

18B1554



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

L-PFHpS

LOT NUMBER:

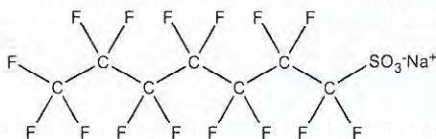
LPFHpS0817

COMPOUND:

Sodium perfluoro-1-heptanesulfonate

STRUCTURE:**CAS #:**

Not available

**MOLECULAR FORMULA:** $C_7F_{15}SO_3Na$ **MOLECULAR WEIGHT:**

472.10

CONCENTRATION:

50.0 ± 2.5 µg/ml (Na salt)

SOLVENT(S):

Methanol

47.6 ± 2.4 µg/ml (PFHpS anion)

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

09/01/2017

EXPIRY DATE: (mm/dd/yyyy)

09/01/2022

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)

Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.2% of L-PFHxS ($C_6F_{13}SO_3Na$) and ~ 0.1% of L-PFOS ($C_8F_{17}SO_3Na$).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

Date:

 09/07/2017
 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
 519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

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HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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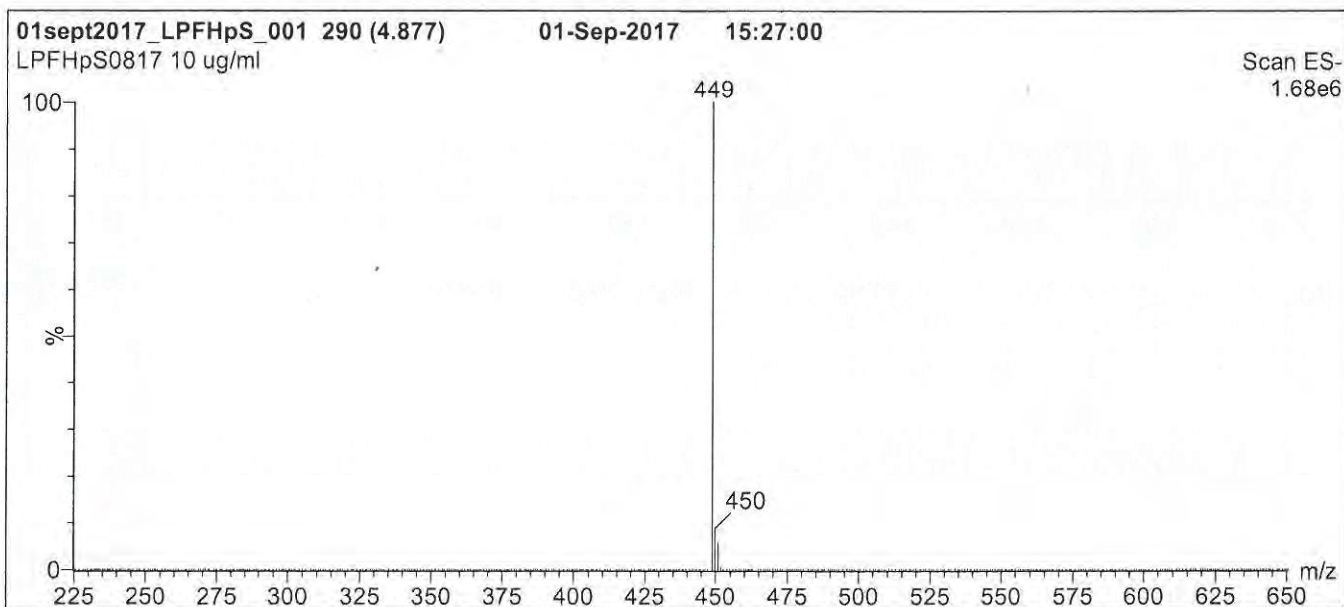
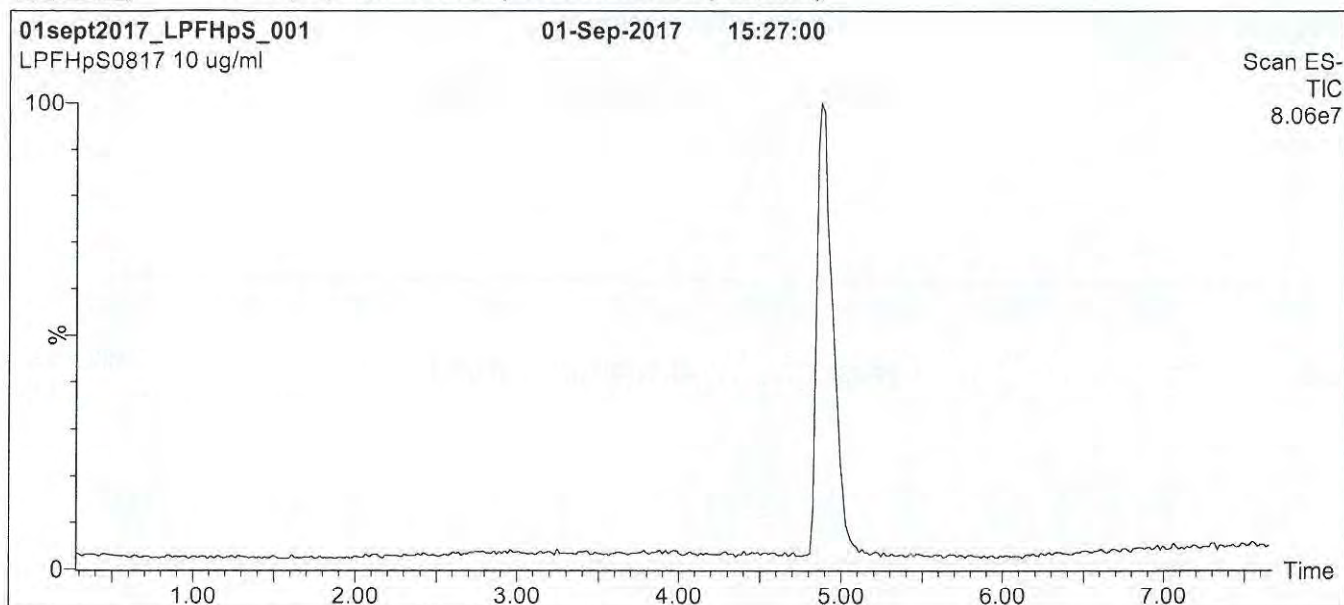
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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Figure 1: L-PFHpS; LC/MS Data (TIC and Mass Spectrum)



Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 8 min and hold
for 1 min before returning to initial conditions in 0.5 min.
Time: 10 min

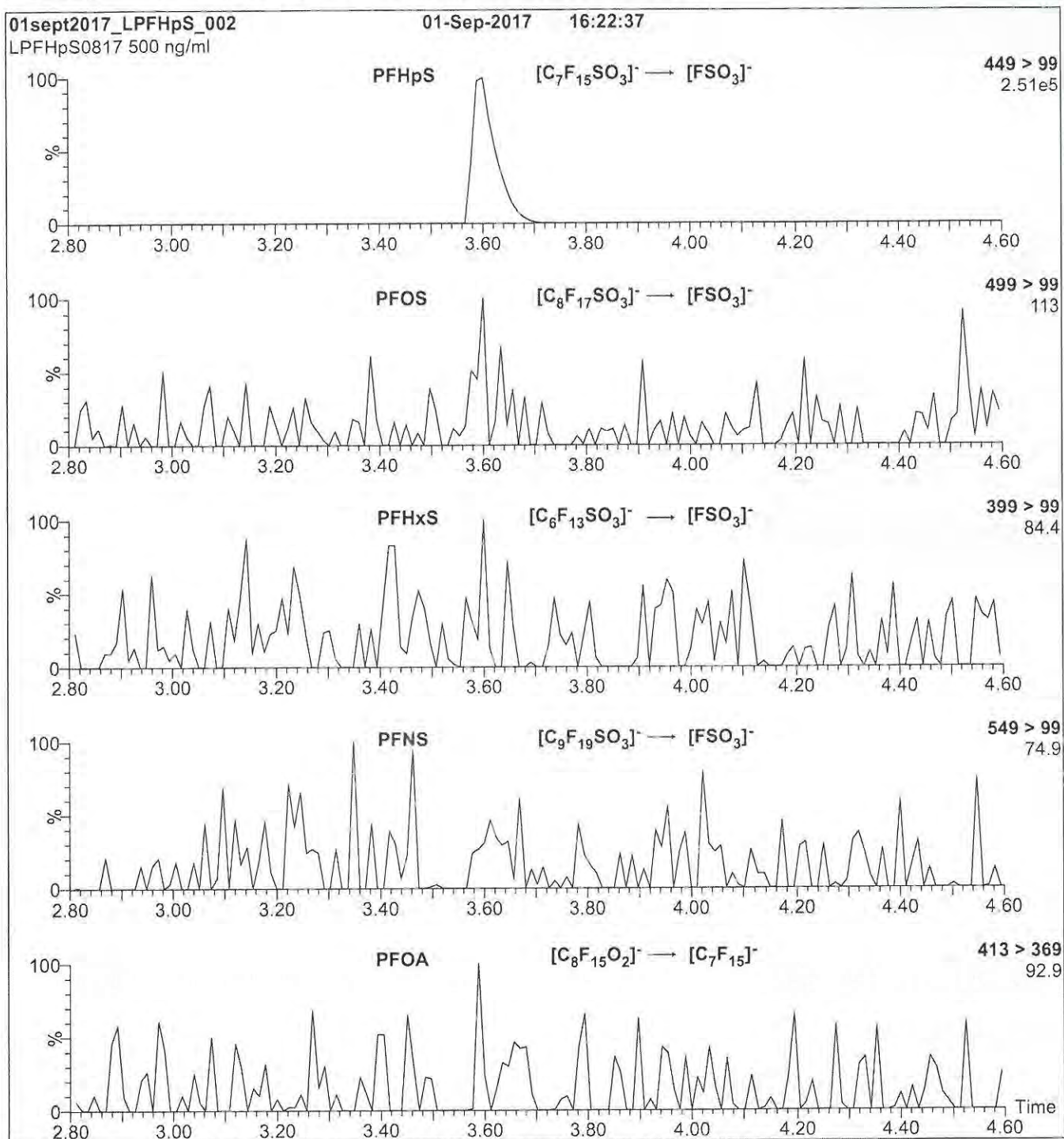
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

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Figure 2: L-PFHpS; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml L-PFHpS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 35

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**WELLINGTON
LABORATORIES****CERTIFICATE OF ANALYSIS
DOCUMENTATION****br-PFOSK****Potassium Perfluorooctanesulfonate
Solution/Mixture of Linear and
Branched Isomers**

PRODUCT CODE: br-PFOSK
LOT NUMBER: brPFOSK0117
CONCENTRATION: 50 ± 2.5 µg/ml (total potassium salt)
46.4 ± 2.3 µg/ml (total PFOS anion)
SOLVENT(S): Methanol
DATE PREPARED: (mm/dd/yyyy) 01/09/2017
LAST TESTED: (mm/dd/yyyy) 01/12/2017
EXPIRY DATE: (mm/dd/yyyy) 01/12/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DESCRIPTION:

The chemical purity has been determined to be ≥98% perfluorooctanesulfonate linear and branched isomers. The full name, structure and percent composition for each of the isomeric components are given in Table A.

DOCUMENTATION/ DATA ATTACHED:

Table A: Isomeric Components and Percent Composition by ¹⁹F-NMR
Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS Data (SIR)
Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- A 5-point calibration curve was generated using linear PFOS (potassium salt) and mass-labelled PFOS as an internal standard to enable quantitation of br-PFOSK using isotopic dilution.
- CAS#: 2795-39-3 (for linear isomer; potassium salt).

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18B1555

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UNCERTAINTY:

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Table A: br-PFOSK; Isomeric Components and Percent Composition (by ^{19}F -NMR)*

Isomer	Name	Structure	Percent Composition by ^{19}F -NMR
1	Potassium perfluoro-1-octanesulfonate	$\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{SO}_3\cdot\text{K}^+$	78.8
2	Potassium 1-trifluoromethylperfluoroheptanesulfonate**	$\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{C}(\text{SO}_3\cdot\text{K}^+)\text{CF}_3$	1.2
3	Potassium 2-trifluoromethylperfluoroheptanesulfonate	$\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{C}(\text{CF}_3)\text{CF}_2\text{SO}_3\cdot\text{K}^+$	0.6
4	Potassium 3-trifluoromethylperfluoroheptanesulfonate	$\text{CF}_3\text{CF}_2\text{CF}_2\text{CF}_2\text{C}(\text{CF}_3)\text{CF}_2\text{CF}_2\text{SO}_3\cdot\text{K}^+$	1.9
5	Potassium 4-trifluoromethylperfluoroheptanesulfonate	$\text{CF}_3\text{CF}_2\text{CF}_2\text{C}(\text{CF}_3)\text{CF}_2\text{CF}_2\text{CF}_2\text{SO}_3\cdot\text{K}^+$	2.2
6	Potassium 5-trifluoromethylperfluoroheptanesulfonate	$\text{CF}_3\text{CF}_2\text{C}(\text{CF}_3)\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{SO}_3\cdot\text{K}^+$	4.5
7	Potassium 6-trifluoromethylperfluoroheptanesulfonate	$\text{CF}_3\text{C}(\text{CF}_3)\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{CF}_2\text{SO}_3\cdot\text{K}^+$	10.0
8	Potassium 5,5-di(trifluoromethyl)perfluorohexanesulfonate	$\text{CF}_3\text{C}(\text{CF}_3)_2\text{CF}_2\text{CF}_2\text{CF}_2\text{SO}_3\cdot\text{K}^+$	0.2
9	Potassium 4,4-di(trifluoromethyl)perfluorohexanesulfonate	$\text{CF}_3\text{CF}_2\text{C}(\text{CF}_3)_2\text{CF}_2\text{CF}_2\text{SO}_3\cdot\text{K}^+$	0.03
10	Potassium 4,5-di(trifluoromethyl)perfluorohexanesulfonate	$\text{CF}_3\text{C}(\text{CF}_3)\text{CF}_2\text{C}(\text{CF}_3)\text{CF}_2\text{CF}_2\text{SO}_3\cdot\text{K}^+$	0.4
11	Potassium 3,5-di(trifluoromethyl)perfluorohexanesulfonate	$\text{CF}_3\text{C}(\text{CF}_3)\text{CF}_2\text{C}(\text{CF}_3)\text{CF}_2\text{CF}_2\text{SO}_3\cdot\text{K}^+$	0.07

