

The recovery for the labeled compound used as extraction standards is outside the QC acceptance limits as noted on the QC Summary. The following corrective action was taken: The sample was reextracted outside holding time. The data is reported from the original extraction. Both sets of data are included in the data package.

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18333008	12/04/2018 19:04	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18333008	11/29/2018 15:30	Danielle D McCully	1

1/2/19 Q

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NSP-2-01 Grab Groundwater
MCLB Barstow

Gutierrez Canales Engineering
ELLE Sample #: GW 9913120
ELLE Group #: 2012436
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/27/2018 11:15
Collection Date/Time: 11/20/2018 14:05
SDG#: BSI22-02

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.86	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.86	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.26	0.95	1.7	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.34	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.34	0.95	1.7	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.34	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18333008	12/04/2018 19:13	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18333008	11/29/2018 15:30	Danielle D McCully	1

1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NS7-4-01 Grab Groundwater
MCLB Barstow

Gutierrez Canales Engineering
ELLE Sample #: GW 9913121
ELLE Group #: 2012436
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/27/2018 11:15
Collection Date/Time: 11/21/2018 09:02
SDG#: BSI22-03

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.87	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.87	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	0.51 J	0.26	0.95	1.7	1
14434	Perfluorodecanoic acid	335-76-2	2.9	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	2.3	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	0.98 J	0.35	0.95	1.7	1
14434	Perfluorohexanoic acid	307-24-4	3.1	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	2.4	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	3.0	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	4.6	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	0.61 J	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18333008	12/04/2018 19:22	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18333008	11/29/2018 15:30	Danielle D McCully	1

1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NS7-4-W-01 Grab Water
MCLB Barstow

Gutierrez Canales Engineering
ELLE Sample #: GW 9913122
ELLE Group #: 2012436
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/27/2018 11:15
Collection Date/Time: 11/21/2018 09:15
SDG#: BSI22-04EB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NETFOSAA NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.90	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.90	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.99	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	0.99	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18333008	12/04/2018 19:41	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18333008	11/29/2018 15:30	Danielle D McCully	1

1/26/19 8

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NS7-4-W-02 Grab Water
MCLB Barstow

Gutierrez Canales Engineering
ELLE Sample #: GW 9913123
ELLE Group #: 2012436
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/27/2018 11:15
Collection Date/Time: 11/21/2018 09:20
SDG#: BSI22-05EB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.89	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.89	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.98	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	0.98	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.44	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.44	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.44	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18333008	12/04/2018 19:50	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18333008	11/29/2018 15:30	Danielle D McCully	1

1/26/19 8

*=This limit was used in the evaluation of the final result

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6786 • www.EurofinsUS.com/LancLabsEnv

Sample Description: OU1-NS7-8-01 Grab Groundwater
MCLB Barstow

Gutierrez Canales Engineering
ELLE Sample #: GW 9913124
ELLE Group #: 2012436
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/27/2018 11:15
Collection Date/Time: 11/21/2018 11:26
SDG#: BSI22-06

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.86	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.86	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.26	0.95	1.7	1
14434	Perfluorodecanoic acid	335-76-2	6.8	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	0.93 J	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	1.3 J	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.35	0.95	1.7	1
14434	Perfluorohexanoic acid	307-24-4	1.7 J	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	2.5	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	2.4	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	1.9	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	2.5	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18333008	12/04/2018 19:59	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18333008	11/29/2018 15:30	Danielle D McCully	1

1/26/19 8

*=This limit was used in the evaluation of the final result

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6786 • www.EurofinsUS.com/LancLaboEnv

Sample Description: OU1-NS7-3-01 Grab Groundwater
MCLB Barstow

Gutierrez Canales Engineering
ELLE Sample #: GW 9913125
ELLE Group #: 2012436
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/27/2018 11:15
Collection Date/Time: 11/21/2018 14:30
SDG#: BSI22-07

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.91	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.91	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	1.0	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.46	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.46	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.37	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.37	1.0	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.46	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.37	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.46	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.46	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.55	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.55	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.46	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18333008	12/04/2018 20:08	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18333008	11/29/2018 15:30	Danielle D McCully	1

1/26/19

*=This limit was used in the evaluation of the final result

LDC #: 44154C96
 SDG #: BSI22/2012436
 Laboratory: Eurofins

VALIDATION COMPLETENESS WORKSHEET
 Stage 2B

Date: 12/19
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537M)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A-A	SD < 20%. Y ² , TMO/ICV < 30%
IV.	Continuing calibration/ISC	A	CCV/ISC < 30%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	SB = 4. SB = 5.
VII.	Matrix spike/Matrix spike duplicates	N	CS
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	
X.	Labeled Compounds	W	
XI.	Compound quantitation RL/LOQ/LODs	N	
XII.	Target compound identification	N	
XIII.	System performance	N	
XIV.	Overall assessment of data	A	

Note: A = Acceptable
 N = Not provided/applicable
 SW = See worksheet
 ND = No compounds detected
 R = Rinsate
 FB = Field blank
 D = Duplicate
 TB = Trip blank
 EB = Equipment blank
 SB = Source blank
 OTHER:

	Client ID	Lab ID	Matrix	Date
1	OU2N-TIM3-01	9913119	Water	11/20/18
2	OU1-NSP-2-01	9913120	Water	11/20/18
3	OU1-NS7-4-01	9913121	Water	11/21/18
4	OU1-NS7-4-W-01	9913122	Water	11/21/18
5	OU1-NS7-4-W-02	9913123	Water	11/21/18
6	OU1-NS7-8-01	9913124	Water	11/21/18
7	OU1-NS7-3-01	9913125	Water	11/21/18
8				
9				
10				

Notes:

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. NEtFOSAA			
B. NMeFOSAA			
C. Perfluorobutanesulfonate			
D. Perfluorobutanoic acid			
E. Perfluorodecanesulfonate			
F. Perfluorodecanoic acid			
G. Perfluorododecanoic acid			
H. Perfluoroheptanoic acid			
I. Perfluorohexanesulfonate			
J. Perfluorohexanoic acid			
K. Perfluorononanoic acid			
L. Perfluorooctanesulfonamide			
M. Perfluoro-octanesulfonate			
N. Perfluorooctanoic acid			
O. Perfluoropentanoic acid			
P. Perfluorotetradecanoic acid			
Q. Perfluorotridecanoic acid			
R. Perfluoroundecanoic acid			

VALIDATION FINDINGS WORKSHEET
Labeled Compounds

METHOD: LC/MS PFAS (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all labeled compound recoveries within the QC criteria?

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		<u>1 (data)</u> <u>CND</u>	<u>13C2-PTEDA</u>	<u>46</u> (<u>50-150</u>)	<u>N/A</u> (<u>?</u>)
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Barstow Site Inspection

LDC Report Date: January 22, 2019

Parameters: Perfluoroalkyl & Polyfluoroalkyl Substances

Validation Level: Stage 2B

Laboratory: Eurofins

Sample Delivery Group (SDG): BSI23/2014748

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OUI-YS15-2-01	9922836	Water	11/29/18
OUI-YS15-2-W-01	9922837	Water	11/29/18
OUI-YS15-2-W-02	9922838	Water	11/29/18
OUI-YS21-3-01	9922839	Water	11/29/18
OUI-YS21-3-02	9922840	Water	11/29/18
OUI-PMW-6-01	9922841	Water	11/29/18
OUI-YS20-3-01	9922844	Water	11/29/18
OUI-YS20-3-02	9922845	Water	11/29/18
OUI-NGW01-01	9922846	Water	11/30/18
OUI-YIMW-8-01	9922847	Water	11/30/18
OUI-YIMW-8-W-01	9922850	Water	11/30/18
OUI-YIMW-8-W-02	9922851	Water	11/30/18
OUI-YIMW-6-01	9922852	Water	11/30/18
OUI-NNE-5-01	9922853	Water	11/30/18
OUI-PMW-6-01MS	9922842MS	Water	11/29/18
OUI-PMW-6-01MSD	9922843MSD	Water	11/29/18
OUI-YIMW-8-01MS	9922848MS	Water	11/30/18
OUI-YIMW-8-01MSD	9922849MSD	Water	11/30/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Field Sampling and Analysis Plan for Site Inspection Per- and Polyfluoroalkyl Substances, Nebo Main Base and Yermo Annex, Marine Corps Logistics Base, Barstow, CA (October 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) by Environmental Protection Agency (EPA) Method 537 Modified

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked and the requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990.

For each calibration standard, all compounds were within 70-130% of their true value.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

The percent differences (%D) of the instrument sensitivity check (ISC) were less than or equal to 30.0% for all compounds.

All compound concentrations were at the limit of quantitation (LOQ) for the ISC standard.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Samples OUI-YS15-2-W-01 and OUI-YIMW-8-W-01 were identified as equipment blanks. No contaminants were found.

Samples OUI-YS15-2-W-02 and OUI-YIMW-8-W-02 were identified as source blanks. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
OUI-YIMW-8-01MS/MSD (OUI-YIMW-8-01)	Perfluorohexanesulfonate	68 (71-130)	-	J (all detects)	A

Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) were analyzed as required by the method. Percent recoveries (%R) were within QC limits.

IX. Field Duplicates

Samples OUI-YS21-3-01 and OUI-YS21-3-02 and samples OUI-YS20-3-01 and OUI-YS20-3-02 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ng/L)		RPD (Limits)	Flag	A or P
	OUI-YS21-3-01	OUI-YS21-3-02			
Perfluorobutanesulfonate	2.6	2.5	4 (≤30)	-	-
Perfluoroheptanoic acid	0.55	0.53	4 (≤30)	-	-
Perfluorohexanesulfonate	12	12	0 (≤30)	-	-
Perfluorohexanoic acid	1.1	1.0	10 (≤30)	-	-
Perfluoro-octanesulfonate	14	22	44 (≤30)	J (all detects)	A
Perfluorooctanoic acid	9.4	8.6	9 (≤30)	-	-

Compound	Concentration (ng/L)		RPD (Limits)	Flag	A or P
	OUI-YS20-3-01	OUI-YS20-3-02			
Perfluorobutanesulfonate	1.3	1.4	7 (≤ 30)	-	-
Perfluorohexanesulfonate	5.0	5.1	2 (≤ 30)	-	-
Perfluorohexanoic acid	0.48	0.47	2 (≤ 30)	-	-
Perfluoro-octanesulfonate	3.2	3.4	6 (≤ 30)	-	-
Perfluorooctanoic acid	1.5	1.5	0 (≤ 30)	-	-

X. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits.

XI. Compound Quantitation

The laboratory indicated that PFAS are currently being reported as the sum of the branched and linear isomers so both peaks were integrated.

Raw data were not reviewed for Stage 2B validation.