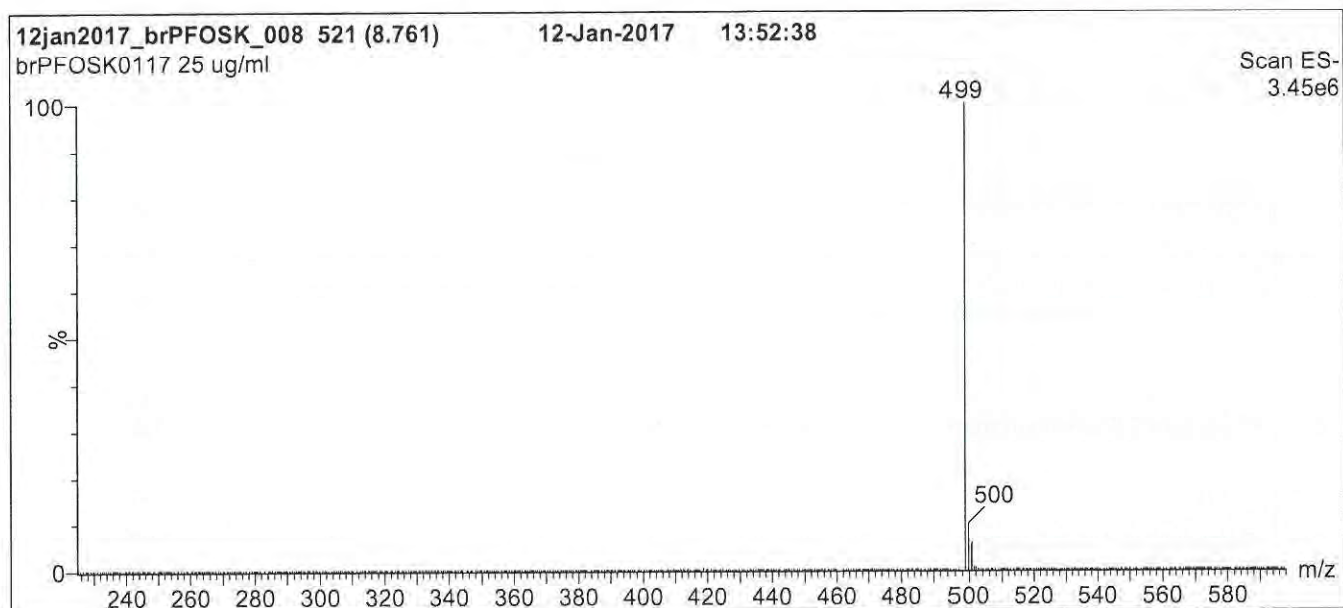
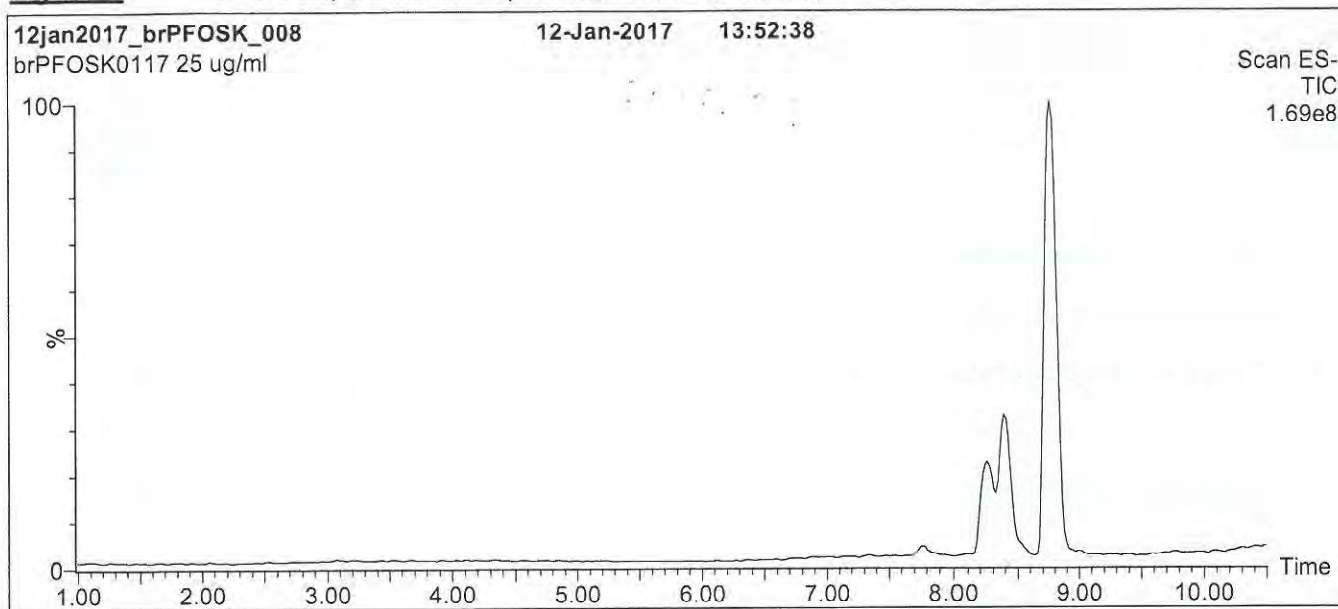
* Percent of total perfluorooctanesulfonate isomers only. Isomers are labelled in Figure 2.
 ** Systematic Name: Potassium perfluorooctane-2-sulfonate.

Certified By:


 B.G. Chittim
Date: 01/20/2017
(mm/dd/yyyy)

18B(555

Figure 1: br-PFOSK; LC/MS Data (TIC and Mass Spectrum)



Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

Start: 45% (80:20 MeOH:ACN) / 55% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 12 min and hold for 2 min.
Return to initial conditions over 0.5 min.
Time: 16 min

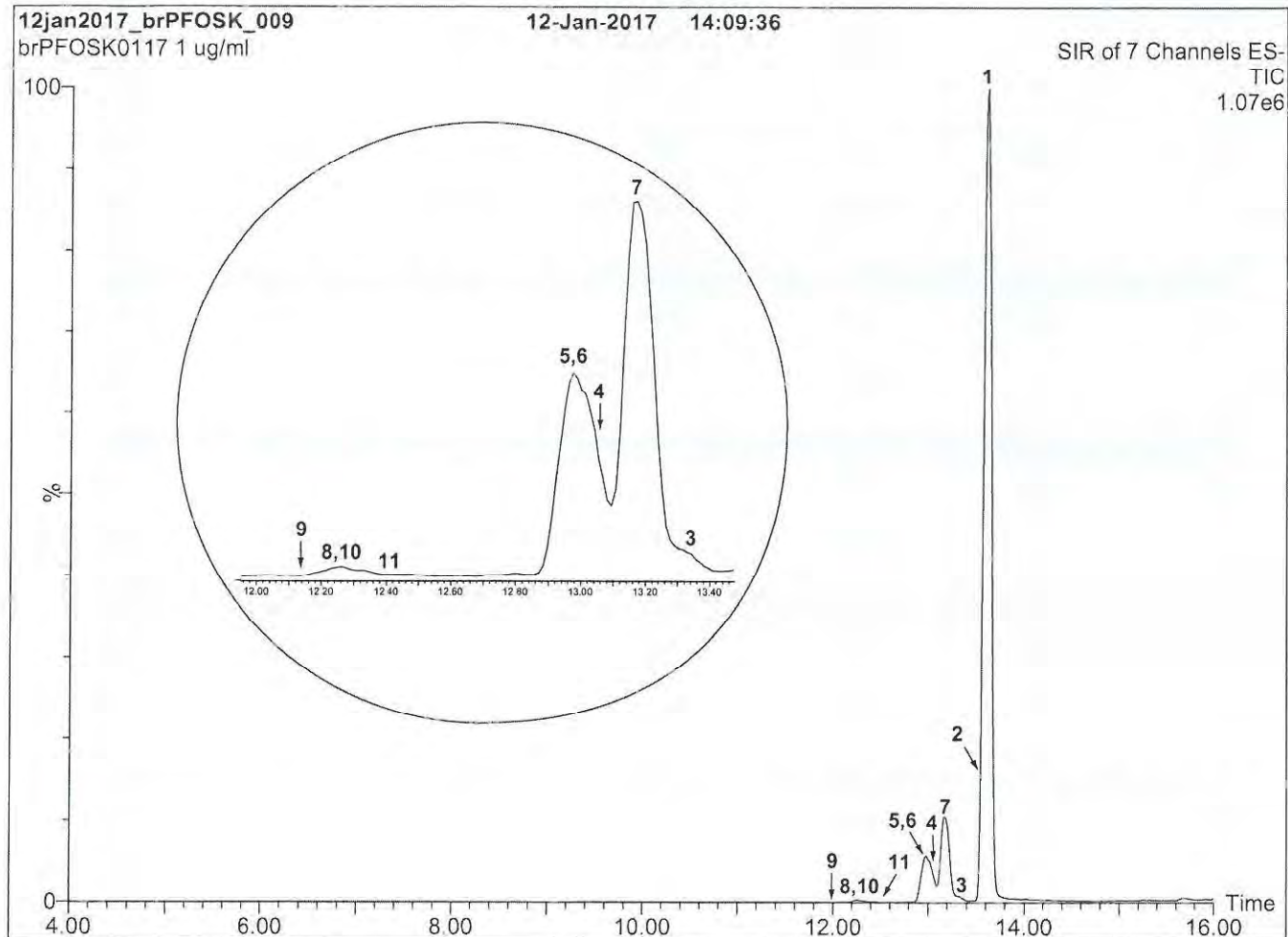
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18B1555

Figure 2: br-PFOSK; LC/MS Data (SIR)**Conditions for Figure 2:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro micro API MS

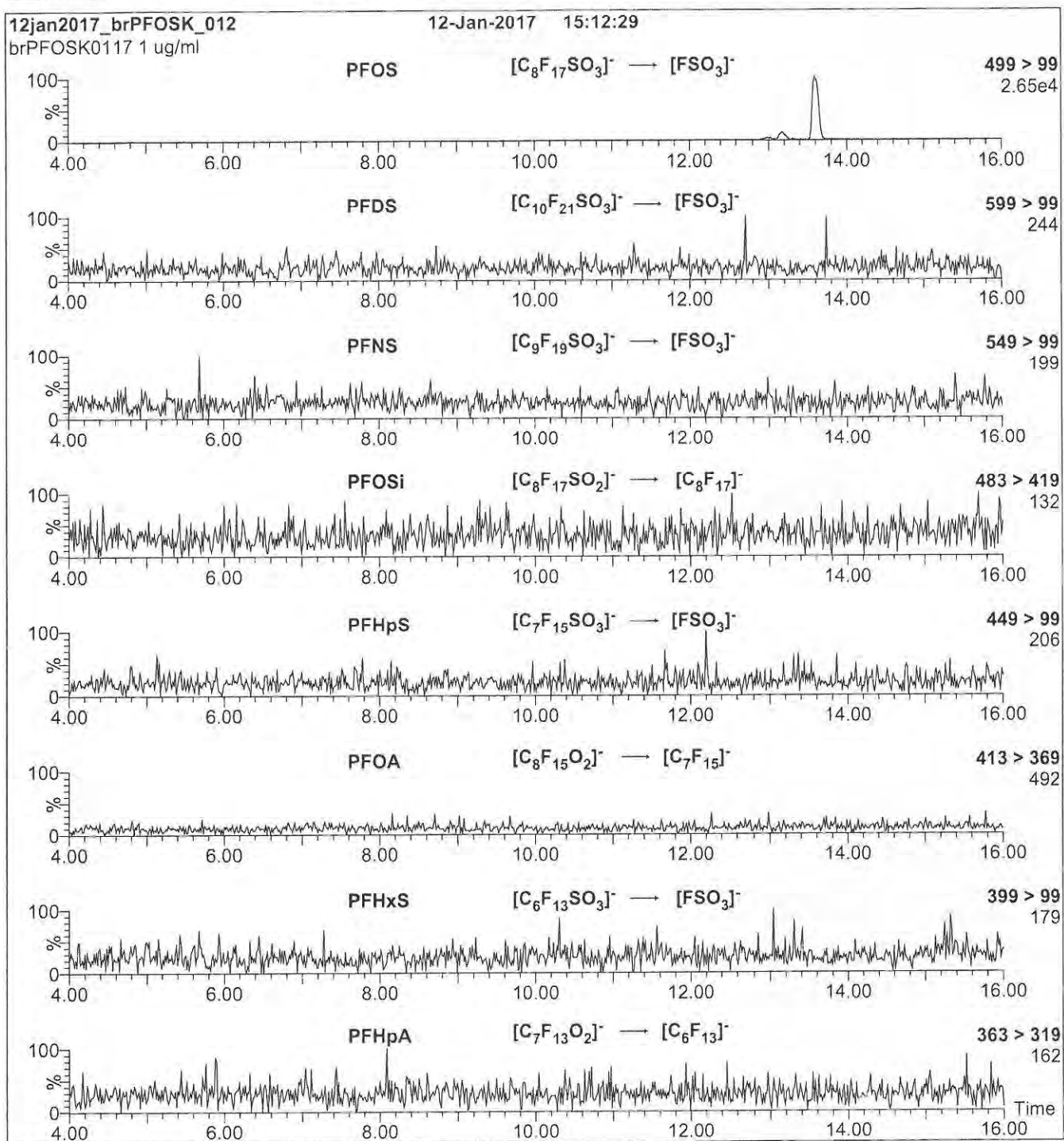
Chromatographic Conditions:

Column: Acquity UPLC BEH Shield RP₁₈ (1.7 μ m, 2.1 x 100 mm)
Injection: 1.0 μ g/ml of br-PFOSK
Mobile Phase: Gradient
 45% (80:20 MeOH:ACN) / 55% H₂O (both with 10 mM NH₄OAc buffer)
 Ramp to 90% organic over 15 min and hold for 3 min.
 Return to initial conditions over 1 min.
 Time: 20 min
Flow: 300 μ l/min

MS Conditions:

SIR (ES)
 Source = 110 °C
 Desolvation = 325 °C
 Cone Voltage = 60V

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Figure 3: br-PFOSK; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 3:**

Injection: On-column

Mobile phase: Same as Figure 2

Flow: 300 μ l/min**MS Parameters**

Collision Gas (mbar) = 3.31e-3

Collision Energy (eV) = 11-50 (variable)

18B1556

**WELLINGTON**
LABORATORIES**CERTIFICATE OF ANALYSIS**
DOCUMENTATION**PRODUCT CODE:**

L-PFNS

LOT NUMBER:

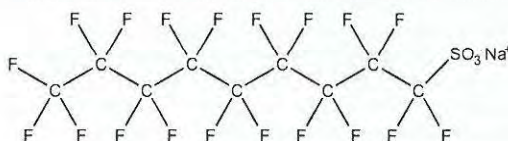
LPFNS0917

COMPOUND:

Sodium perfluoro-1-nonanesulfonate

STRUCTURE:**CAS #:**

98789-57-2

**MOLECULAR FORMULA:** $C_9F_{19}SO_3Na$ **MOLECULAR WEIGHT:**

572.12

CONCENTRATION: $50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt)**SOLVENT(S):**

Methanol

 $48.0 \pm 2.4 \mu\text{g/ml}$ (PFNS anion)**CHEMICAL PURITY:**

>98%

LAST TESTED: (mm/dd/yyyy)

09/27/2017

EXPIRY DATE: (mm/dd/yyyy)

09/27/2022

RECOMMENDED STORAGE:

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(mm/dd/yyyy)

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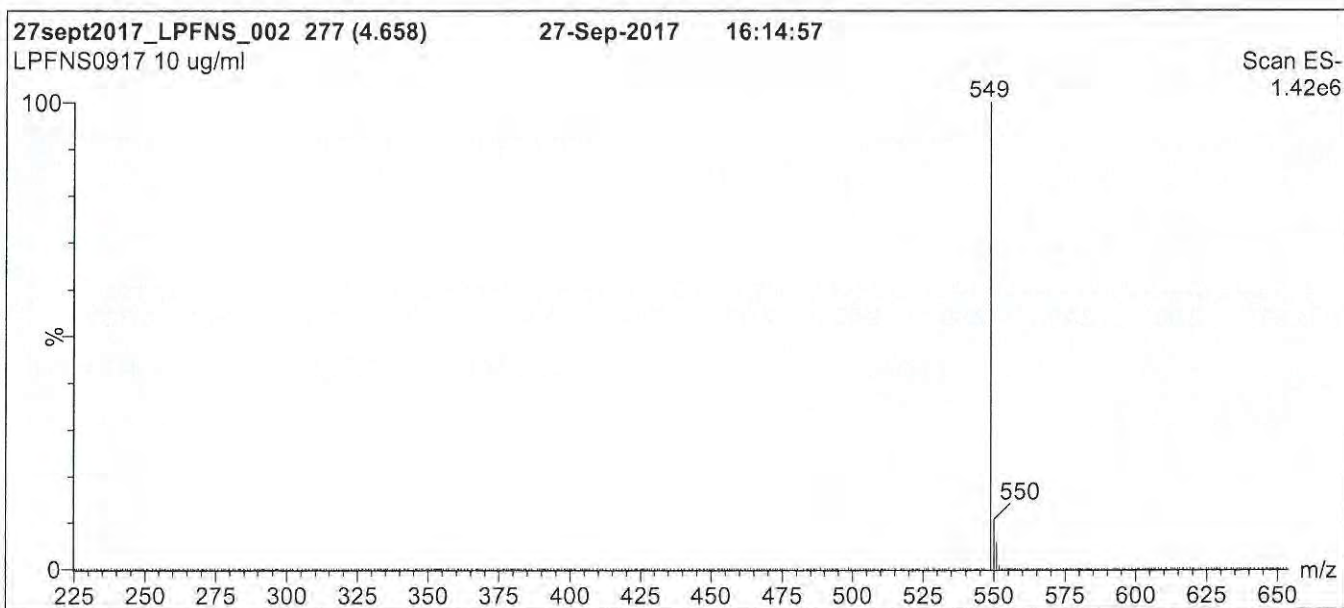
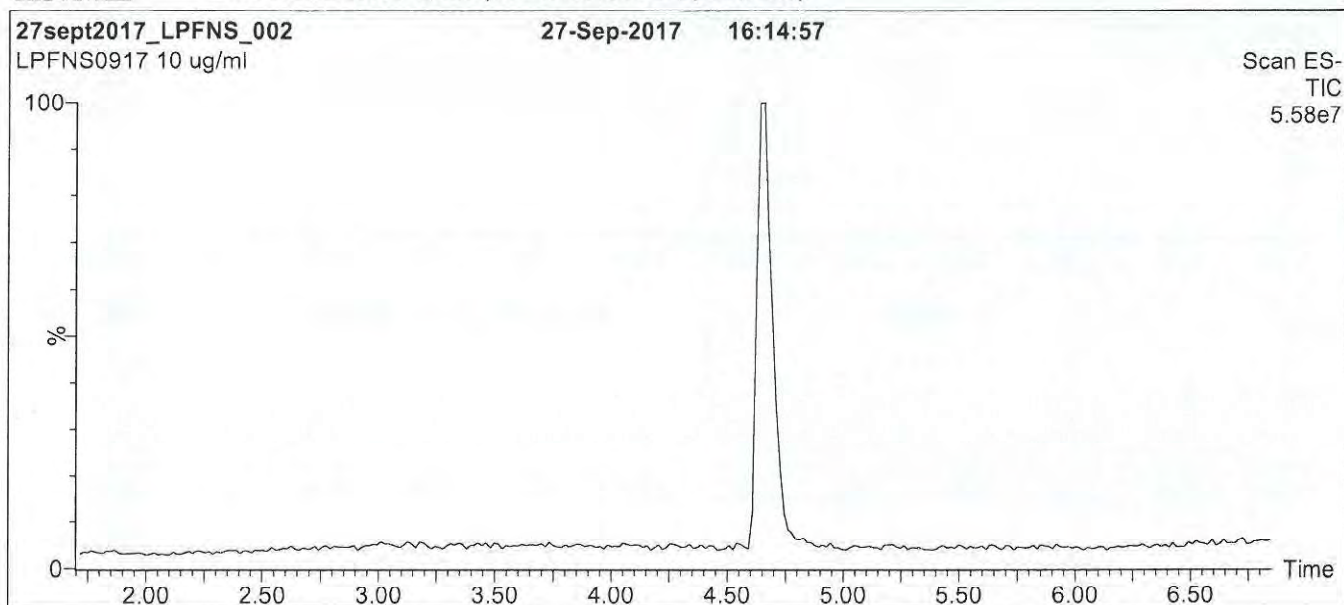
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MS: Micromass Quattro *micro* API MS