XII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIII. System Performance

Raw data were not reviewed for Stage 2B validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to MS/MSD %R and field duplicate RPD, data were qualified as estimated in three samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

**Barstow Site Inspection
 Perfluoroalkyl & Polyfluoroalkyl Substances - Data Qualification Summary - SDG
 BSI23/2014748**

Sample	Compound	Flag	A or P	Reason
OUI-YIMW-8-01	Perfluorohexanesulfonate	J (all detects)	A	Matrix spike/Matrix spike duplicate (%R)
OUI-YS21-3-01 OUI-YS21-3-02	Perfluoro-octanesulfonate	J (all detects)	A	Field duplicates (RPD)

**Barstow Site Inspection
 Perfluoroalkyl & Polyfluoroalkyl Substances - Laboratory Blank Data Qualification
 Summary - SDG BSI23/2014748**

No Sample Data Qualified in this SDG

**Barstow Site Inspection
 Perfluoroalkyl & Polyfluoroalkyl Substances - Field Blank Data Qualification
 Summary - SDG BSI23/2014748**

No Sample Data Qualified in this SDG

Sample Description: OUI-YS15-2-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9922836
ELLE Group #: 2014748
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/04/2018 10:00
Collection Date/Time: 11/29/2018 09:34
SDG#: BSI23-01

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.87	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.87	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	2.8	0.26	0.96	1.7	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	9.5	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	3.3	0.35	0.96	1.7	1
14434	Perfluorohexanoic acid	307-24-4	27	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	0.82 J	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18339013	12/08/2018 12:10	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18339013	12/05/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OUI-YS15-2-W-01 Grab Water
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9922837
ELLE Group #: 2014748
Matrix: Water

Project Name: Barstow Site Inspection

Submission Date/Time: 12/04/2018 10:00
Collection Date/Time: 11/29/2018 09:50
SDG#: BSI23-02EB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.90	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.90	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.99	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	0.99	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18339013	12/08/2018 12:19	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18339013	12/05/2018 16:00	Anthony C Polaski	1

12/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OUI-YS15-2-W-02 Grab Water
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9922838
ELLE Group #: 2014748
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/04/2018 10:00
Collection Date/Time: 11/29/2018 09:55
SDG#: BSI23-03EB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.85	2.0	2.5	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.85	2.0	2.5	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.25	0.93	1.7	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.42	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.42	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.34	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.34	0.93	1.7	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.42	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.34	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.42	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.42	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.51	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.51	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.42	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18339013	12/08/2018 12:28	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18339013	12/05/2018 16:00	Anthony C Polaski	1

12/6/19 Y

*=This limit was used in the evaluation of the final result

Sample Description: OUI-YS21-3-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9922839
ELLE Group #: 2014748
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/04/2018 10:00
Collection Date/Time: 11/29/2018 11:49
SDG#: BSI23-04

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.87	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.87	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	2.6	0.26	0.96	1.7	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	0.55 J	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	12	0.35	0.96	1.7	1
14434	Perfluorohexanoic acid	307-24-4	1.1 J	0.44	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	14 J	0.44	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	9.4	0.44	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18339013	12/08/2018 12:37	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18339013	12/05/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OUI-YS21-3-02 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9922840
ELLE Group #: 2014748
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/04/2018 10:00
Collection Date/Time: 11/29/2018 11:50
SDG#: BSI23-05

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.92	2.2	2.8	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.92	2.2	2.8	1
14434	Perfluorobutanesulfonate	375-73-5	2.5	0.28	1.0	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.46	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.46	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	0.53 J	0.37	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	12	0.37	1.0	1.8	1
14434	Perfluorohexanoic acid	307-24-4	1.0 J	0.46	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.37	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	22 J	0.46	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	8.6	0.46	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.55	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.55	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.46	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18339013	12/08/2018 12:46	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18339013	12/05/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OUI-PMW-6-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9922841
ELLE Group #: 2014748
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submission Date/Time: 12/04/2018 10:00
Collection Date/Time: 11/29/2018 13:57
SDG#: BSI23-06BKG

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.89	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.89	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	1.3 J	0.27	0.98	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	0.83 J	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	7.2	0.36	0.98	1.8	1
14434	Perfluorohexanoic acid	307-24-4	4.1	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	2.3	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	0.93 J	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18339013	12/08/2018 12:55	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18339013	12/05/2018 16:00	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

Sample Description: OUI-YS20-3-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9922844
ELLE Group #: 2014748
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/04/2018 10:00
Collection Date/Time: 11/29/2018 16:01
SDG#: BSI23-07

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.89	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.89	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	1.3 J	0.27	0.98	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.35	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	5.0	0.35	0.98	1.8	1
14434	Perfluorohexanoic acid	307-24-4	0.48 J	0.44	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	3.2	0.44	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	1.5 J	0.44	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18339013	12/08/2018 13:05	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18339013	12/05/2018 16:00	Anthony C Polaski	1

1/26/19 J

*=This limit was used in the evaluation of the final result

Sample Description: OUI-YS20-3-02 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9922845
ELLE Group #: 2014748
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/04/2018 10:00
Collection Date/Time: 11/29/2018 16:02
SDG#: BSI23-08

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.90	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.90	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	1.4 J	0.27	0.99	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	5.1	0.36	0.99	1.8	1
14434	Perfluorohexanoic acid	307-24-4	0.47 J	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	3.4	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	1.5 J	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18339013	12/08/2018 13:23	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18339013	12/05/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OUI-NGW01-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9922846
ELLE Group #: 2014748
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/04/2018 10:00
Collection Date/Time: 11/30/2018 10:05
SDG#: BSI23-09

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	1.2	3.0	3.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	1.2	3.0	3.7	1
14434	Perfluorobutanesulfonate	375-73-5	21	0.37	1.4	2.5	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.62	1.5	2.5	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.62	1.5	2.5	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.50	1.5	2.5	1
14434	Perfluorohexanesulfonate	355-46-4	18	0.50	1.4	2.5	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.62	1.5	2.5	1
14434	Perfluorononanoic acid	375-95-1	0.76 J	0.50	1.5	2.5	1
14434	Perfluoro-octanesulfonate	1763-23-1	31	0.62	1.5	2.5	1
14434	Perfluorooctanoic acid	335-67-1	5.8	0.62	1.5	2.5	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.75	1.5	2.5	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.75	1.5	2.5	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.62	1.5	2.5	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18340014	12/10/2018 23:07	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18340014	12/06/2018 16:00	Anthony C Polaski	1

1/26/19 

*=This limit was used in the evaluation of the final result

Sample Description: OUI-YIMW-8-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9922847
ELLE Group #: 2014748
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/04/2018 10:00
Collection Date/Time: 11/30/2018 12:23
SDG#: BSI23-10BKG

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.90	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.90	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	1.6 J	0.27	0.99	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	0.41 J	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	8.1 J	0.36	0.99	1.8	1
14434	Perfluorohexanoic acid	307-24-4	0.62 J	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	7.1	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	4.3	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18340014	12/10/2018 23:16	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18340014	12/06/2018 16:00	Anthony C Polaski	1

1/26/19 g

*=This limit was used in the evaluation of the final result

Sample Description: OUI-YIMW-8-W-01 Grab Water
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9922850
ELLE Group #: 2014748
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/04/2018 10:00
Collection Date/Time: 11/30/2018 12:45
SDG#: BSI23-11EB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.88	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.88	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.26	0.96	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.35	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.35	0.96	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.44	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.44	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.44	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18340014	12/10/2018 23:25	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18340014	12/06/2018 16:00	Anthony C Polaski	1

1/26/19 J

*=This limit was used in the evaluation of the final result

Sample Description: OUI-YIMW-8-W-02 Grab Water
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9922851
ELLE Group #: 2014748
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/04/2018 10:00
Collection Date/Time: 11/30/2018 12:50
SDG#: BSI23-12EB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.88	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.88	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.97	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.35	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.35	0.97	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.44	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.44	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.44	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18340014	12/10/2018 23:34	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18340014	12/06/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OUI-YIMW-6-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9922852
ELLE Group #: 2014748
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submission Date/Time: 12/04/2018 10:00
Collection Date/Time: 11/30/2018 14:35
SDG#: BSI23-13

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.86	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.86	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	2.0	0.26	0.95	1.7	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	0.70 J	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	9.4	0.35	0.95	1.7	1
14434	Perfluorohexanoic acid	307-24-4	1.7 J	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	0.71 J	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	12	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	7.5	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18340014	12/10/2018 23:43	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18340014	12/06/2018 16:00	Anthony C Polaski	1

1/26/19 J

*=This limit was used in the evaluation of the final result

Sample Description: OUI-NNE-5-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9922853
ELLE Group #: 2014748
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/04/2018 10:00
Collection Date/Time: 11/30/2018 16:05
SDG#: BSI23-14

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.90	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.90	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	25	0.27	0.99	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	6.2	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	22	0.36	0.99	1.8	1
14434	Perfluorohexanoic acid	307-24-4	92	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	0.67 J	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	23	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	19	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18340014	12/10/2018 23:52	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18340014	12/06/2018 16:00	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

LDC #: 44154D96
 SDG #: BSI23/2014748
 Laboratory: Eurofins

VALIDATION COMPLETENESS WORKSHEET

Stage 2B

Date: 1/21/19
 Page: bf 2
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537M)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	$RSD \leq 30\%$. $TRE/ICV \leq 30\%$
IV.	Continuing calibration/ISC	A	$CCV/ISC \leq 30\%$
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	SB=2, 11 SB=3.12
VII.	Matrix spike/Matrix spike duplicates	SW	
VIII.	Laboratory control samples	A	LCB
IX.	Field duplicates	M	D=4+5. 7+8
X.	Labeled Compounds	A	
XI.	Compound quantitation RL/LOQ/LODs	N	
XII.	Target compound identification	N	
XIII.	System performance	N	
XIV.	Overall assessment of data	A	

Note: A = Acceptable
 N = Not provided/applicable
 SW = See worksheet
 ND = No compounds detected
 R = Rinsate
 FB = Field blank
 D = Duplicate
 TB = Trip blank
 EB = Equipment blank
 SB=Source blank
 OTHER:

	Client ID	Lab ID	Matrix	Date
1	OUI-YS15-2-01	9922836	Water	11/29/18
2	OUI-YS15-2-W-01	9922837	Water	11/29/18
3	OUI-YS15-2-W-02	9922838	Water	11/29/18
4	OUI-YS21-3-01	9922839	Water	11/29/18
5	OUI-YS21-3-02	9922840	Water	11/29/18
6	OUI-PMW-6-01	9922841	Water	11/29/18
7	OUI-YS20-3-01	9922844	Water	11/29/18
8	OUI-YS20-3-02	9922845	Water	11/29/18
9	OUI-NGW01-01	9922846	Water	11/30/18
10	OUI-YIMW-8-W-01	9922847	Water	11/30/18
11	OUI-YIMW-8-W-01	9922850	Water	11/30/18
12	OUI-YIMW-8-W-02	9922851	Water	11/30/18
13	OUI-YIMW-6-01	9922852	Water	11/30/18
14	OUI-NNE-5-01	9922853	Water	11/30/18
15	OUI-PMW-6-01MS	9922842MS	Water	11/29/18

LDC #: 44154D96
SDG #: BSI23/2014748
Laboratory: Eurofins

VALIDATION COMPLETENESS WORKSHEET
Stage 2B

Date: 1/21/19
Page: 7 of 7
Reviewer: [Signature]
2nd Reviewer: [Signature]

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537M)

	Client ID	Lab ID	Matrix	Date
16	OUI-PMW-6-01MSD	9922843MSD	Water	11/29/18
17	OUI-YIMW-8- V -01MS	9922848MS	Water	11/30/18
18	OUI-YIMW-8- V -01MSD	9922849MSD	Water	11/30/18
19				
20				
21				

Notes:

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. NEtFOSAA			
B. NMeFOSAA			
C. Perfluorobutanesulfonate			
D. Perfluorobutanoic acid			
E. Perfluorodecanesulfonate			
F. Perfluorodecanoic acid			
G. Perfluorododecanoic acid			
H. Perfluoroheptanoic acid			
I. Perfluorohexanesulfonate			
J. Perfluorohexanoic acid			
K. Perfluorononanoic acid			
L. Perfluorooctanesulfonamide			
M. Perfluoro-octanesulfonate			
N. Perfluorooctanoic acid			
O. Perfluoropentanoic acid			
P. Perfluorotetradecanoic acid			
Q. Perfluorotridecanoic acid			
R. Perfluoroundecanoic acid			

VALIDATION FINDINGS WORKSHEET Matrix Spike/Matrix Spike Duplicates

METHOD: LC/MS PFAS (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

- Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) or duplicate sample analyzed for each matrix in this SDG?
- Y N N/A Was a MS/MSD analyzed every 20 samples of each matrix?
- Y N N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?
- Y N ~~N/A~~ Were all duplicate sample relative percent differences (RPD) or differences within QC limits?