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Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

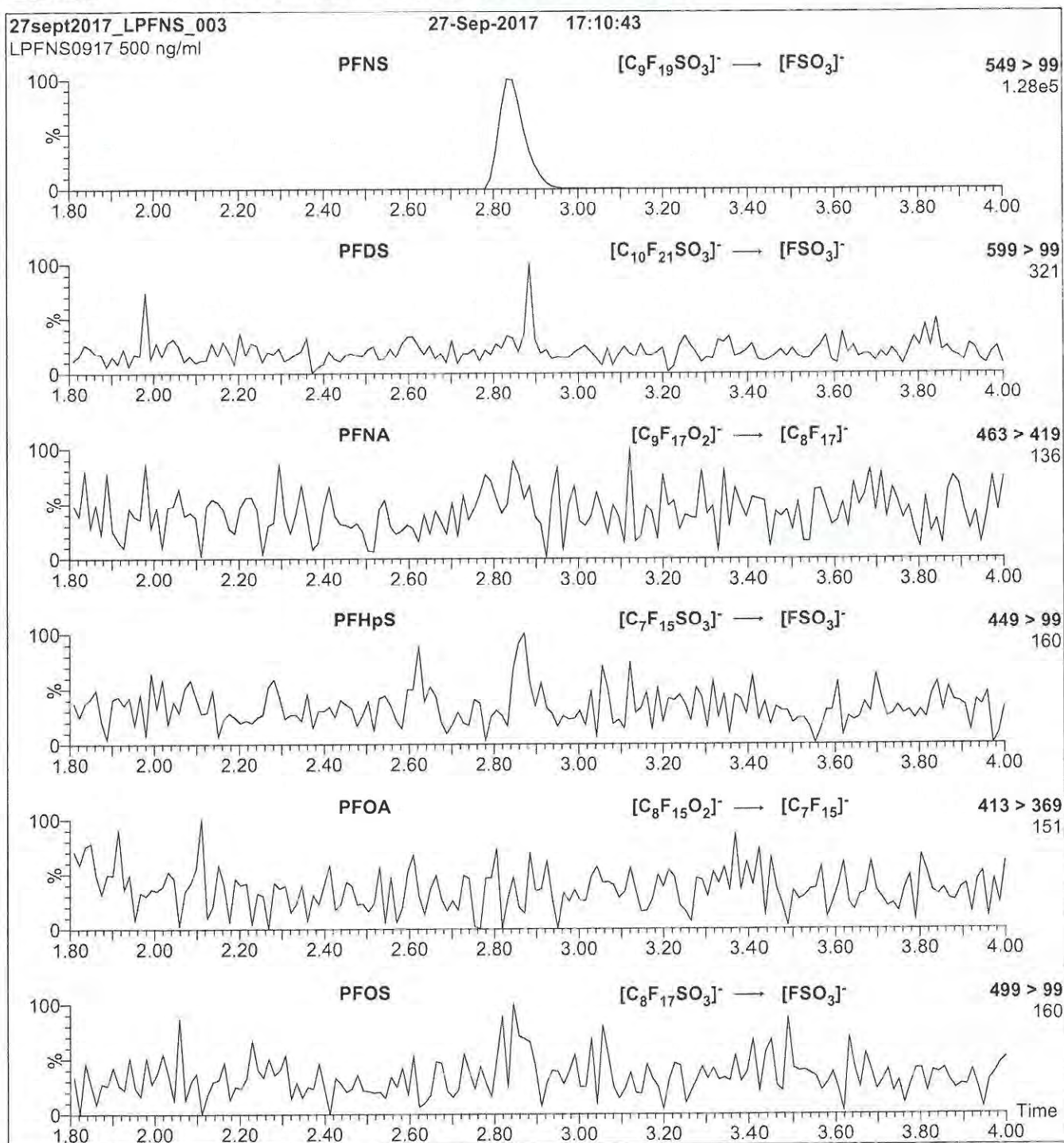
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.00
Cone Voltage (V) = 65.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18B1556

Figure 2: L-PFNS; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml L-PFNS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.50e-3
Collision Energy (eV) = 45

18B1557



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

L-PFDS

LOT NUMBER:

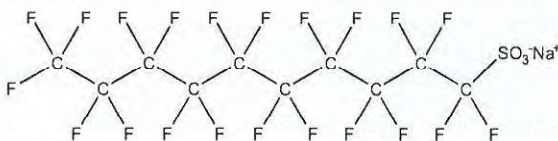
LPFDS1117

COMPOUND:

Sodium perfluoro-1-decanesulfonate

STRUCTURE:**CAS #:**

2806-15-7

**MOLECULAR FORMULA:** $C_{10}F_{21}SO_3Na$ **MOLECULAR WEIGHT:**

622.13

CONCENTRATION:

$50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt)
 $48.2 \pm 2.4 \mu\text{g/ml}$ (PFDS anion)

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

11/08/2017

EXPIRY DATE: (mm/dd/yyyy)

11/08/2022

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)

Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.9% of sodium perfluoro-1-dodecanesulfonate (L-PFDoS).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**Certified By:**

B.G. Chittim, General Manager
Date:11/16/2017
(mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
 519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1557

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of $\pm 5\%$ (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

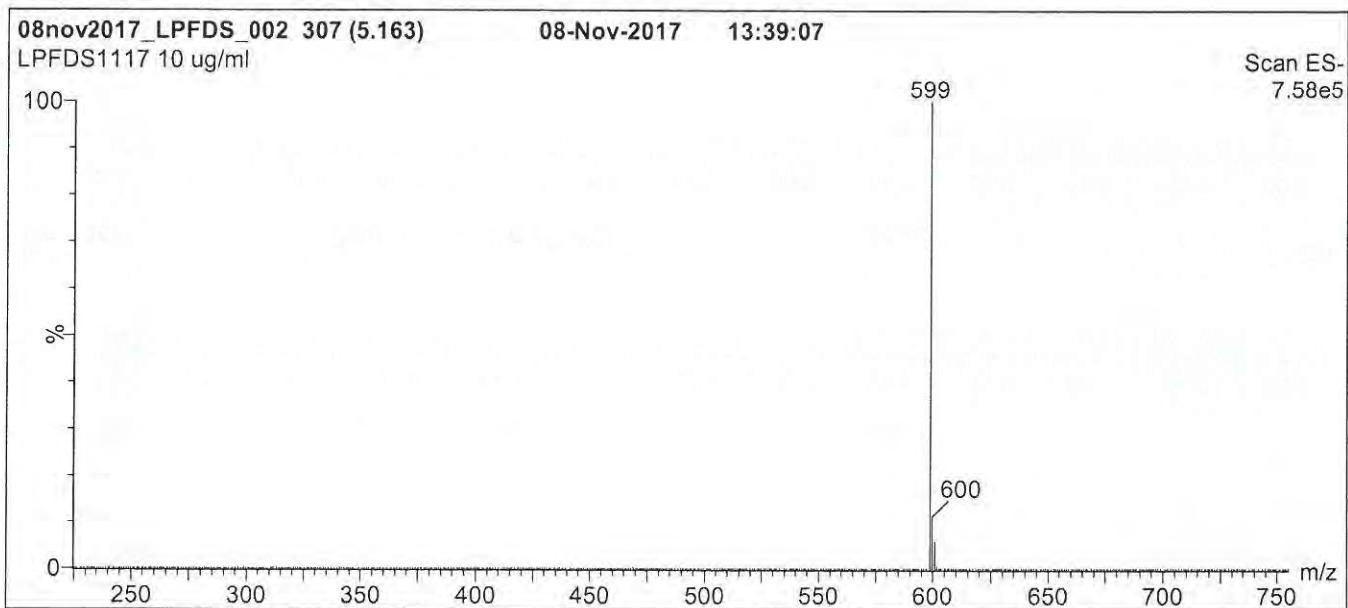
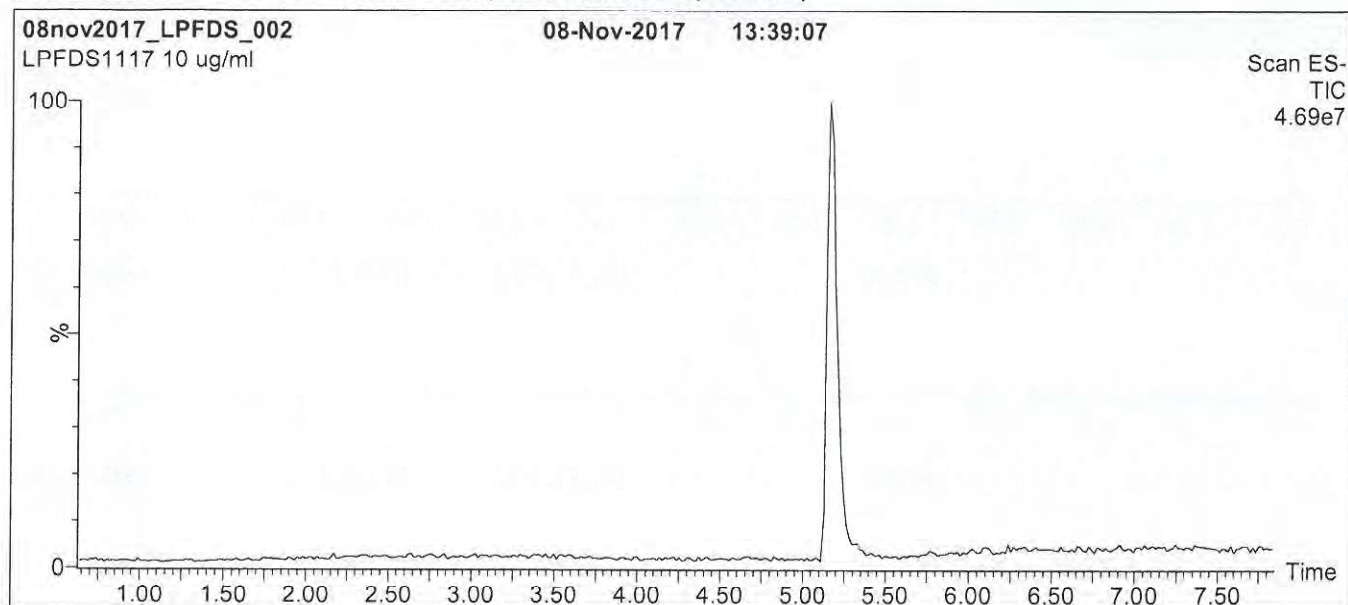
QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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Figure 1: L-PFDS; LC/MS Data (TIC and Mass Spectrum)**Conditions for Figure 1:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for
2 min before returning to initial conditions in 0.5 min.
Time: 10 min

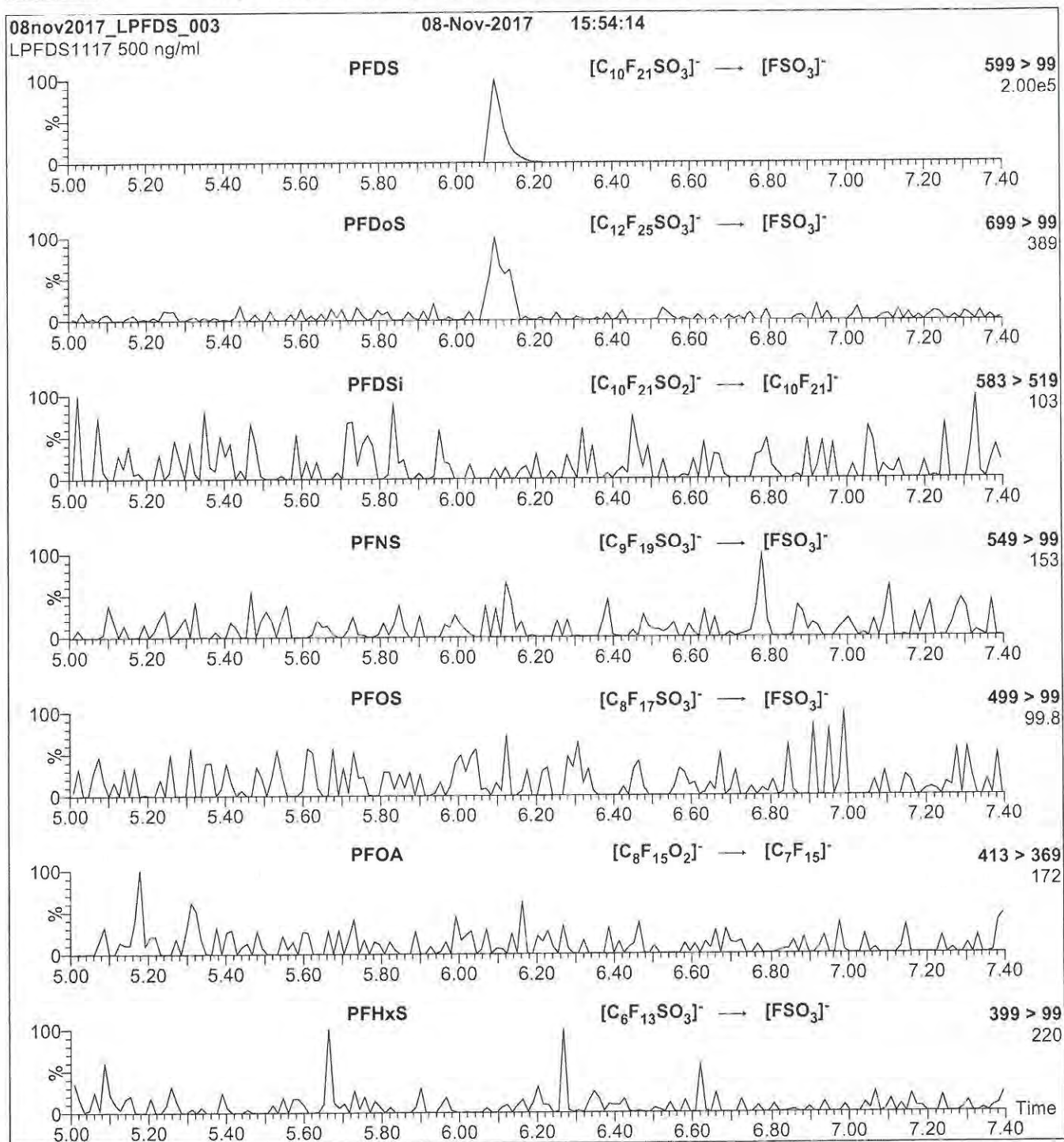
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 70.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18B1557

Figure 2: L-PFDS; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml L-PFDS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.46e-3
Collision Energy (eV) = 50

18B1558



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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

4:2FTS

LOT NUMBER:

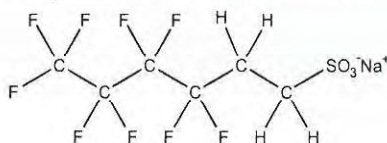
42FTS1216

COMPOUND:

Sodium 1H,1H,2H,2H-perfluorohexane sulfonate

STRUCTURE:**CAS #:**

Not available

**MOLECULAR FORMULA:** $C_6H_4F_9SO_3Na$ **MOLECULAR WEIGHT:**

350.13

CONCENTRATION:

50.0 ± 2.5 µg/ml (Na salt)
 46.7 ± 2.3 µg/ml (4:2FTS anion)

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

12/12/2016

EXPIRY DATE: (mm/dd/yyyy)

12/12/2021

RECOMMENDED STORAGE:

Refrigerate ampoule

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)

Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**Certified By:**

B.G. Chittim
Date:
 12/21/2016
 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
 519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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where x is expressed as a relative standard uncertainty of the individual parameter.