#	Date	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
		<u>17/18</u>	<u>I</u>	<u>68 (71-130)</u>	()	()	<u>ID (dets)</u>	<u>[Signature]</u>
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		
				()	()	()		

VALIDATION FINDINGS WORKSHEET
Field Duplicates

METHOD: LC MS PFCs (EPA Method 537-Mod)

Y/N/NA Were field duplicate pairs identified in this SDG?

Y/N/NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ng/L)		RPD (≤30%)	Qualifications (Parent Only)
	4	5		
C	2.6	2.5	4	
H	0.55	0.53	4	
I	12	12	0	
J	1.1	1.0	10	
M	14	22	44	Jdets/A
N	9.4	8.6	9	

Compound	Concentration (ng/L)		RPD (≤30%)	Qualifications (Parent Only)
	7	8		
C	1.3	1.4	7	
I	5.0	5.1	2	
J	0.48	0.47	2	
M	3.2	3.4	6	
N	1.5	1.5	0	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Barstow Site Inspection

LDC Report Date: January 22, 2019

Parameters: Perfluoroalkyl & Polyfluoroalkyl Substances

Validation Level: Stage 2B

Laboratory: Eurofins

Sample Delivery Group (SDG): BSI24/2015917

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OU1-YEP-3-01	9927672	Water	12/04/18
OU1-YEP-3-W-01	9927673	Water	12/04/18
OU1-YEP-3-W-02	9927674	Water	12/04/18
OU1-YS35-4-01	9927675	Water	12/04/18
OU1-YCW16-4-01	9927676	Water	12/04/18
OU1-YCW16-2-01	9927677	Water	12/04/18
OU1-Y4-2-01	9927678	Water	12/05/18
OU1-Y4-2-W-01	9927679	Water	12/05/18
OU1-Y4-2-W-02	9927680	Water	12/05/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Field Sampling and Analysis Plan for Site Inspection Per- and Polyfluoroalkyl Substances, Nebo Main Base and Yermo Annex, Marine Corps Logistics Base, Barstow, CA (October 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) by Environmental Protection Agency (EPA) Method 537 Modified

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked and the requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990.

For each calibration standard, all compounds were within 70-130% of their true value.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

The percent differences (%D) of the instrument sensitivity check (ISC) were less than or equal to 30.0% for all compounds.

All compound concentrations were at the limit of quantitation (LOQ) for the ISC standard.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Samples OU1-YEP-3-W-01 and OU1-Y4-2-W-01 were identified as equipment blanks. No contaminants were found.

Samples OU1-YEP-3-W-02 and OU1-Y4-2-W-02 were identified as source blanks. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits.

XI. Compound Quantitation

The laboratory indicated that PFAS are currently being reported as the sum of the branched and linear isomers so both peaks were integrated.

Raw data were not reviewed for Stage 2B validation.

XII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIII. System Performance

Raw data were not reviewed for Stage 2B validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

**Barstow Site Inspection
Perfluoroalkyl & Polyfluoroalkyl Substances - Data Qualification Summary - SDG
BSI24/2015917**

No Sample Data Qualified in this SDG

**Barstow Site Inspection
Perfluoroalkyl & Polyfluoroalkyl Substances - Laboratory Blank Data Qualification
Summary - SDG BSI24/2015917**

No Sample Data Qualified in this SDG

**Barstow Site Inspection
Perfluoroalkyl & Polyfluoroalkyl Substances - Field Blank Data Qualification
Summary - SDG BSI24/2015917**

No Sample Data Qualified in this SDG

Sample Description: OU1-YEP-3-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9927672
ELLE Group #: 2015917
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/06/2018 10:30
Collection Date/Time: 12/04/2018 10:25
SDG#: BSI24-01

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.86	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.86	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	5.0	0.26	0.95	1.7	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	1.5 J	0.34	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	2.4	0.34	0.95	1.7	1
14434	Perfluorohexanoic acid	307-24-4	14	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.34	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	0.81 J	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/19/2018 13:53	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	2	18348012	12/14/2018 16:00	Anthony C Polaski	1

Handwritten signature and date: 1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OU1-YEP-3-W-01 Grab Water
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9927673
ELLE Group #: 2015917
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/06/2018 10:30
Collection Date/Time: 12/04/2018 10:40
SDG#: BSI24-02RB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.90	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.90	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.99	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	0.99	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18343003	12/11/2018 05:53	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18343003	12/09/2018 15:55	Danielle D McCully	1

1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OU1-YEP-3-W-02 Grab Water
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9927674
ELLE Group #: 2015917
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/06/2018 10:30
Collection Date/Time: 12/04/2018 10:45
SDG#: BSI24-03BL

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.88	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.88	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.97	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.35	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.35	0.97	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.44	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.44	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.44	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18343003	12/11/2018 06:02	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18343003	12/09/2018 15:55	Danielle D McCully	1

1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OU1-YS35-4-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9927675
ELLE Group #: 2015917
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/06/2018 10:30
Collection Date/Time: 12/04/2018 11:50
SDG#: BSI24-04

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.89	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.89	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	5.4	0.27	0.98	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	0.54 J	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	0.60 J	0.36	0.98	1.8	1
14434	Perfluorohexanoic acid	307-24-4	14	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18343003	12/11/2018 06:11	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18343003	12/09/2018 15:55	Danielle D McCully	1

1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OU1-YCW16-4-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9927676
ELLE Group #: 2015917
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/06/2018 10:30
Collection Date/Time: 12/04/2018 13:21
SDG#: BSI24-05

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.95	2.3	2.8	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.95	2.3	2.8	1
14434	Perfluorobutanesulfonate	375-73-5	3.9	0.28	1.0	1.9	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.47	1.1	1.9	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.47	1.1	1.9	1
14434	Perfluoroheptanoic acid	375-85-9	0.69 J	0.38	1.1	1.9	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.38	1.0	1.9	1
14434	Perfluorohexanoic acid	307-24-4	8.0	0.47	1.1	1.9	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.38	1.1	1.9	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.47	1.1	1.9	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.47	1.1	1.9	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.57	1.1	1.9	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.57	1.1	1.9	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.47	1.1	1.9	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18343003	12/11/2018 06:20	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18343003	12/09/2018 15:55	Danielle D McCully	1

*=This limit was used in the evaluation of the final result

Sample Description: OU1-YCW16-2-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9927677
ELLE Group #: 2015917
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/06/2018 10:30

Collection Date/Time: 12/04/2018 15:04

SDG#: BSI24-06

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
	LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15		ng/l	ng/l	ng/l	ng/l	
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.96	2.3	2.9	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.96	2.3	2.9	1
14434	Perfluorobutanesulfonate	375-73-5	3.3	0.29	1.1	1.9	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.48	1.2	1.9	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.48	1.2	1.9	1
14434	Perfluoroheptanoic acid	375-85-9	0.77 J	0.38	1.2	1.9	1
14434	Perfluorohexanesulfonate	355-46-4	1.1 J	0.38	1.1	1.9	1
14434	Perfluorohexanoic acid	307-24-4	8.7	0.48	1.2	1.9	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.38	1.2	1.9	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.48	1.2	1.9	1
14434	Perfluorooctanoic acid	335-67-1	0.65 J	0.48	1.2	1.9	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.58	1.2	1.9	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.58	1.2	1.9	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.48	1.2	1.9	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18343003	12/11/2018 06:29	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18343003	12/09/2018 15:55	Danielle D McCully	1

*=This limit was used in the evaluation of the final result

1/26/19

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabEnv

Sample Description: OU1-Y4-2-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9927678
ELLE Group #: 2015917
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/06/2018 10:30
Collection Date/Time: 12/05/2018 08:18
SDG#: BSI24-07

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.86	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.86	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	2.8	0.26	0.94	1.7	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	0.99 J	0.34	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	12	0.34	0.94	1.7	1
14434	Perfluorohexanoic acid	307-24-4	2.1	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	0.67 J	0.34	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	15	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	15	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.51	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.51	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18343003	12/11/2018 06:38	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18343003	12/09/2018 15:55	Danielle D McCully	1

1/26/19 J

*=This limit was used in the evaluation of the final result

Sample Description: OU1-Y4-2-W-01 Grab Water
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9927679
ELLE Group #: 2015917
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/06/2018 10:30

Collection Date/Time: 12/05/2018 08:45

SDG#: BSI24-08RB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.91	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.91	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	1.0	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.46	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.46	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.37	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.37	1.0	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.46	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.37	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.46	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.46	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.55	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.55	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.46	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18343003	12/11/2018 06:56	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18343003	12/09/2018 15:55	Danielle D McCully	1

1/26/19 Q

*=This limit was used in the evaluation of the final result

Sample Description: OU1-Y4-2-W-02 Grab Water
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9927680
ELLE Group #: 2015917
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/06/2018 10:30
Collection Date/Time: 12/05/2018 08:50
SDG#: BSI24-09BL

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.89	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.89	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.98	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	0.98	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18343003	12/11/2018 07:05	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18343003	12/09/2018 15:55	Danielle D McCully	1

1/26/19

*=This limit was used in the evaluation of the final result

LDC #: 44154E96
 SDG #: BSI24/2015917
 Laboratory: Eurofins

VALIDATION COMPLETENESS WORKSHEET
 Stage 2B

Date: 12/19
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537M)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A, A	RSO < 20%, Y ² , TMO/ICV < 30%
IV.	Continuing calibration/ISC	A	CCV/ISC < 30%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB = 2.8 SB = 3, 9
VII.	Matrix spike/Matrix spike duplicates	N	CS
VIII.	Laboratory control samples	A	LCB/D
IX.	Field duplicates	N	
X.	Labeled Compounds	A	
XI.	Compound quantitation RL/LOQ/LODs	N	
XII.	Target compound identification	N	
XIII.	System performance	N	
XIV.	Overall assessment of data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
 N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
 SW = See worksheet FB = Field blank EB = Equipment blank

	Client ID	Lab ID	Matrix	Date
1	OU1-YEP-3-01	9927672	Water	12/04/18
2	OU1-YEP-3-W-01	9927673	Water	12/04/18
3	OU1-YEP-3-W-02	9927674	Water	12/04/18
4	OU1-YS35-4-01	9927675	Water	12/04/18
5	OU1-YCW16-4-01	9927676	Water	12/04/18
6	OU1-YCW16-2-01	9927677	Water	12/04/18
7	OU1-Y4-2-01	9927678	Water	12/05/18
8	OU1-Y4-2-W-01	9927679	Water	12/05/18
9	OU1-Y4-2-W-02	9927680	Water	12/05/18
10				

Notes:

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Barstow Site Inspection

LDC Report Date: January 22, 2019

Parameters: Perfluoroalkyl & Polyfluoroalkyl Substances

Validation Level: Stage 2B

Laboratory: Eurofins

Sample Delivery Group (SDG): BSI27/2017387

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OU1-Y15-5-01	9934777	Water	12/05/18
OU1-Y9-5-01	9934778	Water	12/05/18
OU1-YS16-6-01	9934779	Water	12/06/18
OU1-YCW16-1-01	9934780	Water	12/07/18
OU1-YS16-6-W-01	9934781	Water	12/07/18
OU1-YS16-6-W-02	9934782	Water	12/07/18
OU1-YCW16-1-W-01	9934783	Water	12/07/18
OU1-YCW16-1-W-02	9934784	Water	12/07/18
OU1-YCW16-3-01	9934785	Water	12/07/18
OU1-YIMW-4-01	9934786	Water	12/07/18
OU1-PMW-2-01	9934787	Water	12/07/18
OU1-Y9-4-01	9934788	Water	12/07/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Field Sampling and Analysis Plan for Site Inspection Per- and Polyfluoroalkyl Substances, Nebo Main Base and Yermo Annex, Marine Corps Logistics Base, Barstow, CA (October 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) by Environmental Protection Agency (EPA) Method 537 Modified

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked and the requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990.

For each calibration standard, all compounds were within 70-130% of their true value.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

The percent differences (%D) of the instrument sensitivity check (ISC) were less than or equal to 30.0% for all compounds.

All compound concentrations were at the limit of quantitation (LOQ) for the ISC standard.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Samples OU1-YS16-6-W-01 and OU1-YCW16-1-W-01 were identified as equipment blanks. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
OU1-YCW16-1-W-01	12/07/18	Perfluorobutanesulfonate	0.41 ng/L	OU1-YCW16-1-01 OU1-YCW16-3-01 OU1-YIMW-4-01 OU1-PMW-2-01 OU1-Y9-4-01

Samples OU1-YS16-6-W-02 and OU1-YCW16-1-W-02 were identified as source blanks. No contaminants were found.

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater (>10X for common contaminants, >5X for other contaminants) than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
OU1-YCW16-1-01	Perfluorobutanesulfonate	1.8 ng/L	1.8U ng/L
OU1-YIMW-4-01	Perfluorobutanesulfonate	1.7 ng/L	1.7U ng/L

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits with the following exceptions:

Sample	Labeled Compound	%R (Limits)	Affected Compound	Flag	A or P
OU1-Y9-5-01	13C2-Perfluorotetradecanoic acid	36 (50-150)	Perfluorotetradecanoic acid	UJ (all non-detects)	P
OU1-YIMW-4-01	13C2-Perfluorotetradecanoic acid	43 (50-150)	Perfluorotetradecanoic acid	UJ (all non-detects)	P

XI. Compound Quantitation

The laboratory indicated that PFAS are currently being reported as the sum of the branched and linear isomers so both peaks were integrated.

Raw data were not reviewed for Stage 2B validation.

XII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIII. System Performance

Raw data were not reviewed for Stage 2B validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

Due to labeled compound %R, data were qualified as estimated in two samples.

Due to equipment blank contamination, data were qualified as not detected in two samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Sample results that were found to be estimated (J) are usable for limited purposes only. Based upon the data validation all other results are considered valid and usable for all purposes.

**Barstow Site Inspection
 Perfluoroalkyl & Polyfluoroalkyl Substances - Data Qualification Summary - SDG
 BSI27/2017387**

Sample	Compound	Flag	A or P	Reason
OU1-Y9-5-01 OU1-YIMW-4-01	Perfluorotetradecanoic acid	UJ (all non-detects)	P	Labeled compounds (%R)

**Barstow Site Inspection
 Perfluoroalkyl & Polyfluoroalkyl Substances - Laboratory Blank Data Qualification
 Summary - SDG BSI27/2017387**

No Sample Data Qualified in this SDG

**Barstow Site Inspection
 Perfluoroalkyl & Polyfluoroalkyl Substances - Field Blank Data Qualification
 Summary - SDG BSI27/2017387**

Sample	Compound	Modified Final Concentration	A or P
OU1-YCW16-1-01	Perfluorobutanesulfonate	1.8U ng/L	A
OU1-YIMW-4-01	Perfluorobutanesulfonate	1.7U ng/L	A

Sample Description: OU1-Y15-5-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9934777
ELLE Group #: 2017387
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/11/2018 10:05
Collection Date/Time: 12/05/2018 13:50
SDG#: BSI27-01

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NETFOSAA NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.87	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.87	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	4.2	0.26	0.95	1.7	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	2.7	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	11	0.35	0.95	1.7	1
14434	Perfluorohexanoic acid	307-24-4	8.0	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	2.5	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/19/2018 14:02	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/14/2018 16:00	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

Sample Description: OU1-Y9-5-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9934778
ELLE Group #: 2017387
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/11/2018 10:05
Collection Date/Time: 12/05/2018 17:16
SDG#: BSI27-02

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.90	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.90	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	2.6	0.27	0.99	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	1.3 J	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	14	0.36	0.99	1.8	1
14434	Perfluorohexanoic acid	307-24-4	3.4	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	0.42 J	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	13	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	14	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D. <i>MS</i>	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

The recovery for the labeled compound used as extraction standards is outside the QC acceptance limits as noted on the QC Summary. The following corrective action was taken: The sample was reextracted outside holding time. The data is reported from the original extraction. Both sets of data are included in the data package.

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/19/2018 14:11	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/14/2018 16:00	Anthony C Polaski	1

1/26/19 8

*=This limit was used in the evaluation of the final result

Sample Description: OU1-YS16-6-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9934779
ELLE Group #: 2017387
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/11/2018 10:05
Collection Date/Time: 12/06/2018 16:57
SDG#: BSI27-03

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.88	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.88	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	4.9	0.26	0.97	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	0.94 J	0.35	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	0.58 J	0.35	0.97	1.8	1
14434	Perfluorohexanoic acid	307-24-4	15	0.44	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.44	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.44	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/19/2018 14:29	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/14/2018 16:00	Anthony C Polaski	1

12/19/18

*=This limit was used in the evaluation of the final result

Sample Description: OU1-YCW16-1-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9934780
ELLE Group #: 2017387
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/11/2018 10:05
Collection Date/Time: 12/07/2018 09:03
SDG#: BSI27-04

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.90	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.90	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	1.8 u	0.27	1.0	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	0.64 J	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	2.0	0.36	1.0	1.8	1
14434	Perfluorohexanoic acid	307-24-4	4.1	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	0.70 J	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/19/2018 14:38	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/14/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6786 • www.EurofinsUS.com/LancLabsEnv

Sample Description: OU1-YS16-6-W-01 Grab Water
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9934781
ELLE Group #: 2017387
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/11/2018 10:05
Collection Date/Time: 12/07/2018 08:00
SDG#: BSI27-05RB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.92	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.92	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	1.0	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.46	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.46	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.37	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.37	1.0	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.46	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.37	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.46	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.46	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.55	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.55	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.46	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/19/2018 14:47	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/14/2018 16:00	Anthony C Polaski	1

1/26/19 8

*=This limit was used in the evaluation of the final result

Sample Description: OU1-YS16-6-W-02 Grab Water
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9934782
ELLE Group #: 2017387
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/11/2018 10:05
Collection Date/Time: 12/07/2018 08:05
SDG#: BSI27-06BL

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.88	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.88	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.26	0.97	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.35	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.35	0.97	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.44	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.44	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.44	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/19/2018 14:56	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/14/2018 16:00	Anthony C Polaski	1

1/26/19 8

*=This limit was used in the evaluation of the final result

Sample Description: OU1-YCW16-1-W-01 Grab Water
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9934783
ELLE Group #: 2017387
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/11/2018 10:05
Collection Date/Time: 12/07/2018 09:30
SDG#: BSI27-07RB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.90	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.90	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	0.41 J	0.27	0.99	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	0.99	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/19/2018 15:05	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/14/2018 16:00	Anthony C Polaski	1

1/26/19 J

*=This limit was used in the evaluation of the final result

Sample Description: OU1-YCW16-1-W-02 Grab Water
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9934784
ELLE Group #: 2017387
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/11/2018 10:05
Collection Date/Time: 12/07/2018 09:35
SDG#: BSI27-08BL

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.89	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.89	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.98	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.35	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.35	0.98	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.44	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.44	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.44	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/19/2018 15:14	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/14/2018 16:00	Anthony C Polaski	1

1/26/19 8

*=This limit was used in the evaluation of the final result

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6786 • www.EurofinsUS.com/LancLabsEnv

Sample Description: OU1-YCW16-3-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9934785
ELLE Group #: 2017387
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/11/2018 10:05
Collection Date/Time: 12/07/2018 10:29
SDG#: BSI27-09

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.96	2.3	2.9	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.96	2.3	2.9	1
14434	Perfluorobutanesulfonate	375-73-5	3.1	0.29	1.1	1.9	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.48	1.1	1.9	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.48	1.1	1.9	1
14434	Perfluoroheptanoic acid	375-85-9	2.7	0.38	1.1	1.9	1
14434	Perfluorohexanesulfonate	355-46-4	1.3 J	0.38	1.1	1.9	1
14434	Perfluorohexanoic acid	307-24-4	19	0.48	1.1	1.9	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.38	1.1	1.9	1
14434	Perfluoro-octanesulfonate	1763-23-1	0.55 J	0.48	1.1	1.9	1
14434	Perfluorooctanoic acid	335-67-1	1.1 J	0.48	1.1	1.9	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.57	1.1	1.9	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.57	1.1	1.9	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.48	1.1	1.9	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/19/2018 15:23	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/14/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result

2425 New Holland Pike, Lancaster, PA 17601 • 717-666-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description: OU1-YIMW-4-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9934786
ELLE Group #: 2017387
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/11/2018 10:05
Collection Date/Time: 12/07/2018 12:44
SDG#: BSI27-10

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.89	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.89	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	1.7 J U	0.27	0.98	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	0.46 J	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	9.3	0.36	0.98	1.8	1
14434	Perfluorohexanoic acid	307-24-4	1.1 J	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	10	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	7.1	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D. UJ	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

The recovery for the labeled compound used as extraction standards is outside the QC acceptance limits as noted on the QC Summary. The following corrective action was taken: The sample was reextracted outside holding time. The data is reported from the original extraction. Both sets of data are included in the data package.

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/19/2018 15:32	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/14/2018 16:00	Anthony C Polaski	1

1/26/19 8

*=This limit was used in the evaluation of the final result

Sample Description: OU1-PMW-2-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9934787
ELLE Group #: 2017387
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/11/2018 10:05

Collection Date/Time: 12/07/2018 14:31

SDG#: BSI27-11

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.88	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.88	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	3.6	0.26	0.97	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	0.69 J	0.35	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	5.2	0.35	0.97	1.8	1
14434	Perfluorohexanoic acid	307-24-4	2.2	0.44	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	2.3	0.44	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	9.5	0.44	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/19/2018 15:41	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/14/2018 16:00	Anthony C Polaski	1

1/26/19 8

*=This limit was used in the evaluation of the final result

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6786 • www.EurofinsUS.com/LancLabsEnv

Sample Description: OU1-Y9-4-01 Grab Groundwater
Barstow PFAS Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9934788
ELLE Group #: 2017387
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 12/11/2018 10:05
Collection Date/Time: 12/07/2018 15:57
SDG#: BSI27-12

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.88	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.88	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	3.7	0.27	0.97	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	9.7	0.35	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	50	0.35	0.97	1.8	1
14434	Perfluorohexanoic acid	307-24-4	20	0.44	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	3.3	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	26	0.44	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	29	0.44	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/19/2018 15:50	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18348012	12/14/2018 16:00	Anthony C Polaski	1

1/26/19 J

*=This limit was used in the evaluation of the final result

LDC #: 44154F96
 SDG #: BSI27/2017387
 Laboratory: Eurofins

VALIDATION COMPLETENESS WORKSHEET
 Stage 2B

Date: 1/21/19
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: JVB

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537M)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A	$RD \leq 20\%$, $TMC/ICV \leq 30\%$
IV.	Continuing calibration/ISC	A	$CCV/ISC \leq 30\%$
V.	Laboratory Blanks	A	
VI.	Field blanks	W	EB=5.7 SB=6.8
VII.	Matrix spike/Matrix spike duplicates	N	CS
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	
X.	Labeled Compounds	W	
XI.	Compound quantitation RL/LOQ/LODs	N	
XII.	Target compound identification	N	
XIII.	System performance	N	
XIV.	Overall assessment of data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
 N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
 SW = See worksheet FB = Field blank EB = Equipment blank

	Client ID	Lab ID	Matrix	Date
1	OU1-Y15-5-01	9934777	Water	12/05/18
2	OU1-Y9-5-01	9934778	Water	12/05/18
3	OU1-YS16-6-01	9934779	Water	12/06/18
4	OU1-YCW16-1-01	9934780	Water	12/07/18
5	OU1-YS16-6-W-01 EB	9934781	Water	12/07/18
6	OU1-YS16-6-W-02	9934782	Water	12/07/18
7	OU1-YCW16-1-W-01	9934783	Water	12/07/18
8	OU1-YCW16-1-W-02	9934784	Water	12/07/18
9	OU1-YCW16-3-01	9934785	Water	12/07/18
10	OU1-YIMW-4-01	9934786	Water	12/07/18
11	OU1-PMW-2-01	9934787	Water	12/07/18
12	OU1-Y9-4-01	9934788	Water	12/07/18
13				
14				
15				

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. NEtFOSAA			
B. NMeFOSAA			
C. Perfluorobutanesulfonate			
D. Perfluorobutanoic acid			
E. Perfluorodecanesulfonate			
F. Perfluorodecanoic acid			
G. Perfluorododecanoic acid			
H. Perfluoroheptanoic acid			
I. Perfluorohexanesulfonate			
J. Perfluorohexanoic acid			
K. Perfluorononanoic acid			
L. Perfluorooctanesulfonamide			
M. Perfluoro-octanesulfonate			
N. Perfluorooctanoic acid			
O. Perfluoropentanoic acid			
P. Perfluorotetradecanoic acid			
Q. Perfluorotridecanoic acid			
R. Perfluoroundecanoic acid			

VALIDATION FINDINGS WORKSHEET
Field Blanks

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

Y N N/A Were field blanks identified in this SDG?
 Y N N/A Were target compounds detected in the field blanks?