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TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

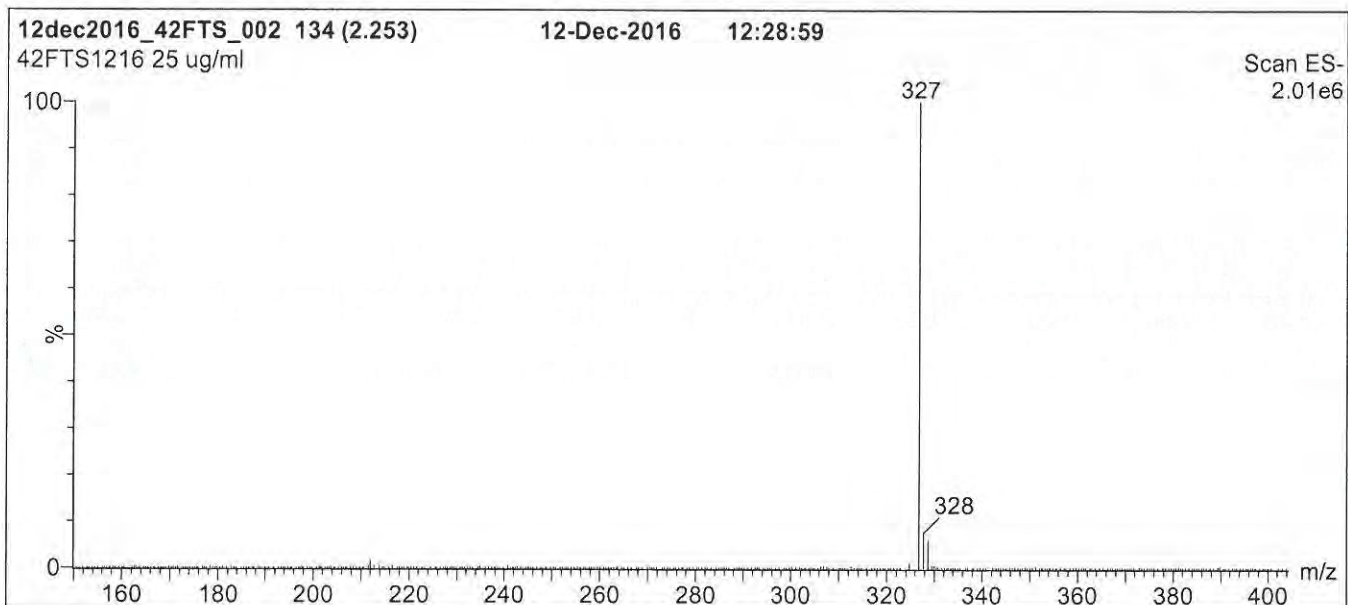
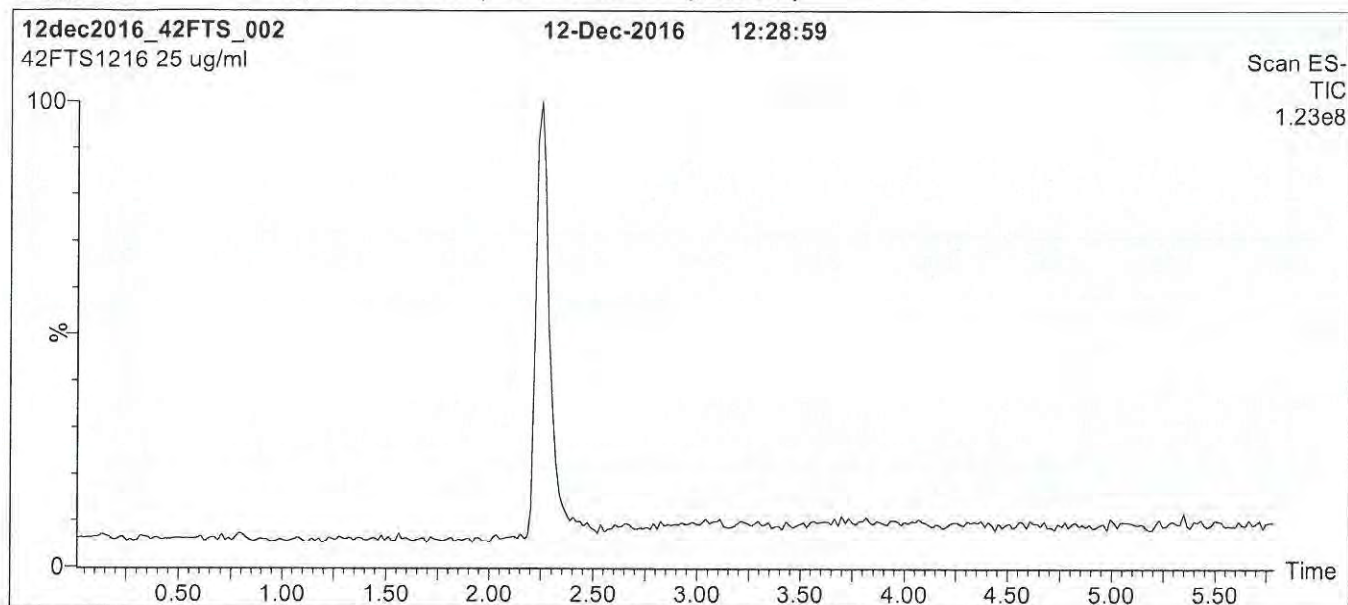
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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Figure 1: 4:2FTS; LC/MS Data (TIC and Mass Spectrum)



Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

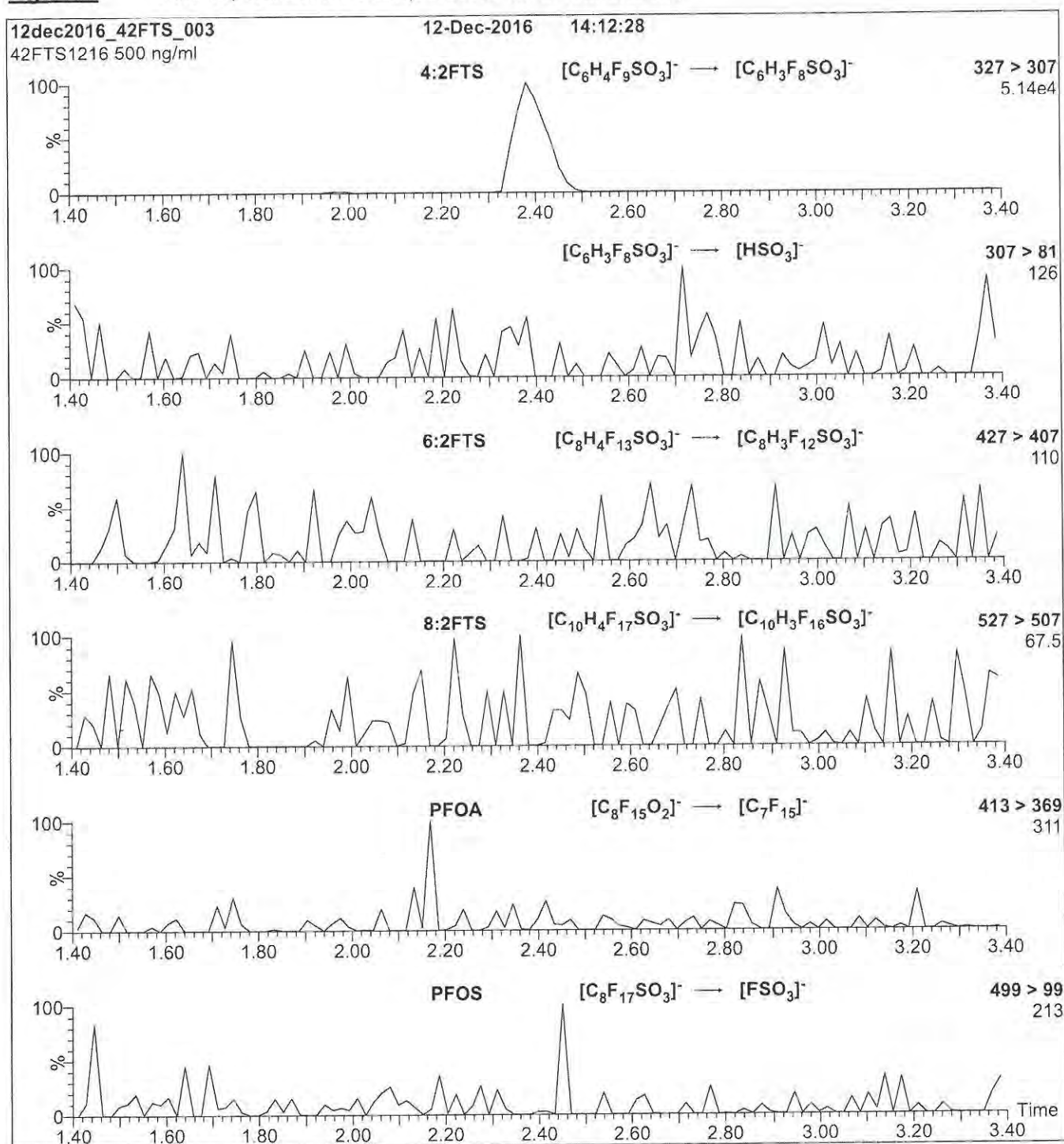
Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)
Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 25.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18B1558

Figure 2: 4:2FTS; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml 4:2FTS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 25

18B1559

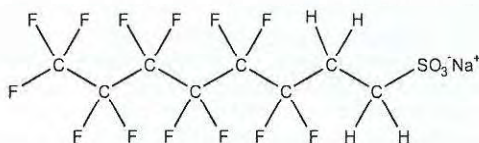


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: 6:2FTS **LOT NUMBER:** 62FTS0417
COMPOUND: Sodium 1H,1H,2H,2H-perfluorooctane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: $C_8H_4F_{13}SO_3Na$ **MOLECULAR WEIGHT:** 450.15
CONCENTRATION: $50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt) **SOLVENT(S):** Methanol
 $47.4 \pm 2.4 \mu\text{g/ml}$ (6:2FTS anion)
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 04/20/2017
EXPIRY DATE: (mm/dd/yyyy) 04/20/2022
RECOMMENDED STORAGE: Refrigerate ampoule

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
 Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: 
 B.G. Chittim, General Manager

Date: 04/24/2017
 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
 519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1559

INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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x_1, x_2, \dots, x_n on which it depends is:

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where x is expressed as a relative standard uncertainty of the individual parameter.

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TRACEABILITY:

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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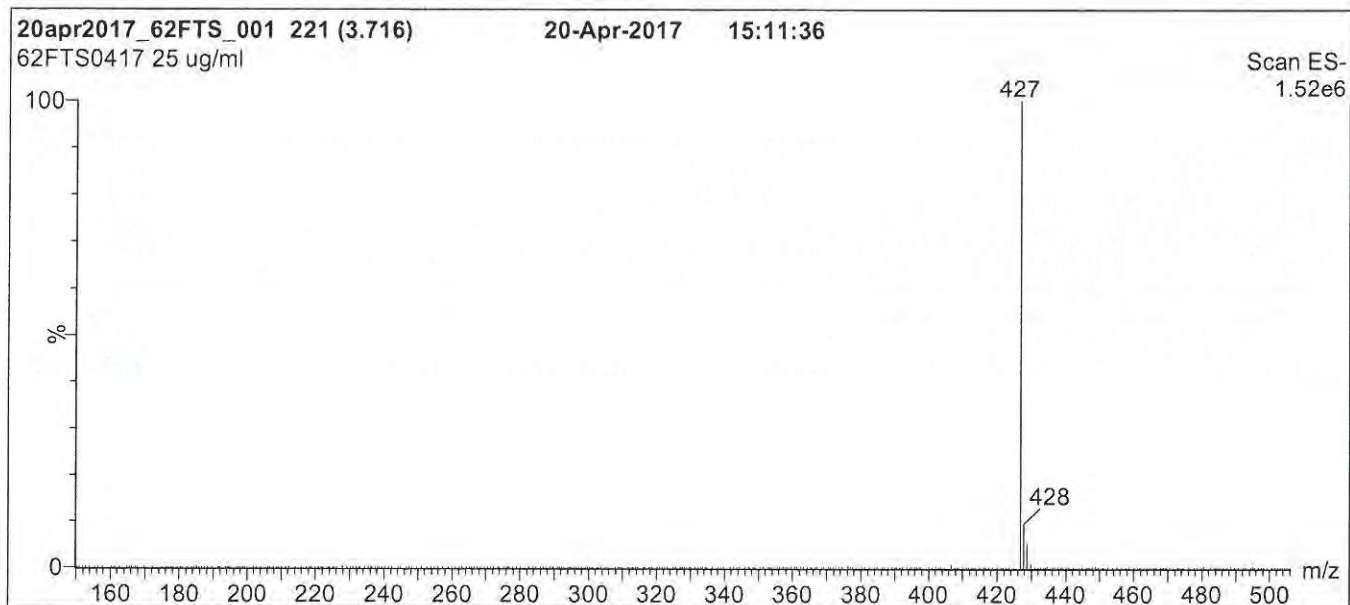
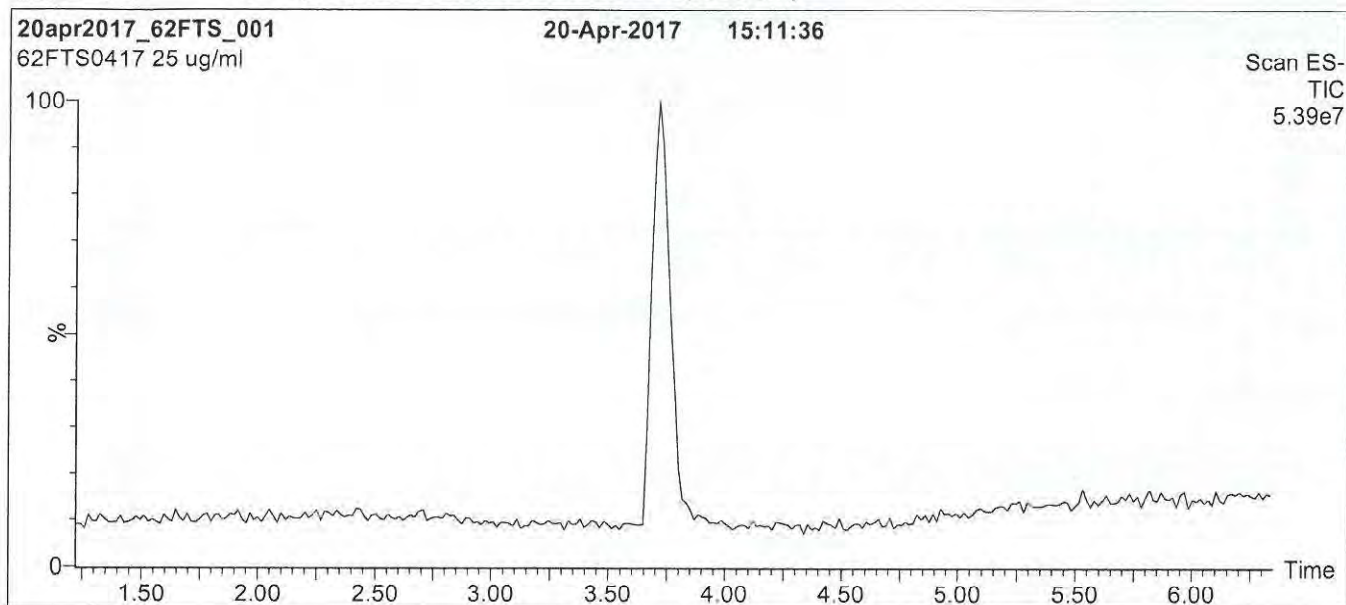
QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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Figure 1: 6:2FTS; LC/MS Data (TIC and Mass Spectrum)**Conditions for Figure 1:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 85% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

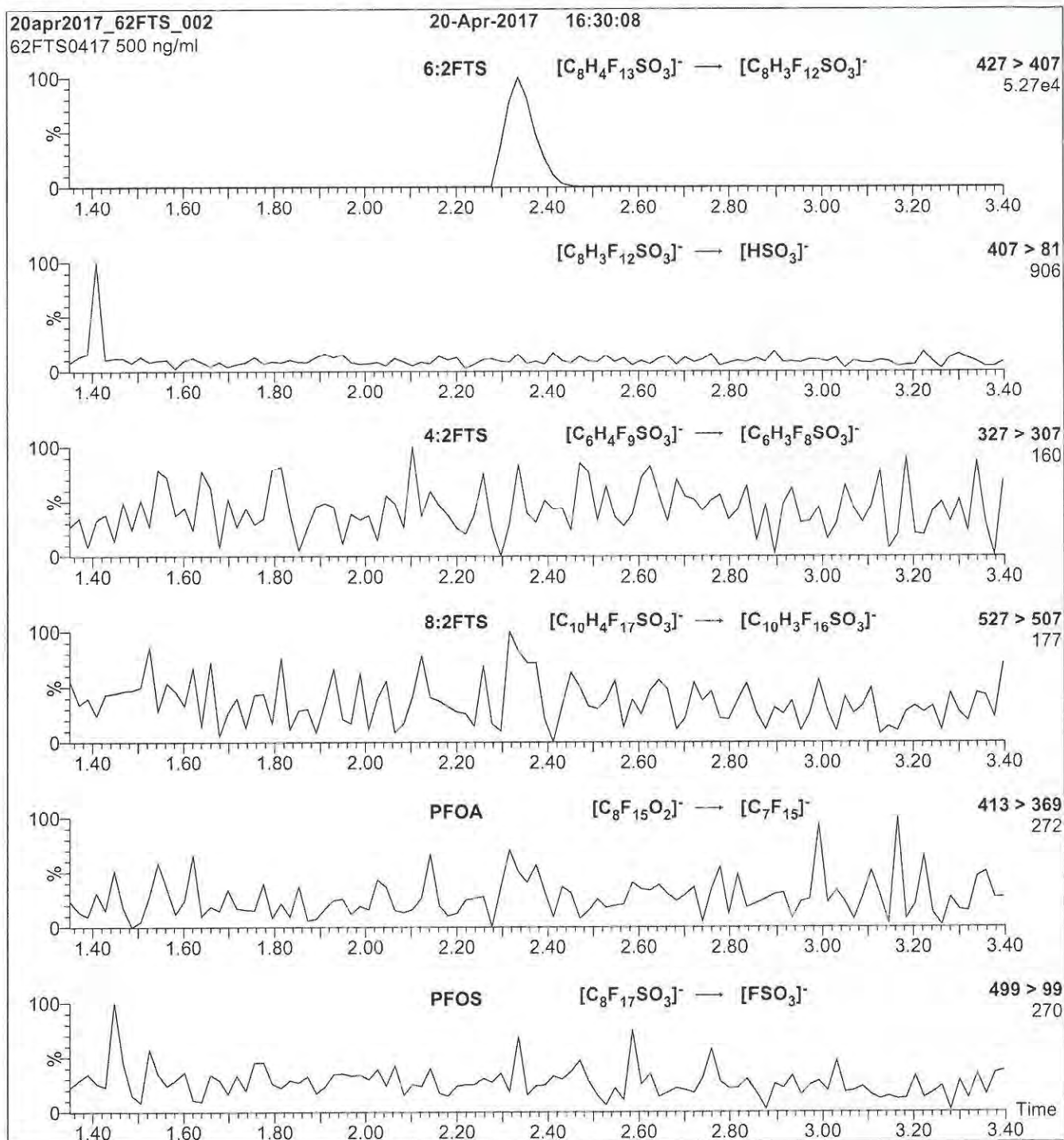
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18B1559

Figure 2: 6:2FTS; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml 6:2FTS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 25

18B1560

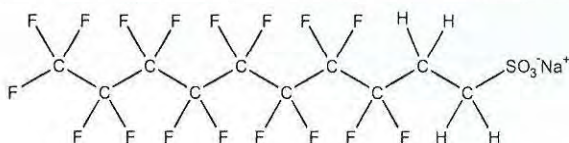


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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: 8:2FTS **LOT NUMBER:** 82FTS1216
COMPOUND: Sodium 1H,1H,2H,2H-perfluorodecane sulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: $C_{10}H_4F_{17}SO_3Na$ **MOLECULAR WEIGHT:** 550.16
CONCENTRATION: $50.0 \pm 2.5 \mu\text{g/ml}$ (Na salt) **SOLVENT(S):** Methanol
 $47.9 \pm 2.4 \mu\text{g/ml}$ (8:2FTS anion)
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 12/12/2016
EXPIRY DATE: (mm/dd/yyyy) 12/12/2021
RECOMMENDED STORAGE: Refrigerate ampoule

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
 Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 12/21/2016
(mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
 519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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LIMITED WARRANTY:

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QUALITY MANAGEMENT:

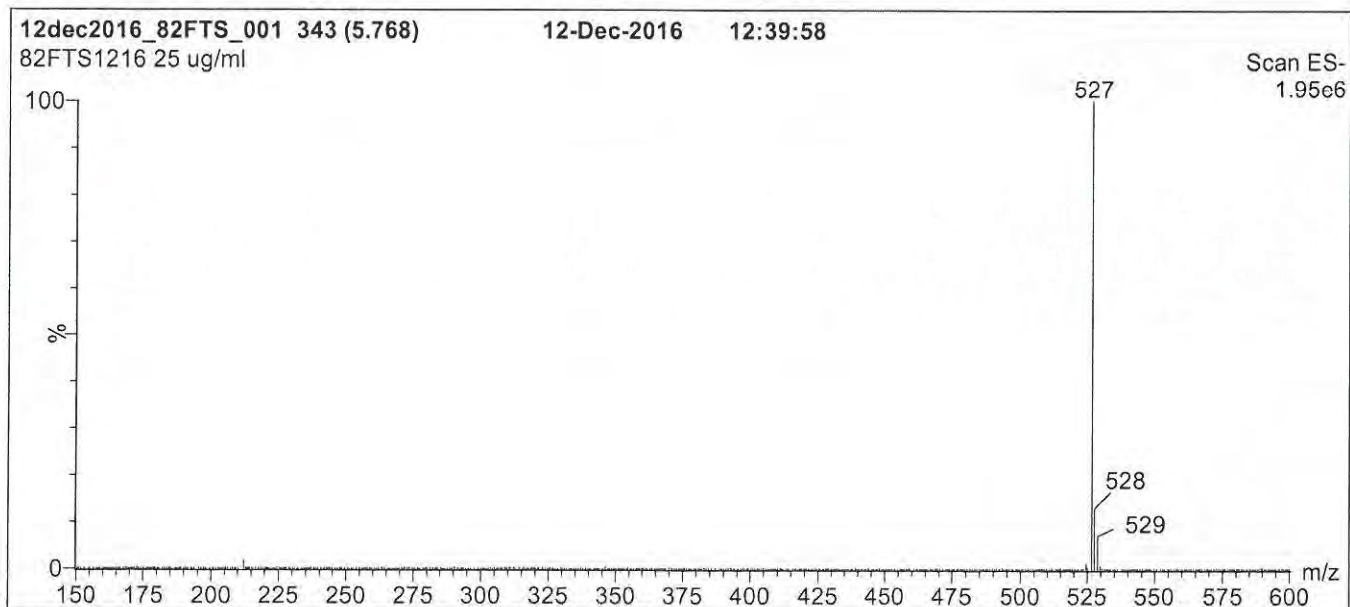
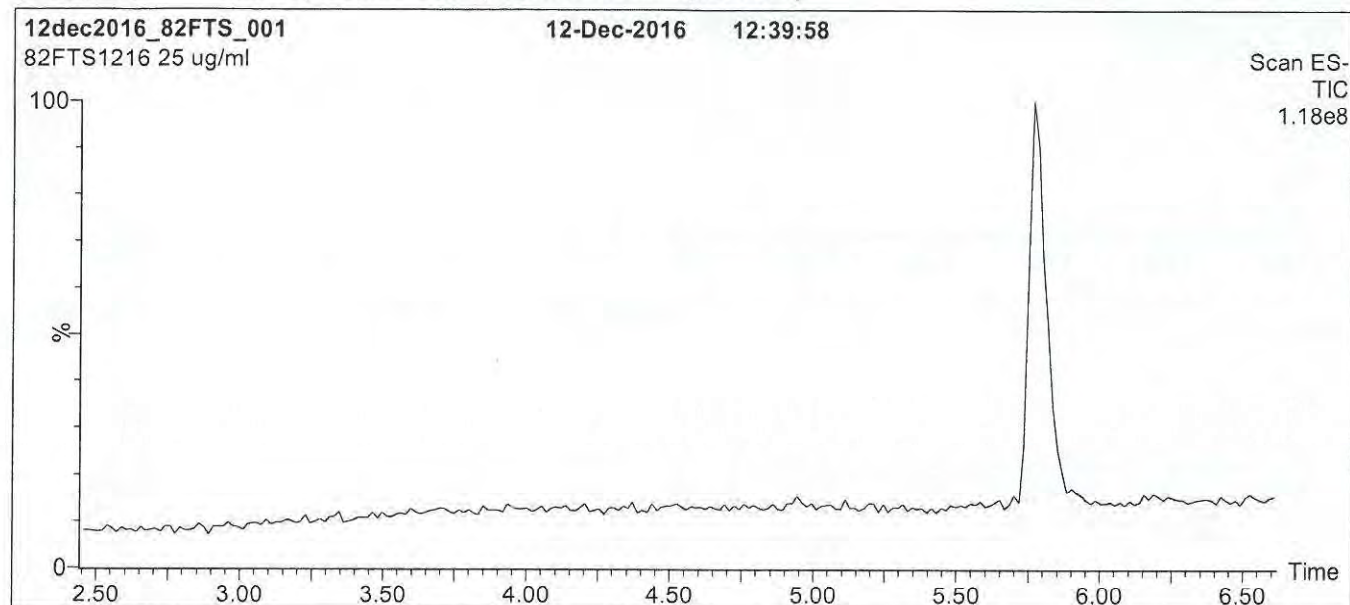
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18B1560

Figure 1: 8:2FTS; LC/MS Data (TIC and Mass Spectrum)



Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

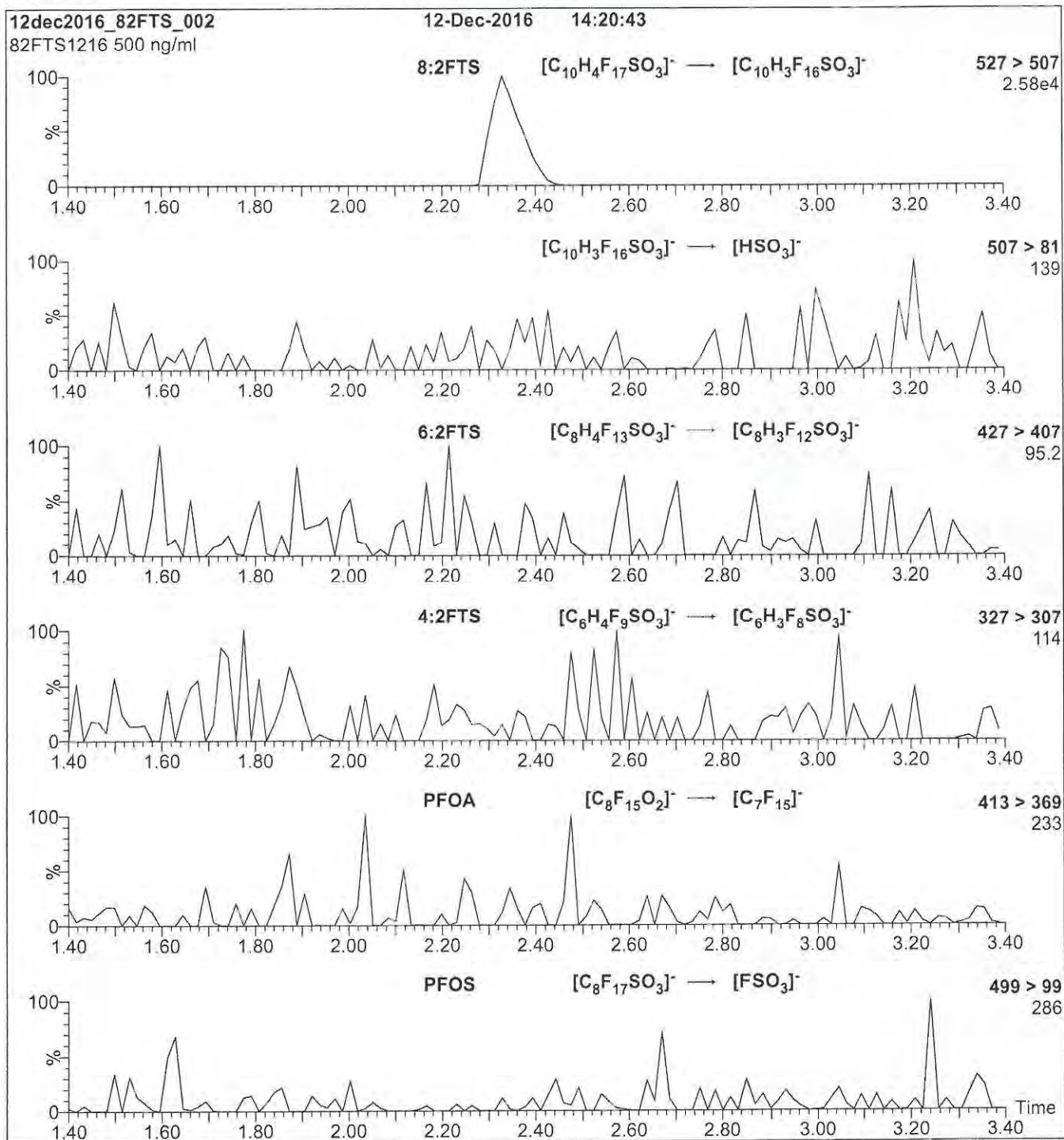
Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 85% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)
Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 30.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18B1566

Figure 2: 8:2FTS; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml 8:2FTS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 30

18B1561

**WELLINGTON
LABORATORIES****CERTIFICATE OF ANALYSIS
DOCUMENTATION****PRODUCT CODE:**

FOSA-I

LOT NUMBER:

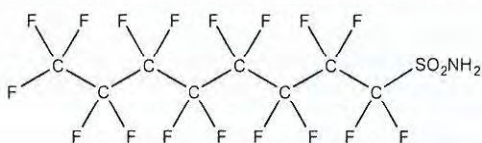
FOSA0817I

COMPOUND:

Perfluoro-1-octanesulfonamide

STRUCTURE:**CAS #:**

754-91-6

**MOLECULAR FORMULA:** $C_8H_2F_{17}NO_2S$ **MOLECULAR WEIGHT:**

499.14

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **SOLVENT(S):**

Isopropanol

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

09/01/2017

EXPIRY DATE: (mm/dd/yyyy)

09/01/2022

RECOMMENDED STORAGE:

Refrigerate ampoule

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)

Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**Certified By:**
B.G. Chittim, General Manager**Date:**09/14/2017
(mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1561

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of $\pm 5\%$ (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