Blank units: US/L Associated sample units: US/L

Sampling date: 12/7/18

Field blank type: (circle one) Trip Blank/Field Blank / Rinsate / Other: EB Associated Samples: 4, 9-12

Compound	Blank ID	Sample Identification							
	7	A	10						
C	0.41	1.8/U	1.7/U						

Blank units: _____ Associated sample units: _____

Sampling date: _____

Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification							

VALIDATION FINDINGS WORKSHEET
Labeled Compounds

METHOD: LC/MS PFAS (EPA Method 537M)

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all labeled compound recoveries within the QC criteria?

#	Date	Lab ID/Reference	Internal Standard	% Recovery (Limit:)	Qualifications
		2 (ND)	1302- FT EDA	36 (50-150)	↓/UN/P (P)
		10 ↓	↓	43 (↓)	↓
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	
				()	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Barstow Site Inspection

LDC Report Date: January 22, 2019

Parameters: Perfluoroalkyl & Polyfluoroalkyl Substances

Validation Level: Stage 2B

Laboratory: Eurofins

Sample Delivery Group (SDG): SBI22/2011587

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OU1-GW-9-01	9909715	Water	11/15/18
OU1-GW-9-02	9909716	Water	11/15/18
OU1-GW-9-W-01	9909717	Water	11/15/18
OU1-GW-9-W-02	9909718	Water	11/15/18
OU1-NS2-2-01	9909719	Water	11/15/18
OU1-NS2-2-02	9909720	Water	11/15/18
OU1-MW-D-01	9909721	Water	11/15/18
OU1-NNP-2-01	9909722	Water	11/15/18
OU1-NPZ-17-01	9909723	Water	11/15/18
OU1-NS2-1-01	9909724	Water	11/15/18
OU1-NSI-3-01	9909725	Water	11/16/18
OU1-NSI-3-W-01	9909726	Water	11/16/18
OU1-NSI-3-W-02	9909727	Water	11/16/18
OU1-NGW-04-01	9909728	Water	11/16/18
OU1-NGW-06-01	9909729	Water	11/16/18
OU1-MW-B-01	9909730	Water	11/16/18
OU1-NPZ-18-01	9909731	Water	11/16/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Field Sampling and Analysis Plan for Site Inspection Per- and Polyfluoroalkyl Substances, Nebo Main Base and Yermo Annex, Marine Corps Logistics Base, Barstow, CA (October 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) by Environmental Protection Agency (EPA) Method 537 Modified

All sample results were subjected to Stage 2B data validation, which comprises an evaluation of quality control (QC) summary results.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked and the requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990.

For each calibration standard, all compounds were within 70-130% of their true value.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

The percent differences (%D) of the instrument sensitivity check (ISC) were less than or equal to 30.0% for all compounds.

All compound concentrations were at the limit of quantitation (LOQ) for the ISC standard.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Samples OU1-GW-9-W-01 and OU1-NSI-3-W-01 were identified as equipment blanks. No contaminants were found.

Samples OU1-GW-9-W-02 and OU1-NSI-3-W-02 were identified as source blanks. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

Samples OU1-MW-A-01 and OU1-MW-A-02 and samples OU1-NWP-6-01 and OU1-NWP-6-02 were identified as field duplicates. No results were detected in any of the samples with the following exceptions:

Compound	Concentration (ng/L)		RPD (Limits)	Flag	A or P
	OU1-MW-A-01	OU1-MW-A-02			
Perfluorobutanesulfonate	16	15	6 (≤30)	-	-
Perfluorodecanoic acid	2.7	2.8	4 (≤30)	-	-
Perfluoroheptanoic acid	5.6	5.4	4 (≤30)	-	-
Perfluorohexanesulfonate	18	17	6 (≤30)	-	-
Perfluorohexanoic acid	18	16	12 (≤30)	-	-
Perfluorononanoic acid	5.3	4.7	12 (≤30)	-	-
Perfluoro-octanesulfonate	54	53	2 (≤30)	-	-
Perfluorooctanoic acid	23	23	0 (≤30)	-	-

Compound	Concentration (ng/L)		RPD (Limits)	Flag	A or P
	OU1-NWP-6-01	OU1-NWP-6-02			
Perfluorobutanesulfonate	26	25	4 (≤30)	-	-
Perfluorodecanoic acid	1.7	1.7	0 (≤30)	-	-

Compound	Concentration (ng/L)		RPD (Limits)	Flag	A or P
	OU1-NWP-6-01	OU1-NWP-6-02			
Perfluoroheptanoic acid	4.6	4.7	2 (≤ 30)	-	-
Perfluorohexanesulfonate	33	33	0 (≤ 30)	-	-
Perfluorohexanoic acid	13	14	7 (≤ 30)	-	-
Perfluorononanoic acid	3.6	3.8	5 (≤ 30)	-	-
Perfluoro-octanesulfonate	51	50	2 (≤ 30)	-	-
Perfluorooctanoic acid	52	53	2 (≤ 30)	-	-

X. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits.

XI. Compound Quantitation

The laboratory indicated that PFAS are currently being reported as the sum of the branched and linear isomers so both peaks were integrated.

Raw data were not reviewed for Stage 2B validation.

XII. Target Compound Identifications

Raw data were not reviewed for Stage 2B validation.

XIII. System Performance

Raw data were not reviewed for Stage 2B validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

**Barstow Site Inspection
Perfluoroalkyl & Polyfluoroalkyl Substances - Data Qualification Summary - SDG
SBI22/2011587**

No Sample Data Qualified in this SDG

**Barstow Site Inspection
Perfluoroalkyl & Polyfluoroalkyl Substances - Laboratory Blank Data Qualification
Summary - SDG SBI22/2011587**

No Sample Data Qualified in this SDG

**Barstow Site Inspection
Perfluoroalkyl & Polyfluoroalkyl Substances - Field Blank Data Qualification
Summary - SDG SBI22/2011587**

No Sample Data Qualified in this SDG

Sample Description: OU1-GW-9-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9909715
ELLE Group #: 2011587
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/15/2018 08:13
SDG#: SBI22-01

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.87	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.87	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	16	0.26	0.96	1.7	1
14434	Perfluorodecanoic acid	335-76-2	2.7	0.44	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	5.6	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	18	0.35	0.96	1.7	1
14434	Perfluorohexanoic acid	307-24-4	18	0.44	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	5.3	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	54	0.44	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	23	0.44	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/28/2018 17:03	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/26/2018 16:00	Anthony C Polaski	1

1/24/19

*=This limit was used in the evaluation of the final result

Sample Description: OU1-GW-9-02 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9909716
ELLE Group #: 2011587
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submission Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/15/2018 08:14
SDG#: SBI22-02

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.90	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.90	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	15	0.27	0.99	1.8	1
14434	Perfluorodecanoic acid	335-76-2	2.8	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	5.4	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	17	0.36	0.99	1.8	1
14434	Perfluorohexanoic acid	307-24-4	16	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	4.7	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	53	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	23	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/28/2018 17:12	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/26/2018 16:00	Anthony C Polaski	1

11/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OU1-GW-9-W-01 Grab Water
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9909717
ELLE Group #: 2011587
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/15/2018 08:35
SDG#: SBI22-03EB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.89	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.89	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.98	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	0.98	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/28/2018 17:21	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/26/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result



Sample Description: OU1-GW-9-W-02 Grab Water
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9909718
ELLE Group #: 2011587
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/15/2018 08:40
SDG#: SBI22-04EB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.87	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.87	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.26	0.96	1.7	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.35	0.96	1.7	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/28/2018 17:30	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/26/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NS2-2-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9909719
ELLE Group #: 2011587
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submission Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/15/2018 09:48
SDG#: SBI22-05

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.87	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.87	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	26	0.26	0.96	1.7	1
14434	Perfluorodecanoic acid	335-76-2	1.7 J	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	4.6	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	33	0.35	0.96	1.7	1
14434	Perfluorohexanoic acid	307-24-4	13	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	3.6	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	51	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	52	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/28/2018 17:39	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/26/2018 16:00	Anthony C Polaski	1

11/26/18

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NS2-2-02 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9909720
ELLE Group #: 2011587
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/15/2018 09:49
SDG#: SBI22-06

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.87	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.87	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	25	0.26	0.96	1.7	1
14434	Perfluorodecanoic acid	335-76-2	1.7 J	0.44	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	4.7	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	33	0.35	0.96	1.7	1
14434	Perfluorohexanoic acid	307-24-4	14	0.44	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	3.8	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	50	0.44	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	53	0.44	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/28/2018 17:48	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/26/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OU1-MW-D-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9909721
ELLE Group #: 2011587
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/15/2018 11:01
SDG#: SBI22-07

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.89	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.89	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	26	0.27	0.98	1.8	1
14434	Perfluorodecanoic acid	335-76-2	4.1	0.44	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	5.9	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	45	0.36	0.98	1.8	1
14434	Perfluorohexanoic acid	307-24-4	11	0.44	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	6.2	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	68	0.44	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	46	0.44	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/28/2018 17:57	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/26/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NNP-2-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9909722
ELLE Group #: 2011587
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/15/2018 12:53
SDG#: SBI22-08

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.92	2.2	2.8	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.92	2.2	2.8	1
14434	Perfluorobutanesulfonate	375-73-5	14	0.28	1.0	1.8	1
14434	Perfluorodecanoic acid	335-76-2	3.1	0.46	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.46	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	3.1	0.37	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	25	0.37	1.0	1.8	1
14434	Perfluorohexanoic acid	307-24-4	5.7	0.46	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	4.8	0.37	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	60	0.46	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	32	0.46	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.55	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.55	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.46	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/28/2018 18:15	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/26/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result



2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description: OU1-NPZ-17-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9909723
ELLE Group #: 2011587
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/15/2018 14:16
SDG#: SBI22-09

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	4.8	1.0	2.4	3.0	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	1.3 J	1.0	2.4	3.0	1
14434	Perfluorobutanesulfonate	375-73-5	18	0.30	1.1	2.0	1
14434	Perfluorodecanoic acid	335-76-2	10	0.51	1.2	2.0	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.51	1.2	2.0	1
14434	Perfluoroheptanoic acid	375-85-9	3.8	0.41	1.2	2.0	1
14434	Perfluorohexanesulfonate	355-46-4	30	0.41	1.1	2.0	1
14434	Perfluorohexanoic acid	307-24-4	4.9	0.51	1.2	2.0	1
14434	Perfluorononanoic acid	375-95-1	8.0	0.41	1.2	2.0	1
14434	Perfluoro-octanesulfonate	1763-23-1	120	0.51	1.2	2.0	1
14434	Perfluorooctanoic acid	335-67-1	44	0.51	1.2	2.0	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.61	1.2	2.0	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.61	1.2	2.0	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.51	1.2	2.0	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/28/2018 18:24	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/26/2018 16:00	Anthony C Polaski	1