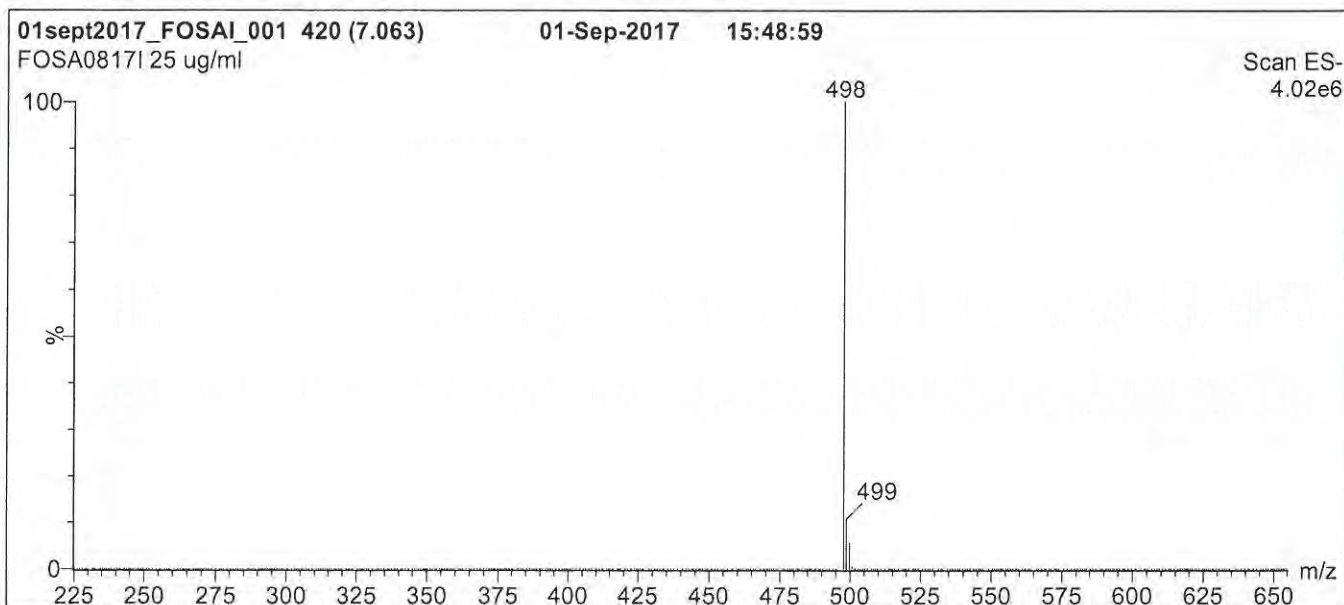
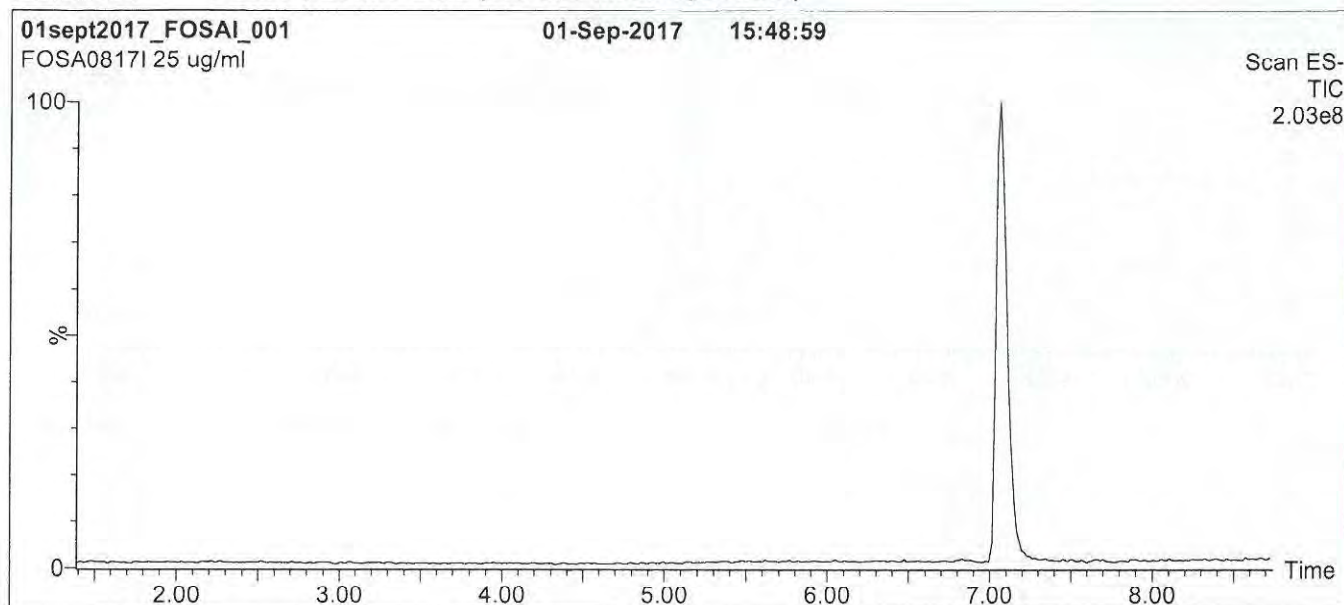
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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18B1561

Figure 1: FOSA-I; LC/MS Data (TIC and Mass Spectrum)



Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 8 min and hold for 1 min
before returning to initial conditions in 0.5 min.
Time: 10 min

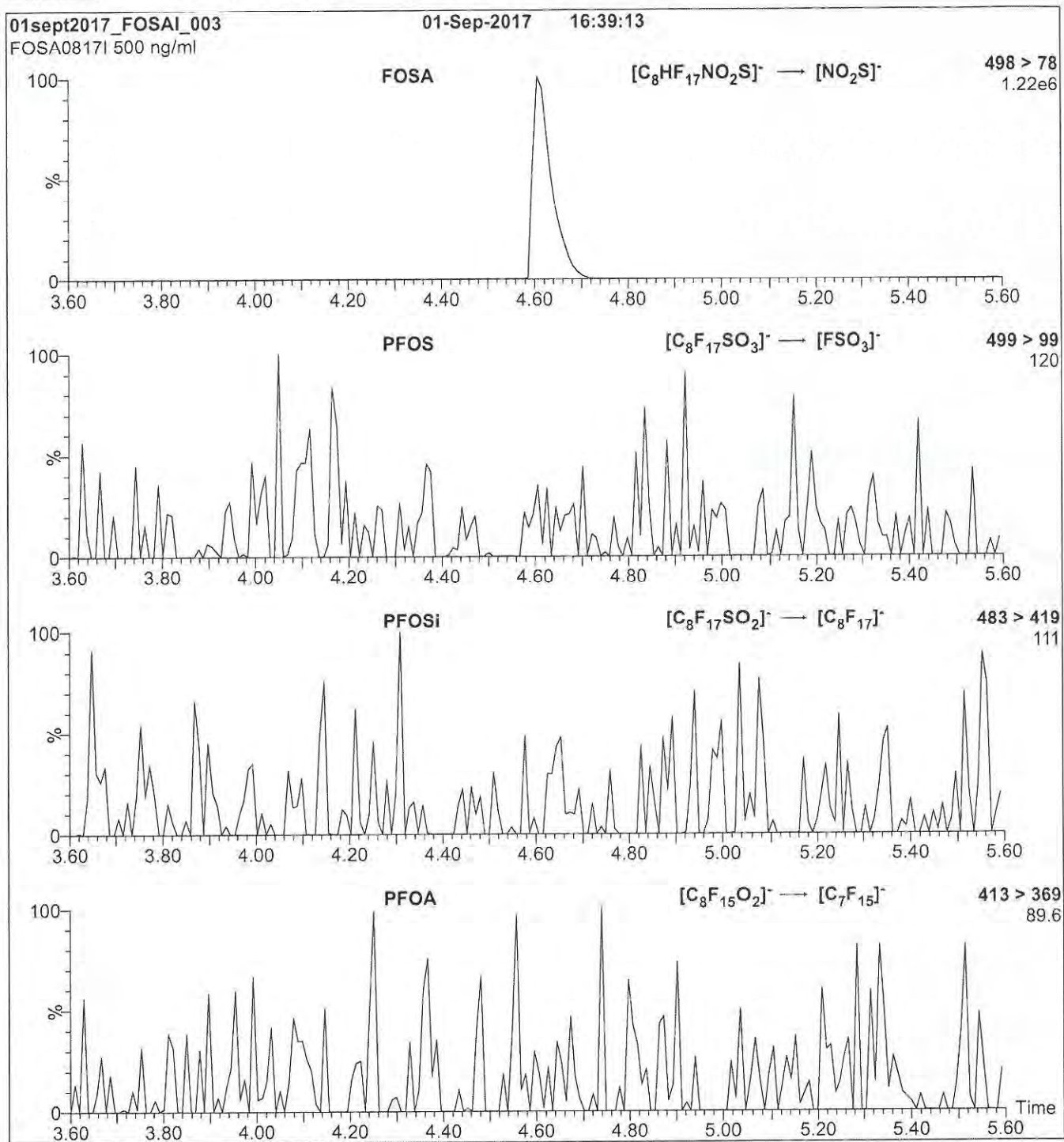
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18B1561

Figure 2: FOSA-I; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml FOSA-I)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.20e-3
Collision Energy (eV) = 30

18B1562

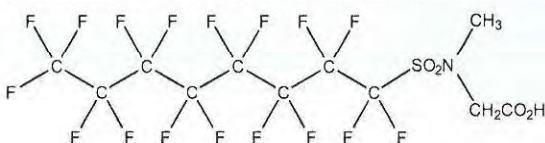


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: N-MeFOSAA **LOT NUMBER:** NMeFOSAA0117
COMPOUND: N-methylperfluoro-1-octanesulfonamidoacetic acid

STRUCTURE: **CAS #:** 2355-31-9



MOLECULAR FORMULA: $C_{11}H_6F_{17}NO_4S$
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$

MOLECULAR WEIGHT: 571.21
SOLVENT(S): Methanol
 Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 01/11/2017
EXPIRY DATE: (mm/dd/yyyy) 01/11/2022
RECOMMENDED STORAGE: Refrigerate ampoule

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
 Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid moiety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date: 01/12/2017
 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
 519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

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x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of $\pm 5\%$ (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using NIST and/or NRC traceable external weights. All volumetric glassware used is of Class A tolerance and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

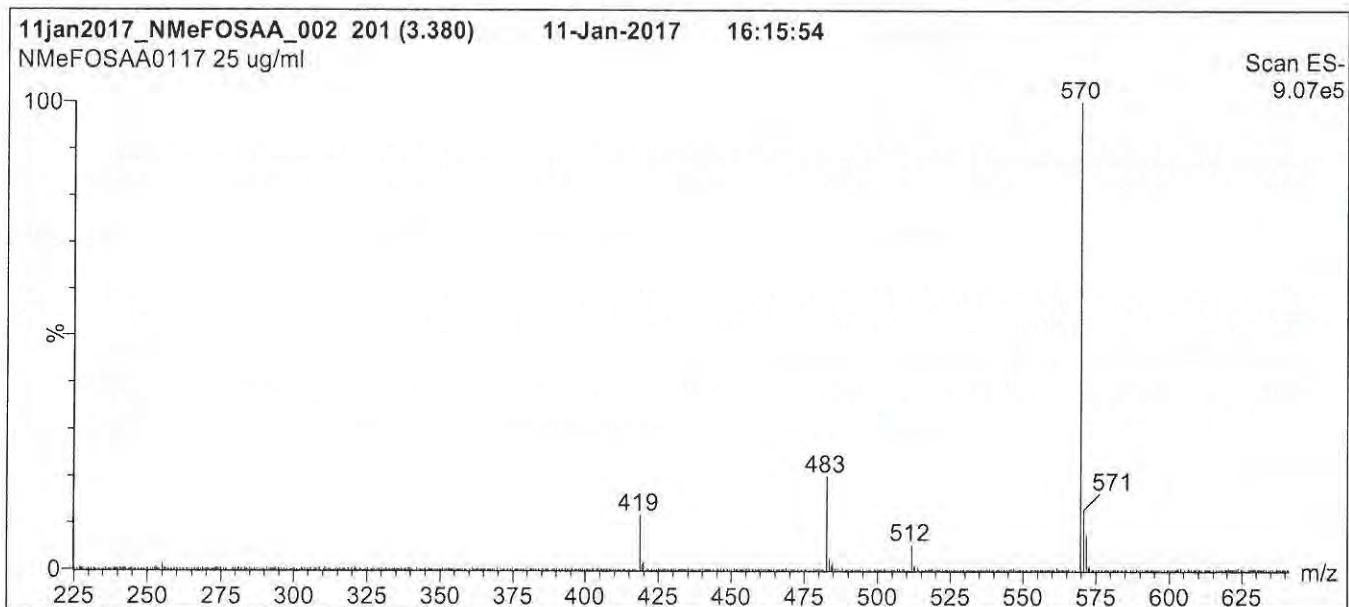
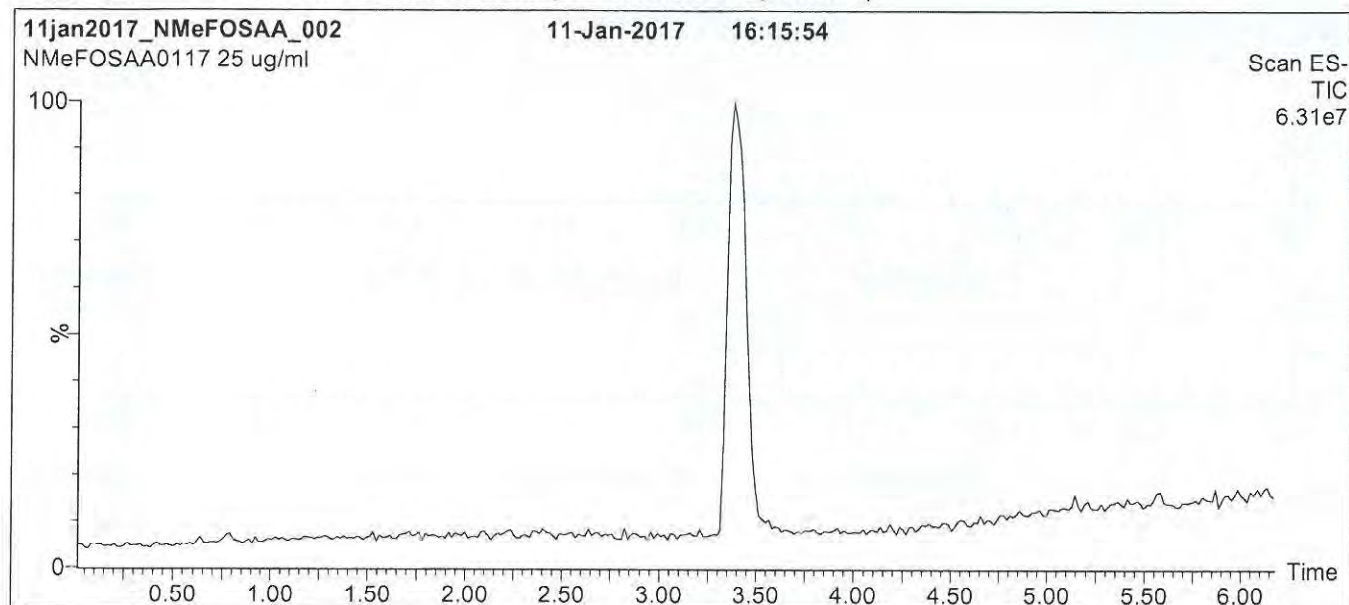
QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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18B1562

Figure 1: N-MeFOSAA; LC/MS Data (TIC and Mass Spectrum)**Conditions for Figure 1:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

Start: 65% (80:20 MeOH:ACN) / 35% H₂O
 (both with 10 mM NH₄OAc buffer)
 Ramp to 90% organic over 7.5 min and hold for
 1.5 min before returning to initial conditions in 0.5 min.
 Time: 10 min

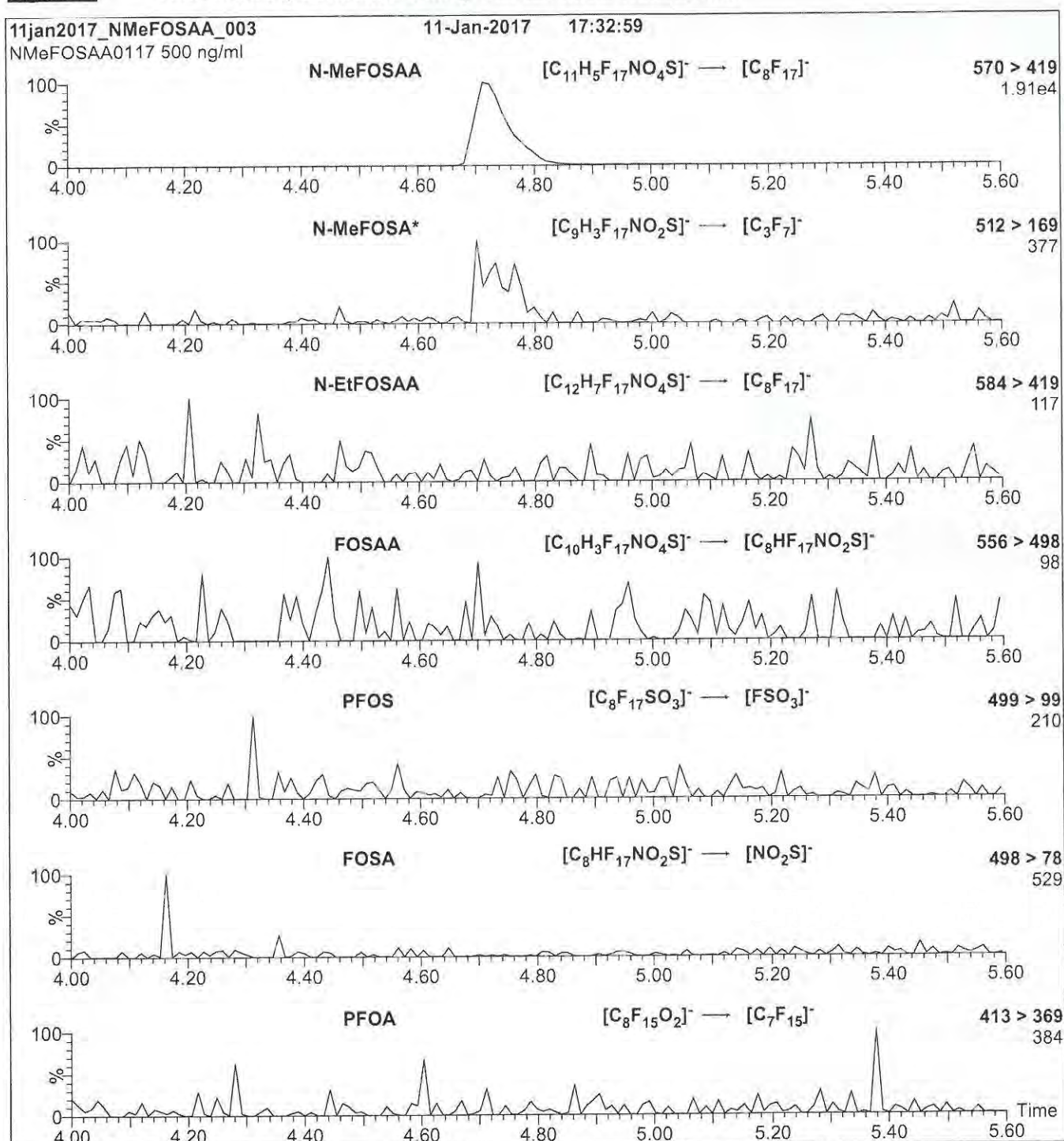
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
 Capillary Voltage (kV) = 3.00
 Cone Voltage (V) = 35.00
 Cone Gas Flow (l/hr) = 50
 Desolvation Gas Flow (l/hr) = 750

18B1562

Figure 2: N-MeFOSAA; LC/MS/MS Data (Selected MRM Transitions)

*Note: N-MeFOSA is formed by in-source fragmentation.

Conditions for Figure 2:

Injection: Direct loop injection
10 μ l (500 ng/ml N-MeFOSAA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 20

18B1563

**WELLINGTON**
LABORATORIES**CERTIFICATE OF ANALYSIS**
DOCUMENTATION**PRODUCT CODE:**

N-EtFOSAA

LOT NUMBER:

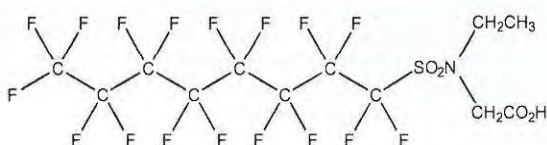
NEtFOSAA0117

COMPOUND:

N-ethylperfluoro-1-octanesulfonamidoacetic acid

STRUCTURE:**CAS #:**

2991-50-6

**MOLECULAR FORMULA:** $C_{12}H_6F_{17}NO_4S$ **MOLECULAR WEIGHT:**

585.23

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **SOLVENT(S):**Methanol
Water (<1%)**CHEMICAL PURITY:**

>98%

LAST TESTED: (mm/dd/yyyy)

01/11/2017

EXPIRY DATE: (mm/dd/yyyy)

01/11/2022

RECOMMENDED STORAGE:

Refrigerate ampoule

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)

Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent the conversion of the acetic acid moiety to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim

Date:

01/12/2017
(mm/dd/yyyy)Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

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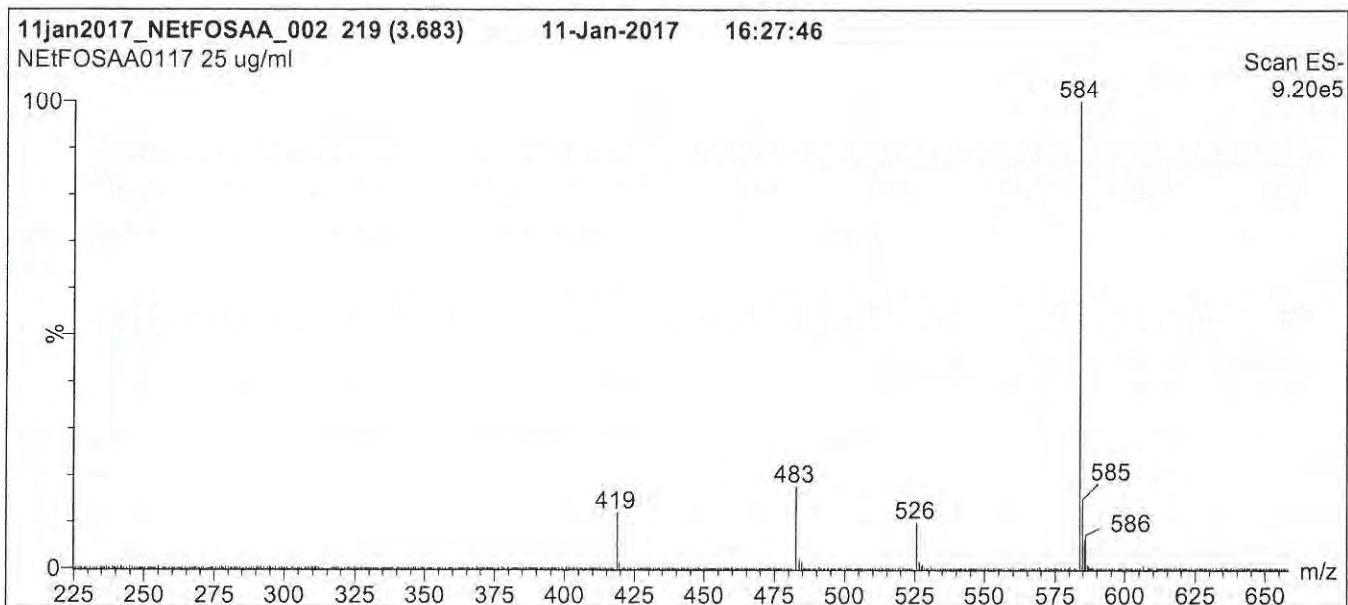
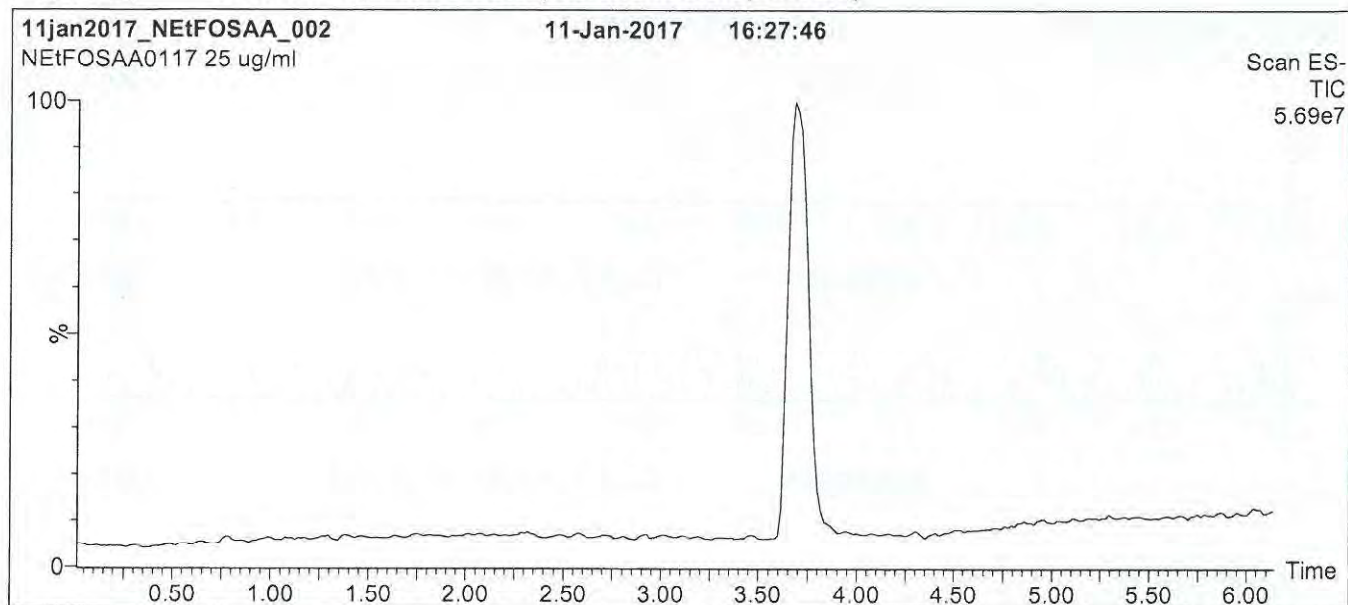
QUALITY MANAGEMENT:

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18B1563

Figure 1: N-EtFOSAA; LC/MS Data (TIC and Mass Spectrum)**Conditions for Figure 1:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 65% (80:20 MeOH:ACN) / 35% H₂O
 (both with 10 mM NH₄OAc buffer)
 Ramp to 90% organic over 7.5 min and hold for 1.5 min
 before returning to initial conditions in 0.5 min.
 Time: 10 min

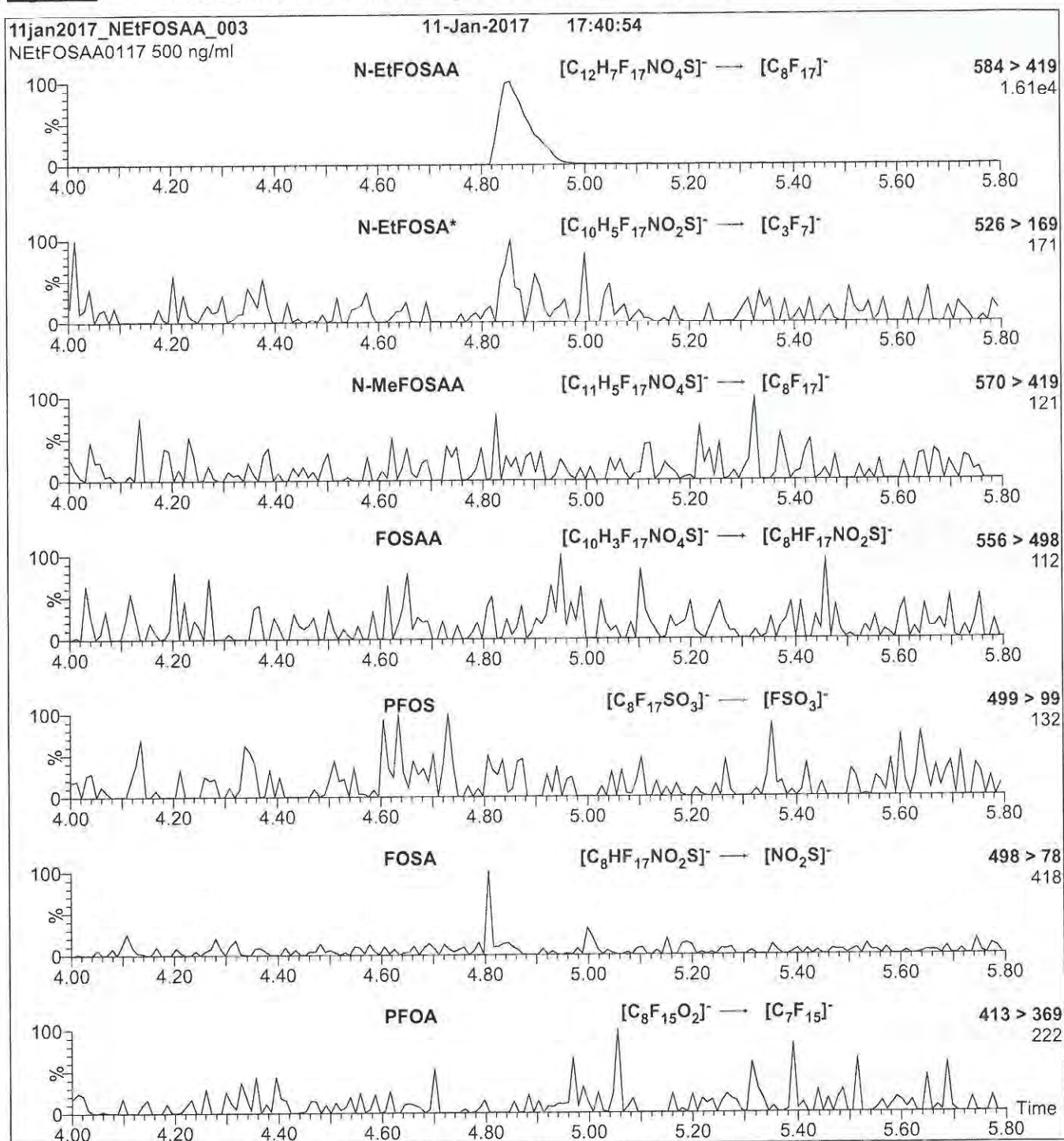
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
 Capillary Voltage (kV) = 3.00
 Cone Voltage (V) = 35.00
 Cone Gas Flow (l/hr) = 50
 Desolvation Gas Flow (l/hr) = 750

18B1563

Figure 2: N-EtFOSAA; LC/MS/MS Data (Selected MRM Transitions)

Note: N-EtFOSA is formed by fragmentation of N-EtFOSAA.

Conditions for Figure 2:

Injection: Direct loop injection
10 μ l (500 ng/ml N-EtFOSAA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 20

18B1564



WELLINGTON LABORATORIES

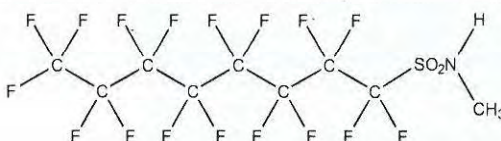
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: N-MeFOSA-M
COMPOUND: N-methylperfluoro-1-octanesulfonamide

LOT NUMBER: NMeFOSA0717M

STRUCTURE:

CAS #: 31506-32-8



MOLECULAR FORMULA: $C_8H_4F_{17}NO_2S$
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 07/05/2017
EXPIRY DATE: (mm/dd/yyyy) 07/05/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

MOLECULAR WEIGHT: 513.17
SOLVENT(S): Methanol

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: 
B.G. Chittim, General Manager

Date: 07/10/2017
(mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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18B1564

INTENDED USE:

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HAZARDS:

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SYNTHESIS / CHARACTERIZATION:

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x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

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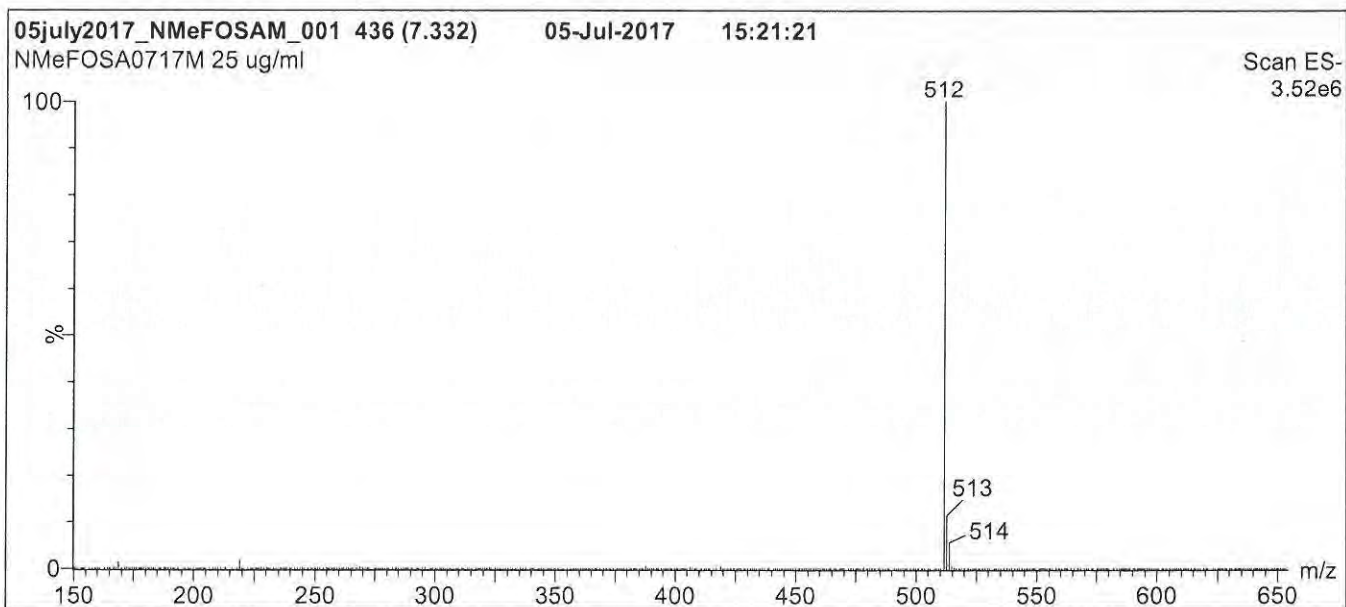
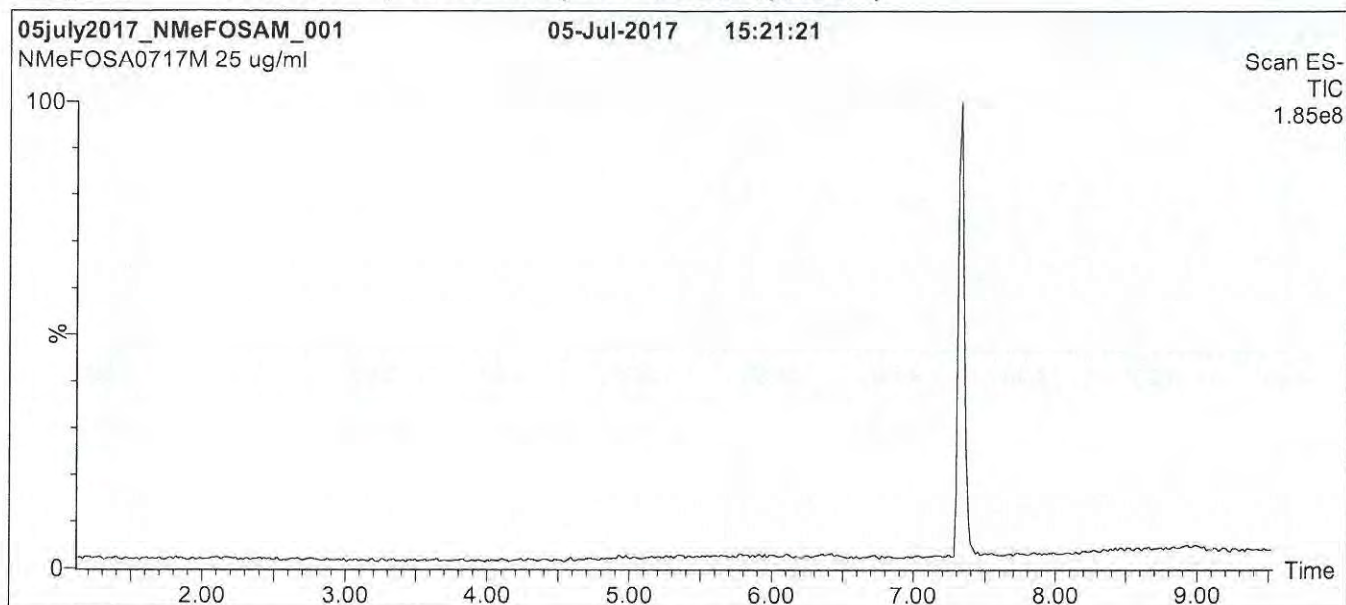
QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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1881564

Figure 1: N-MeFOSA-M; LC/MS Data (TIC and Mass Spectrum)**Conditions for Figure 1:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

Start: 45% H₂O / 55% (80:20 MeOH:ACN)
(both with 10 mM NH₄OAc buffer)

Ramp to 90% organic over 7.5 min and hold for
1.5 min before returning to initial conditions in 0.5 min.