11/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NS2-1-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9909724
ELLE Group #: 2011587
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submission Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/15/2018 15:47
SDG#: SBI22-10

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	1.8 J	0.88	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	1.1 J	0.88	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	6.7	0.26	0.97	1.8	1
14434	Perfluorodecanoic acid	335-76-2	3.1	0.44	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	1.1 J	0.35	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	17	0.35	0.97	1.8	1
14434	Perfluorohexanoic acid	307-24-4	1.2 J	0.44	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	3.2	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	49	0.44	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	28	0.44	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/28/2018 18:33	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/26/2018 16:00	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result



Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description: OU1-NSI-3-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9909725
ELLE Group #: 2011587
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/16/2018 09:01
SDG#: SBI22-11

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.87	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.87	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	13	0.26	0.95	1.7	1
14434	Perfluorodecanoic acid	335-76-2	2.6	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	4.4	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	35	0.35	0.95	1.7	1
14434	Perfluorohexanoic acid	307-24-4	12	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	3.1	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	50	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	32	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/28/2018 18:42	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/26/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result



2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description: OU1-NSI-3-W-01 Grab Water
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9909726
ELLE Group #: 2011587
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/16/2018 09:30
SDG#: SBI22-12EB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.91	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.91	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	1.0	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	1.0	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.55	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.55	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/28/2018 18:51	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/26/2018 16:00	Anthony C Polaski	1

11/26/18

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NSI-3-W-02 Grab Water
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9909727
ELLE Group #: 2011587
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/16/2018 09:35
SDG#: SBI22-13EB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.87	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.87	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.26	0.95	1.7	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.35	0.95	1.7	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/28/2018 19:00	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/26/2018 16:00	Anthony C Polaski	1

1/26/19 8

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NGW-04-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9909728
ELLE Group #: 2011587
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/16/2018 10:42
SDG#: SBI22-14

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.89	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.89	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	13	0.27	0.98	1.8	1
14434	Perfluorodecanoic acid	335-76-2	0.91 J	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	4.6	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	39	0.36	0.98	1.8	1
14434	Perfluorohexanoic acid	307-24-4	6.9	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	2.6	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	62	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	30	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/28/2018 19:09	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/26/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result



2425 New Holland Pike, Lancaster, PA 17601 • 717-656-2300 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description: OU1-NGW-06-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9909729
ELLE Group #: 2011587
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/16/2018 12:05
SDG#: SBI22-15

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NETFOSAA NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.86	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.86	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	14	0.26	0.94	1.7	1
14434	Perfluorodecanoic acid	335-76-2	0.64 J	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	3.3	0.34	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	54	0.34	0.94	1.7	1
14434	Perfluorohexanoic acid	307-24-4	3.5	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	2.6	0.34	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	80	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	30	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.51	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.51	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/28/2018 19:18	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330012	11/26/2018 16:00	Anthony C Polaski	1

1/26/19 @

*=This limit was used in the evaluation of the final result



Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-686-2300 • Fax: 717-686-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description: OU1-MW-B-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9909730
ELLE Group #: 2011587
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submission Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/16/2018 13:44
SDG#: SBI22-16

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.86	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.86	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	28	0.26	0.94	1.7	1
14434	Perfluorodecanoic acid	335-76-2	3.3	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	4.8	0.34	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	26	0.34	0.94	1.7	1
14434	Perfluorohexanoic acid	307-24-4	10	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	5.6	0.34	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	73	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	32	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.51	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.51	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/28/2018 20:21	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/26/2018 16:00	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

1/26/19 8

Sample Description: OU1-NPZ-18-01 Grab Groundwater
Barstow Site Inspection

Gutierrez Canales Engineering
ELLE Sample #: GW 9909731
ELLE Group #: 2011587
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/16/2018 14:53
SDG#: SBI22-17

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEIFOSAA NEIFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.91	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.91	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	24	0.27	1.0	1.8	1
14434	Perfluorodecanoic acid	335-76-2	3.3	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	5.2	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	23	0.36	1.0	1.8	1
14434	Perfluorohexanoic acid	307-24-4	16	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	5.2	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	61	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	27	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.55	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.55	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/28/2018 20:30	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/26/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result

LDC #: 44154G96
 SDG #: SBI22/2011587
 Laboratory: Eurofins

VALIDATION COMPLETENESS WORKSHEET
 Stage ~~4~~ **B**

Date: 4/19
 Page: 1 of 2
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537M)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 20%. TME/ICV ≤ 30%
IV.	Continuing calibration/ISC	A	CV ≤ 30%. ISC ≤ 30%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB = 3.12 SB = 4, 13
VII.	Matrix spike/Matrix spike duplicates	N	CS
VIII.	Laboratory control samples	A	LCS/B
IX.	Field duplicates	M	D = 1 + 2. 5 + 6
X.	Labeled Compounds	A	
XI.	Compound quantitation RL/LOQ/LODs	N	
XII.	Target compound identification	N	
XIII.	System performance	N	
XIV.	Overall assessment of data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB = Source blank
 N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
 SW = See worksheet FB = Field blank EB = Equipment blank

	Client ID	Lab ID	Matrix	Date
1	OU1-GW-9-01	9909715	Water	11/15/18
2	OU1-GW-9-02	9909716	Water	11/15/18
3	OU1-GW-9-W-01	9909717	Water	11/15/18
4	OU1-GW-9-W-02	9909718	Water	11/15/18
5	OU1-NS2-2-01	9909719	Water	11/15/18
6	OU1-NS2-2-02	9909720	Water	11/15/18
7	OU1-MW-D-01	9909721	Water	11/15/18
8	OU1-NNP-2-01	9909722	Water	11/15/18
9	OU1-NPZ-17-01	9909723	Water	11/15/18
10	OU1-NS2-1-01	9909724	Water	11/15/18
11	OU1-NSI-3-01	9909725	Water	11/16/18
12	OU1-NSI-3-W-01	9909726	Water	11/16/18
13	OU1-NSI-3-W-02	9909727	Water	11/16/18
14	OU1-NGW-04-01	9909728	Water	11/16/18
15	OU1-NGW-06-01	9909729	Water	11/16/18

LDC #: 44154G96
SDG #: SBI22/2011587
Laboratory: Eurofins

VALIDATION COMPLETENESS WORKSHEET
Stage 4

Date: 1/21/19
Page: 2 of 2
Reviewer: [Signature]
2nd Reviewer: [Signature]

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537M)

	Client ID	Lab ID	Matrix	Date
16	OU1-MW-B-01	9909730	Water	11/16/18
17	OU1-NPZ-18-01	9909731	Water	11/16/18
18				
19				
20				

Notes:

TARGET COMPOUND WORKSHEET

METHOD: PFOS/PFOAs

A. NETFOSAA			
B. NMeFOSAA			
C. Perfluorobutanesulfonate			
D. Perfluorobutanoic acid			
E. Perfluorodecanesulfonate			
F. Perfluorodecanoic acid			
G. Perfluorododecanoic acid			
H. Perfluoroheptanoic acid			
I. Perfluorohexanesulfonate			
J. Perfluorohexanoic acid			
K. Perfluorononanoic acid			
L. Perfluorooctanesulfonamide			
M. Perfluoro-octanesulfonate			
N. Perfluorooctanoic acid			
O. Perfluoropentanoic acid			
P. Perfluorotetradecanoic acid			
Q. Perfluorotridecanoic acid			
R. Perfluoroundecanoic acid			

VALIDATION FINDINGS WORKSHEET
Field Duplicates

METHOD: LC MS PFCs (EPA Method 537-Mod)

Y N NA Were field duplicate pairs identified in this SDG?

Y N NA Were target analytes detected in the field duplicate pairs?

Compound	Concentration (ng/L)		RPD (≤30%)	Qualifications (Parent Only)
	1	2		
C	16	15	6	
F	2.7	2.8	4	
H	5.6	5.4	4	
I	18	17	6	
J	18	16	12	
K	5.3	4.7	12	
M	54	53	2	
N	23	23	0	

Compound	Concentration (ng/L)		RPD (≤30%)	Qualifications (Parent Only)
	5	6		
C	26	25	4	
F	1.7	1.7	0	
H	4.6	4.7	2	
I	33	33	0	
J	13	14	7	
K	3.6	3.8	5	
M	51	50	2	
N	52	53	2	

Laboratory Data Consultants, Inc. Data Validation Report

Project/Site Name: Barstow Site Inspection

LDC Report Date: February 5, 2019

Parameters: Perfluoroalkyl & Polyfluoroalkyl Substances

Validation Level: Stage 4

Laboratory: Eurofins

Sample Delivery Group (SDG): SBI23/2011591

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
OU1-NSP-3-01	9909753	Water	11/19/18
OU1-NSP-3-W-01	9909754	Water	11/19/18
OU1-NSP-3-W-02	9909755	Water	11/19/18
OU1-NC-8-01	9909756	Water	11/19/18
OU1-NC-6-01	9909757	Water	11/19/18
OU1-NC-1-01	9909758	Water	11/19/18
OU1-NNP-3-01	9909759	Water	11/20/18
OU1-NNP-3-W-01	9909760	Water	11/20/18
OU1-NNP-3-W-02	9909761	Water	11/20/18
OU1-NWP-5-01	9909762	Water	11/20/18

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Field Sampling and Analysis Plan for Site Inspection Per- and Polyfluoroalkyl Substances, Nebo Main Base and Yermo Annex, Marine Corps Logistics Base, Barstow, CA (October 2018), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.1 (2017), and a modified outline of the USEPA National Functional Guidelines (NFG) for Organic Superfund Methods Data Review (January 2017). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluoroalkyl and Polyfluoroalkyl Substances (PFAS) by Environmental Protection Agency (EPA) Method 537 Modified

All sample results were subjected to Stage 4 data validation, which is comprised of the quality control (QC) summary forms as well as the raw data, to confirm sample quantitation and identification.

The following are definitions of the data qualifiers utilized during data validation:

- J (Estimated): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation.
- U (Non-detected): The compound or analyte was analyzed for and positively identified by the laboratory; however the compound or analyte should be considered non-detected at the reported concentration due to the presence of contaminants detected in the associated blank(s).
- UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.
- R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.
- NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound or analyte in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

A qualification summary table is provided at the end of this report if data has been qualified. Flags are classified as P (protocol) or A (advisory) to indicate whether the flag is due to a laboratory deviation from a specified protocol or is of technical advisory nature.

I. Sample Receipt and Technical Holding Times

All samples were received in good condition and cooler temperatures upon receipt met validation criteria.

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked and the requirements were met.

III. Initial Calibration and Initial Calibration Verification

Initial calibration was performed as required by the method.

For compounds where average calibration factors were utilized, percent relative standard deviations (%RSD) were less than or equal to 20.0%.

A curve fit, based on the initial calibration, was established for quantitation. The coefficient of determination (r^2) was greater than or equal to 0.990.

For each calibration standard, all compounds were within 70-130% of their true value.

The signal to noise (S/N) ratio was within validation criteria for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 30.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 30.0% for all compounds.

The signal to noise (S/N) ratio was within validation criteria for all compounds.

The percent differences (%D) of the instrument sensitivity check (ISC) were less than or equal to 30.0% for all compounds.

All compound concentrations were at the limit of quantitation (LOQ) for the ISC standard.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks.

VI. Field Blanks

Samples OU1-NSP-3-W-01 and OU1-NNP-3-W-01 were identified as equipment blanks. No contaminants were found.

Samples OU1-NSP-3-W-02 and OU1-NNP-3-W-02 were identified as source blanks. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

The laboratory has indicated that there were no matrix spike (MS) and matrix spike duplicate (MSD) analyses specified for the samples in this SDG, and therefore matrix spike and matrix spike duplicate analyses were not performed for this SDG.

VIII. Laboratory Control Samples

Laboratory control samples (LCS) and laboratory control samples duplicates (LCSD) were analyzed as required by the method. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Labeled Compounds

All percent recoveries (%R) for labeled compounds used to quantitate target compounds were within QC limits.

XI. Compound Quantitation

All compound quantitations met validation criteria.

The laboratory indicated that PFAS are currently being reported as the sum of the branched and linear isomers so both peaks were integrated.

XII. Target Compound Identifications

All target compound identifications met validation criteria.

XIII. System Performance

The system performance was acceptable.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the method. No results were rejected in this SDG.

The quality control criteria reviewed were met and are considered acceptable. Based upon the data validation all results are considered valid and usable for all purposes.

**Barstow Site Inspection
Perfluoroalkyl & Polyfluoroalkyl Substances - Data Qualification Summary - SDG
SBI23/2011591**

No Sample Data Qualified in this SDG

**Barstow Site Inspection
Perfluoroalkyl & Polyfluoroalkyl Substances - Laboratory Blank Data Qualification
Summary - SDG SBI23/2011591**

No Sample Data Qualified in this SDG

**Barstow Site Inspection
Perfluoroalkyl & Polyfluoroalkyl Substances - Field Blank Data Qualification
Summary - SDG SBI23/2011591**

No Sample Data Qualified in this SDG



2425 New Holland Pike, Lancaster, PA 17601 • 717-666-2300 • Fax: 717-666-4766 • www.EurofinsUS.com/LancLabEnv

Sample Description: OU1-NSP-3-01 Grab Groundwater
Barstow Site Investigation

Gutierrez Canales Engineering
ELLE Sample #: GW 9909753
ELLE Group #: 2011591
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/19/2018 10:59
SDG#: SBI23-01

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.87	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.87	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.26	0.95	1.7	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.35	0.95	1.7	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	0.60 J	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/28/2018 20:39	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/26/2018 16:00	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

1/26/19



Lancaster Laboratories
Environmental

Analysis Report

2426 New Holland Pike, Lancaster, PA 17601 • 717-666-2300 • Fax: 717-666-6786 • www.EurofinsUS.com/LancLab/Env

Sample Description: **OU1-NSP-3-W-01 Grab Water
Barstow Site Investigation**

Gutierrez Canales Engineering
ELLE Sample #: **GW 9909754**
ELLE Group #: **2011591**
Matrix: **Water**

Project Name: **Barstow Site Inspection**

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/19/2018 11:15
SDG#: SBI23-02EB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NETFOSAA NETFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.90	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.90	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.99	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	0.99	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/28/2018 20:48	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/26/2018 16:00	Anthony C Polaski	1

1/26/19 8

*=This limit was used in the evaluation of the final result



Lancaster Laboratories
Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-696-2300 • Fax: 717-696-6786 • www.EurofinsUS.com/LancLabEnv

Sample Description: OU1-NSP-3-W-02 Grab Water
Barstow Site Investigation

Gutierrez Canales Engineering
ELLE Sample #: GW 9909755
ELLE Group #: 2011591
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/19/2018 11:20
SDG#: SBI23-03EB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15			ng/l	ng/l	ng/l	ng/l	
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.87	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.87	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.26	0.96	1.7	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.44	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.35	0.96	1.7	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.44	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.44	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.44	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/28/2018 20:57	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/26/2018 16:00	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

1/26/19



Sample Description: **OU1-NC-8-01 Grab Groundwater
Barstow Site Investigation**

Gutierrez Canales Engineering
ELLE Sample #: **GW 9909756**
ELLE Group #: **2011591**
Matrix: **Groundwater**

Project Name: **Barstow Site Inspection**

Submittal Date/Time: **11/21/2018 11:00**
Collection Date/Time: **11/19/2018 12:55**
SDG#: **SBI23-04**

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.86	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.86	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	1.2 J	0.26	0.94	1.7	1
14434	Perfluorodecanoic acid	335-76-2	0.56 J	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	2.3	0.34	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	2.3	0.34	0.94	1.7	1
14434	Perfluorohexanoic acid	307-24-4	8.2	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	0.71 J	0.34	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	15	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/28/2018 21:06	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/26/2018 16:00	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

11/26/19



Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-696-3200 • Fax: 717-656-0786 • www.EurofinsUS.com/LancLabEnv

Sample Description: OU1-NC-6-01 Grab Groundwater
Barstow Site Investigation

Gutierrez Canales Engineering
ELLE Sample #: GW 9909757
ELLE Group #: 2011591
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submission Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/19/2018 14:35
SDG#: SBI23-05

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEiFOSAA NEiFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.98	2.4	2.9	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.98	2.4	2.9	1
14434	Perfluorobutanesulfonate	375-73-5	0.30 J	0.29	1.1	2.0	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.49	1.2	2.0	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.49	1.2	2.0	1
14434	Perfluoroheptanoic acid	375-85-9	1.3 J	0.39	1.2	2.0	1
14434	Perfluorohexanesulfonate	355-46-4	0.70 J	0.39	1.1	2.0	1
14434	Perfluorohexanoic acid	307-24-4	6.3	0.49	1.2	2.0	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.39	1.2	2.0	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.49	1.2	2.0	1
14434	Perfluorooctanoic acid	335-67-1	7.6	0.49	1.2	2.0	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.59	1.2	2.0	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.59	1.2	2.0	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.49	1.2	2.0	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18337008	12/04/2018 16:40	Joshua P Trost	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	2	18337008	12/03/2018 16:00	Danielle D McCully	1

1/26/19

*=This limit was used in the evaluation of the final result



Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-696-2000 • Fax: 717-656-6766 • www.EurofinsUS.com/LancLabEnv

Sample Description: OU1-NC-1-01 Grab Groundwater
Barstow Site Investigation

Gutierrez Canales Engineering
ELLE Sample #: GW 9909758
ELLE Group #: 2011591
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/19/2018 16:32
SDG#: SBI23-06

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.91	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.91	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	0.29 J	0.27	1.0	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.46	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.46	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	1.7 J	0.37	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	0.76 J	0.37	1.0	1.8	1
14434	Perfluorohexanoic acid	307-24-4	8.3	0.46	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.37	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.46	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	8.6	0.46	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.55	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.55	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.46	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/28/2018 21:24	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/26/2018 16:00	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

1/26/19 9



Lancaster Laboratories
Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-696-2300 • Fax: 717-656-6786 • www.EurofinsUS.com/LancLabsEnv

Sample Description: OU1-NNP-3-01 Grab Groundwater
Barstow Site Investigation

Gutierrez Canales Engineering
ELLE Sample #: GW 9909759
ELLE Group #: 2011591
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/20/2018 08:21
SDG#: SBI23-07

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.88	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.88	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	14	0.26	0.96	1.8	1
14434	Perfluorodecanoic acid	335-76-2	2.9	0.44	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	3.0	0.35	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	25	0.35	0.96	1.8	1
14434	Perfluorohexanoic acid	307-24-4	4.7	0.44	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	3.6	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	45	0.44	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	30	0.44	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/28/2018 21:42	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/26/2018 16:00	Anthony C Polaski	1

1/26/19 Q

*=This limit was used in the evaluation of the final result



2425 New Holland Pike, Lancaster, PA 17601 • 717-696-2300 • Fax: 717-666-6766 • www.EurofinsUS.com/LancLabsEnv

Sample Description: OU1-NNP-3-W-01 Grab Water
Barstow Site Investigation

Gutierrez Canales Engineering
ELLE Sample #: GW 9909760
ELLE Group #: 2011591
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/20/2018 08:30
SDG#: SBI23-08EB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.90	2.2	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.90	2.2	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.27	0.99	1.8	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.45	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.45	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.36	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.36	0.99	1.8	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.45	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.36	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.45	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.54	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.54	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.45	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/28/2018 21:51	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/26/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result

Sample Description: OU1-NNP-3-W-02 Grab Water
Barstow Site Investigation

Gutierrez Canales Engineering
ELLE Sample #: GW 9909761
ELLE Group #: 2011591
Matrix: Water

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/20/2018 08:35
SDG#: SBI23-09EB

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	N.D.	0.86	2.1	2.6	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.86	2.1	2.6	1
14434	Perfluorobutanesulfonate	375-73-5	N.D.	0.26	0.95	1.7	1
14434	Perfluorodecanoic acid	335-76-2	N.D.	0.43	1.0	1.7	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.43	1.0	1.7	1
14434	Perfluoroheptanoic acid	375-85-9	N.D.	0.35	1.0	1.7	1
14434	Perfluorohexanesulfonate	355-46-4	N.D.	0.35	0.95	1.7	1
14434	Perfluorohexanoic acid	307-24-4	N.D.	0.43	1.0	1.7	1
14434	Perfluorononanoic acid	375-95-1	N.D.	0.35	1.0	1.7	1
14434	Perfluoro-octanesulfonate	1763-23-1	N.D.	0.43	1.0	1.7	1
14434	Perfluorooctanoic acid	335-67-1	N.D.	0.43	1.0	1.7	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.52	1.0	1.7	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.52	1.0	1.7	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.43	1.0	1.7	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/28/2018 22:00	Mark Makowiecki	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/26/2018 16:00	Anthony C Polaski	1

*=This limit was used in the evaluation of the final result

11/28/19



Lancaster Laboratories
Environmental

Analysis Report

2425 New Holland Pike, Lancaster, PA 17601 • 717-696-2000 • Fax: 717-695-0786 • www.EurofinsUS.com/LancLabEnv

Sample Description: ^WOU1-NMP-5-01 Grab Groundwater
Barstow Site Investigation

Gutierrez Canales Engineering
ELLE Sample #: GW 9909762
ELLE Group #: 2011591
Matrix: Groundwater

Project Name: Barstow Site Inspection

Submittal Date/Time: 11/21/2018 11:00
Collection Date/Time: 11/20/2018 10:19
SDG#: SBI23-10

CAT No.	Analysis Name	CAS Number	As Received Result	As Received Detection Limit*	As Received Limit of Detection	As Received Limit of Quantitation	DF
LC/MS/MS Miscellaneous EPA 537 mod QSM 5.1 table B-15							
14434	NEtFOSAA NEtFOSAA is the acronym for N-ethyl perfluorooctanesulfonamidoacetic Acid.	2991-50-6	2.6 J	0.89	2.1	2.7	1
14434	NMeFOSAA NMeFOSAA is the acronym for N-methyl perfluorooctanesulfonamidoacetic Acid.	2355-31-9	N.D.	0.89	2.1	2.7	1
14434	Perfluorobutanesulfonate	375-73-5	26	0.27	0.98	1.8	1
14434	Perfluorodecanoic acid	335-76-2	4.0	0.44	1.1	1.8	1
14434	Perfluorododecanoic acid	307-55-1	N.D.	0.44	1.1	1.8	1
14434	Perfluoroheptanoic acid	375-85-9	6.8	0.35	1.1	1.8	1
14434	Perfluorohexanesulfonate	355-46-4	79	0.35	0.98	1.8	1
14434	Perfluorohexanoic acid	307-24-4	39	0.44	1.1	1.8	1
14434	Perfluorononanoic acid	375-95-1	13	0.35	1.1	1.8	1
14434	Perfluoro-octanesulfonate	1763-23-1	97	0.44	1.1	1.8	1
14434	Perfluorooctanoic acid	335-67-1	23	0.44	1.1	1.8	1
14434	Perfluorotetradecanoic acid	376-06-7	N.D.	0.53	1.1	1.8	1
14434	Perfluorotridecanoic acid	72629-94-8	N.D.	0.53	1.1	1.8	1
14434	Perfluoroundecanoic acid	2058-94-8	N.D.	0.44	1.1	1.8	1

Sample Comments

CA ELAP Lab Certification No. 2792

Laboratory Sample Analysis Record

CAT No.	Analysis Name	Method	Trial#	Batch#	Analysis Date and Time	Analyst	Dilution Factor
14434	PFAS in Water by LC/MS/MS-DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/29/2018 21:32	Marissa C Drexinger	1
14465	PFAS Water Prep - DoD	EPA 537 mod QSM 5.1 table B-15	1	18330013	11/26/2018 16:00	Anthony C Polaski	1

1/26/19

*=This limit was used in the evaluation of the final result

LDC #: 44154H96
 SDG #: SBI23/2011591
 Laboratory: Eurofins

VALIDATION COMPLETENESS WORKSHEET
 Stage 2B4

Date: 1/24/19
 Page: 1 of 1
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

METHOD: LC/MS Perfluoroalkyl & Polyfluoroalkyl Substances (EPA Method 537M)

The samples listed below were reviewed for each of the following validation areas. Validation findings are noted in attached validation findings worksheets.

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	
II.	LC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/A	RSD ≤ 20%. Y ² , TMO/ICV ≤ 30%
IV.	Continuing calibration/ISC	A	COV/ISC ≤ 30%
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB = 2.8 SB = 3, 9
VII.	Matrix spike/Matrix spike duplicates	N	CS
VIII.	Laboratory control samples	A	LCSD
IX.	Field duplicates	N	
X.	Labeled Compounds	A	
XI.	Compound quantitation RL/LOQ/LODs	A	
XII.	Target compound identification	A	
XIII.	System performance	A	
XIV.	Overall assessment of data	A	

Note: A = Acceptable ND = No compounds detected D = Duplicate SB=Source blank
 N = Not provided/applicable R = Rinsate TB = Trip blank OTHER:
 SW = See worksheet FB = Field blank EB = Equipment blank

	Client ID	Lab ID	Matrix	Date
1	OU1-NSP-3-01	9909753	Water	11/19/18
2	OU1-NSP-3-W-01	9909754	Water	11/19/18
3	OU1-NSP-3-W-02	9909755	Water	11/19/18
4	OU1-NC-8-01	9909756	Water	11/19/18
5	OU1-NC-6-01	9909757	Water	11/19/18
6	OU1-NC-1-01	9909758	Water	11/19/18
7	OU1-NNP-3-01	9909759	Water	11/20/18
8	OU1-NNP-3-W-01	9909760	Water	11/20/18
9	OU1-NNP-3-W-02	9909761	Water	11/20/18
10	OU1-NNP-5-01	9909762	Water	11/20/18
11				
12				

Notes:

Method: LCMS (EPA Method 537 Modified)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times:				
Were all technical holding times met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was cooler temperature criteria met?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
II. LC/MS Instrument performance check:				
Were the instrument performance reviewed and found to be within the validation criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
III. Initial calibration:				
Did the laboratory perform a 5 point calibration prior to sample analysis?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent relative standard deviations (%RSD) < 20%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of > 0.990?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all analytes within 70-130% or percent differences (%D) < 30% of their true value for each calibration standard?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IIIb. Initial Calibration Verification:				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) < 30%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
IV. Continuing calibration:				
Was a continuing calibration analyzed daily?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) of the continuing calibration < 30%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was the signal to noise (S/N) ratio for all compounds within the validation criteria?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were all percent differences (%D) of the Instrument Sensitivity Check < 30%?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
V. Laboratory Blanks:				
Was a laboratory blank associated with every sample in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was a laboratory blank analyzed for each matrix and concentration?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was there contamination in the laboratory blanks?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VI. Field Blanks:				
Were field blanks identified in this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were target compounds detected in the field blanks?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
VII. Matrix spike/Matrix spike duplicates:				
Were matrix spike (MS) and matrix spike duplicate (MSD) analyzed in this SDG?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
VIII. Laboratory control samples:				
Was an LCS analyzed per extraction batch for this SDG?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

LDC #: 44-574-96

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
 Reviewer: [Signature]
 2nd Reviewer: [Signature]

Validation Area	Yes	No	NA	Findings/Comments
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were target compounds detected in the field duplicates?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
XI. Labeled compounds				
Were labeled compound percent recoveries (%R) within the QC limits?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XII. Compound quantitation				
Did the laboratory reporting limits (RL) meet the QAPP RLs?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Did reported results include both branched and linear isomers?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were the correct ion transition, labeled compound and relative response factor (RRF) used to quantitate the compound?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XIII. Target compound identification				
Were two transitions and the ion transition ratio per analyte monitored and documented with the exception of PFBA and PFPeA?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XIV. System performance				
System performance was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

LDC: 44154 H96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 4
Reviewwe: [Signature]
2nd Reviewer: Me

Method: PFACs (EPA Method 537)

Calibration Date	Analyte	Standard	(Y) Concentration	(X) Area
11/28/2018	PFOA	1	0.040	0.0412551
		2	0.120	0.1032343
		3	0.400	0.4251480
		4	1.600	1.6180283
		5	4.000	3.9501116
		6	10.000	9.4990554
		7	20.000	17.3013685

Linear through the origin

	<i>calculated</i>	<i>Reported</i>
Constant	0.000000	0.0000
X Coefficient(s)	0.88598307	0.967630
Correlation Coefficient	0.999027	0.99955
Coefficient of Determination (r ²)	0.998054	

Method: PFACs (EPA Method 537)

Calibration Date	Analyte	Standard	(Y) Concentration	(X) Area
11/28/2018	PFOS	1	0.039	0.0410015
		2	0.116	0.1089653
		3	0.387	0.4501466
		4	1.548	1.6273983
		5	3.870	4.3562471
		6	9.686	10.8403194
		7	19.372	22.4809355

Linear through the origin

	<i>calculated</i>	<i>Reported</i>
Constant	0.000000	0.0000
X Coefficient(s)	1.15088058	1.139530
Correlation Coefficient	0.999874	0.99969
Coefficient of Determination (r ²)	0.999747	

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Method: PFACs (EPA Method 537)

Calibration Date	Analyte	Standard	(Y) Concentration	(X) Area
12/4/2018	PFOA	1	0.040	0.0410375
		2	0.120	0.1078823
		3	0.400	0.4266144
		4	1.600	1.5216516
		5	4.000	4.0864872
		6	10.000	9.5327125
		7	20.000	18.4415655

Linear through the origin

	<i>calculated</i>	<i>Reported</i>
Constant	0.000000	0.0000
X Coefficient(s)	0.93134901	0.944630
Correlation Coefficient	0.999759	0.99936
Coefficient of Determination (r ²)	0.999518	

Method: PFACs (EPA Method 537)

Calibration Date	Analyte	Standard	(Y) Concentration	(X) Area
12/4/2018	PFOS	1	0.039	0.0470742
		2	0.116	0.1128684
		3	0.387	0.4282712
		4	1.548	1.6316595
		5	3.870	4.2854714
		6	9.686	10.5344483
		7	19.372	22.4560318

Linear through the origin

	<i>calculated</i>	<i>Reported</i>
Constant	0.000000	0.0000
X Coefficient(s)	1.14323595	1.127850
Correlation Coefficient	0.999666	0.99945
Coefficient of Determination (r ²)	0.999332	

VALIDATION FINDINGS WORKSHEET

Continuing Calibration Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

$$\% \text{ Difference} = 100 * (\text{ave. RRF} - \text{RRF}) / \text{ave. RRF}$$

$$\text{RRF} = (A_x)(C_w) / (A_w)(C_x)$$

Where: ave. RRF = initial calibration average RRF
 RRF = continuing calibration RRF
 A_x = Area of compound,
 C_x = Concentration of compound,
 A_w = Area of associated internal standard
 C_w = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported	Recalculated	Reported	Recalculated
					RRF (CC)	RRF (CC)	%D	%D
1	CA1 ISC	12/4/18	PFOA (1st internal standard)	0.60	0.60	0.60	0.79	0.79
	CA2		PFOS (2nd internal standard)	0.56	0.45	0.45	19.23	19.95
			(3rd internal standard)					
2	CA2 CA3	11/58/18	(1st internal standard)	2.00	2.16	2.62 2.16	8.20	8.20
			(2nd internal standard)	1.85	1.87	1.87	1.00	1.00
			(3rd internal standard)					
3	CA3 CA4	11/58/18	(1st internal standard)	8.00	7.55	7.55	5.57	5.57
			(2nd internal standard)	7.40	6.90	6.90	6.69	6.69
			(3rd internal standard)					
4	CA1 ISC - CA2	11/58/18	(1st internal standard)	0.60	0.55	0.55	9.12	9.12
			(2nd internal standard)	0.56	0.47	0.47	16.20	16.94
			(3rd internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results

VALIDATION FINDINGS WORKSHEET Continuing Calibration Results Verification

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

% Difference = $100 * (\text{ave. RRF} - \text{RRF}) / \text{ave. RRF}$
 $\text{RRF} = (A_x)(C_s) / (A_s)(C_x)$

Where: ave. RRF = initial calibration average RRF
 RRF = continuing calibration RRF
 A_x = Area of compound, A_s = Area of associated internal standard
 C_x = Concentration of compound, C_s = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported	Recalculated	Reported	Recalculated
					RRF (CC)	RRF (CC)	%D	%D
1	CVT-ISC EX 2	11/29/8	PFOA (1st internal standard)	0.60	0.56	0.56	6.71	6.71
			PFOS (2nd internal standard)	0.56	0.47	0.47	15.33	16.1
			(3rd internal standard)					
2			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
3			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					
4			(1st internal standard)					
			(2nd internal standard)					
			(3rd internal standard)					

Comments: Refer to Continuing Calibration findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: 9

2nd Reviewer: JG

METHOD: LC/MS PFOS/PFOAs (EPA Method 537M)

The percent recoveries (%R) and Relative Percent Difference (RPD) of the laboratory control sample and laboratory control sample duplicate were recalculated for the compounds identified below using the following calculation:

% Recovery = 100 * (SC/SA)

Where: SSC = Spike concentration
SA = Spike added

RPD = | LCSC - LCSDC | * 2 / (LCSC + LCSDC)

LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: 206/D 330013

Compound	Spike Added (US/L)		Spike Concentration (US/L)		LCS		LCSD		LCS/LCSD	
	LCS	LCSD	LCS	LCSD	Percent Recovery		Percent Recovery		RPD	
					Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
PFA	5.14	5.14	5.49	5.63	101	101	104	104	3	3
PFOS	5.20	5.20	4.21	4.22	81	81	81	81	0	0

Comments: Refer to Laboratory Control Sample/Laboratory Control Sample Duplicates findings worksheet for list of qualifications and associated samples when reported results do not agree within 10.0% of the recalculated results.

LDC #: 44154

EDD POPULATION COMPLETENESS WORKSHEET

Date: 1/29
 Page: 1 of 1
 2nd Reviewer: FM

The LDC job number listed above was entered by JE
 Entered from Body or Summary

	EDD Process		Comments/Action
I.	EDD Completeness	-	
Ia.	- All methods present?	Y	
Ib.	- All samples present/match report?	Y	
Ic.	- All reported analytes present?	Y	
Id.	- 10% or 100% verification of EDD?	Y	
II.	EDD Preparation/Entry	-	
IIa.	- Carryover U/J?	Y	
IIb.	- Reason Codes used? If so, note which codes.	-	
IIc.	- Additional Information (QC Level, Validator, Validated Y/N, etc.)	Y	
III.	Reasonableness Checks	-	
IIIa.	- Do all qualified ND results have ND qualifier (e.g. UJ)?	Y	
IIIb.	- Do all qualified detect results have detect qualifier (e.g. J)?	Y	
IIIc.	- If reason codes are used, do all qualified results have reason code field populated, and vice versa?	-	
IIId.	- Does the detect flag require changing for blank qualifier? If so, are all U results marked ND?	Y/Y	
IIIe.	- Do blank concentrations in report match EDD where data was qualified due to blank contamination?	Y	
IIIf.	- Were multiple results reported due to dilutions/reanalysis? If so, were results qualified appropriately?	+	
IIIg.	- Are there any discrepancies between the data packet and the EDD?	N	

Notes: *see discrepancy sheet