Time: 10 min

Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)

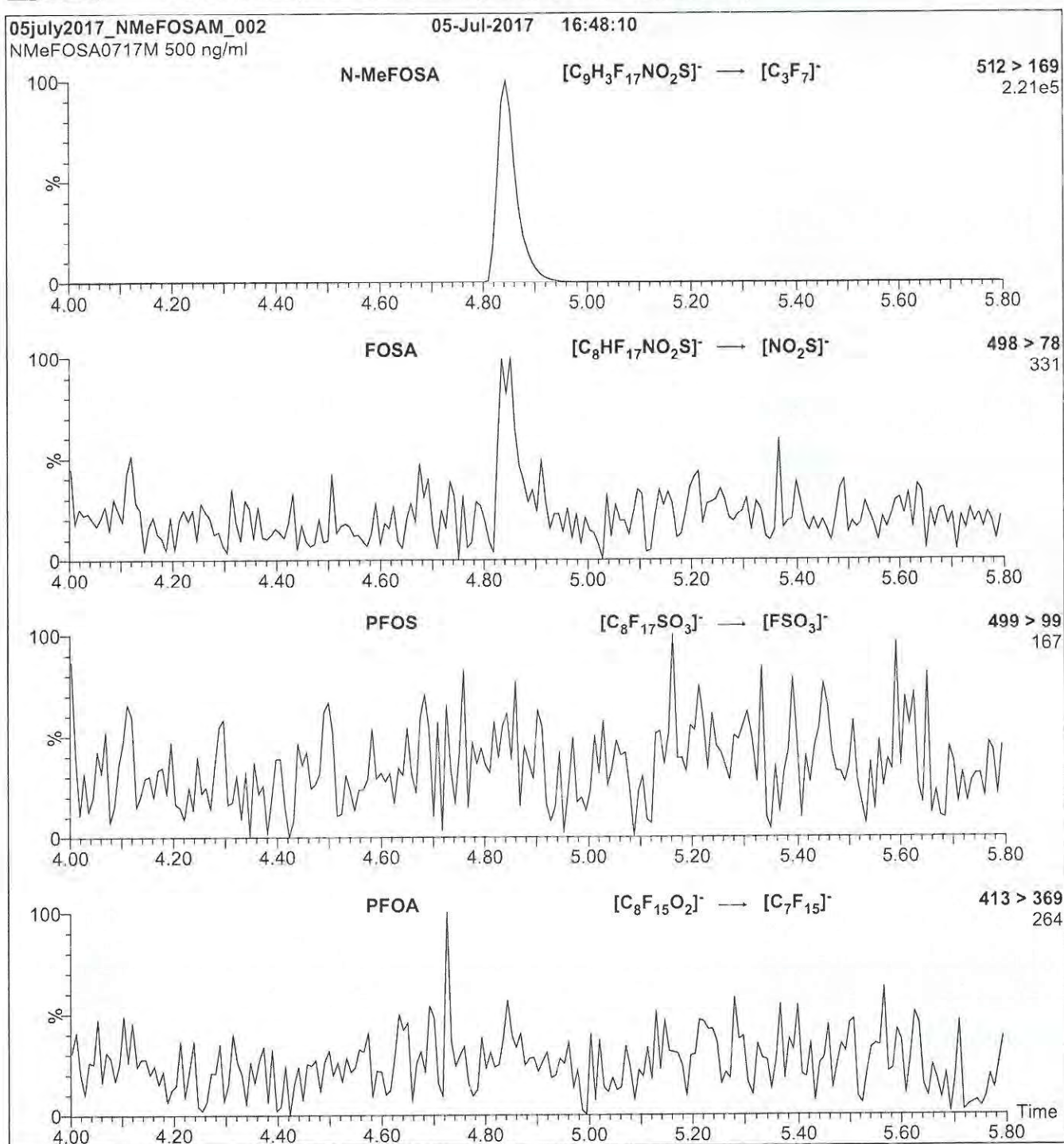
Capillary Voltage (kV) = 2.50

Cone Voltage (V) = 40.00

Cone Gas Flow (l/hr) = 50

Desolvation Gas Flow (l/hr) = 750

18B1564

Figure 2: N-MeFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml N-MeFOSA-M)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 30

18B1565

**WELLINGTON**
LABORATORIES**CERTIFICATE OF ANALYSIS**
DOCUMENTATION**PRODUCT CODE:**

N-EtFOSA-M

LOT NUMBER:

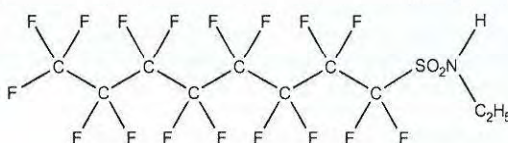
NEtFOSA0717M

COMPOUND:

N-ethylperfluoro-1-octanesulfonamide

STRUCTURE:**CAS #:**

4151-50-2

**MOLECULAR FORMULA:** $C_{10}H_6F_{17}NO_2S$ **MOLECULAR WEIGHT:**

527.20

CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **SOLVENT(S):**

Methanol

CHEMICAL PURITY:

>98%

LAST TESTED: (mm/dd/yyyy)

07/05/2017

EXPIRY DATE: (mm/dd/yyyy)

07/05/2022

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)

Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**Certified By:**
B.G. Chittim, General Manager**Date:**07/18/2017
(mm/dd/yyyy)**Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA**
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1565

INTENDED USE:

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HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

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HOMOGENEITY:

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UNCERTAINTY:

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x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

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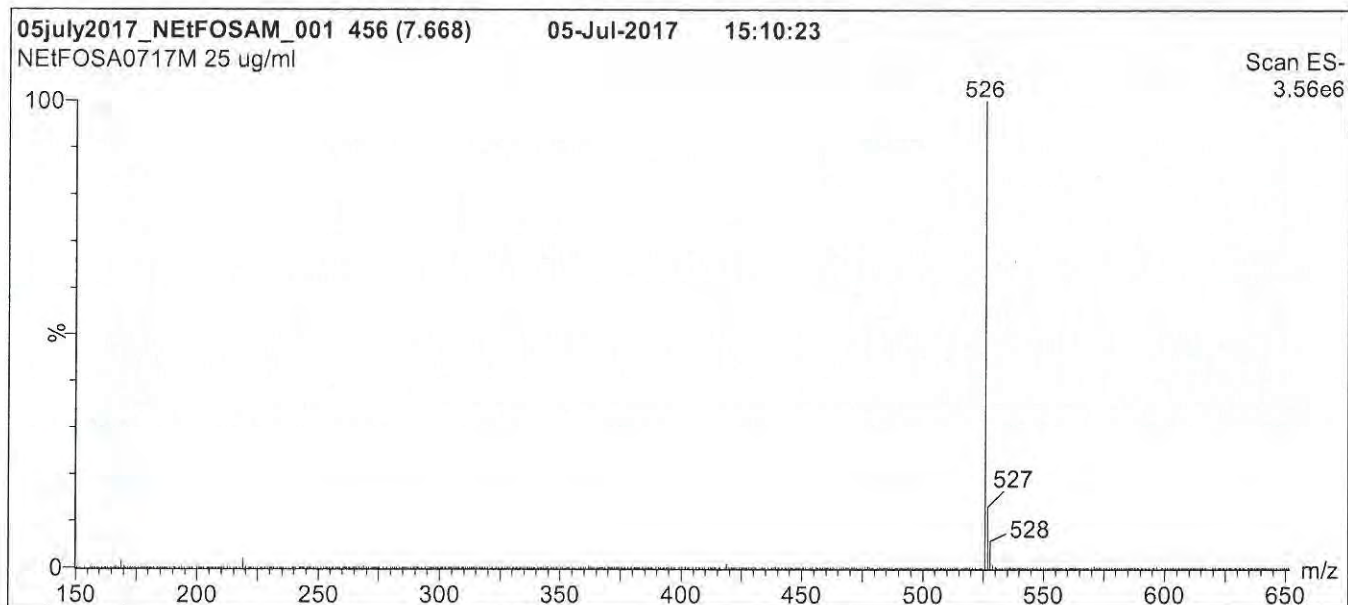
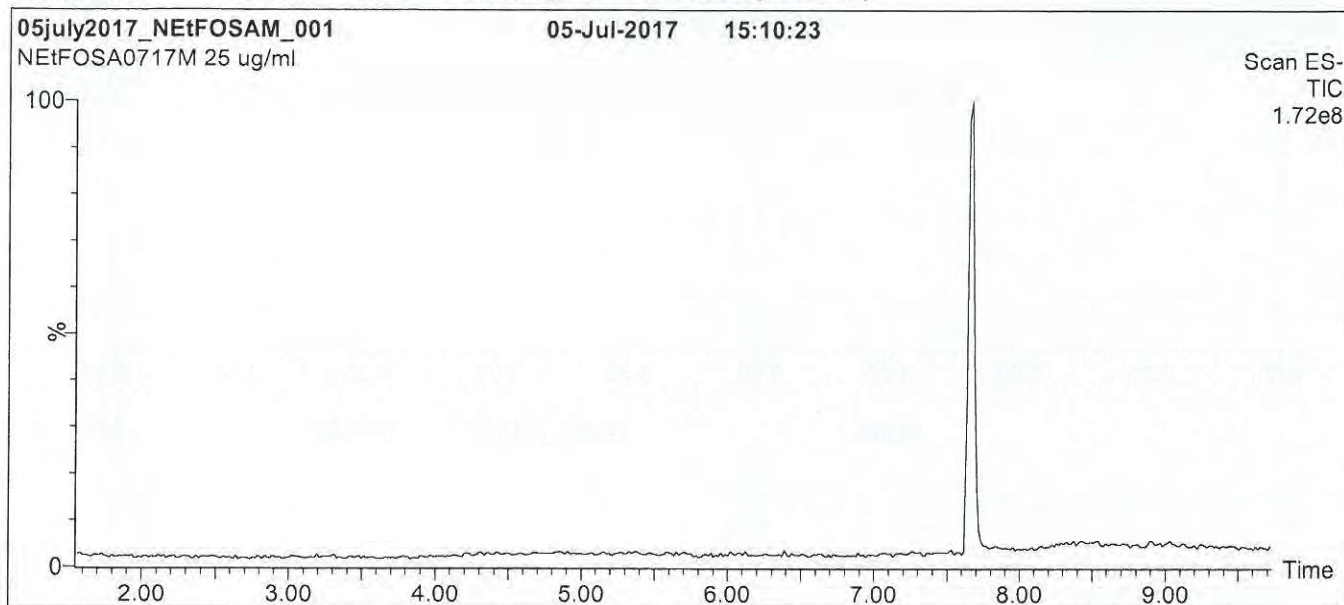
QUALITY MANAGEMENT:

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18B1565

Figure 1: N-EtFOSA-M; LC/MS Data (TIC and Mass Spectrum)**Conditions for Figure 1:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

Start: 45% H₂O / 55% (80:20 MeOH:ACN)
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

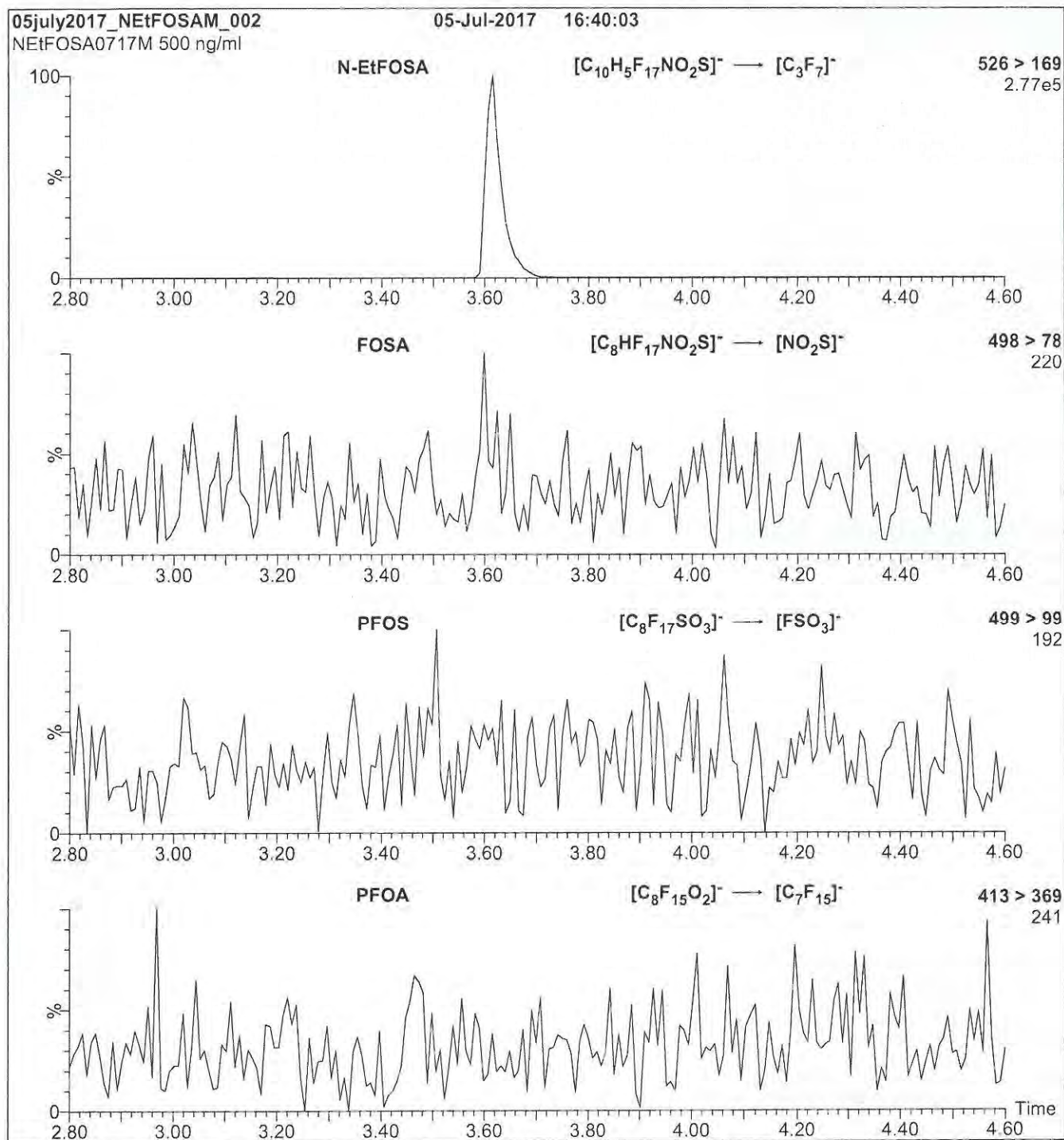
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 2.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18B1565

Figure 2: N-EtFOSA-M; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μ l (500 ng/ml N-EtFOSA-M)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H₂O
(both with 10 mM NH₄OAc buffer)

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 30

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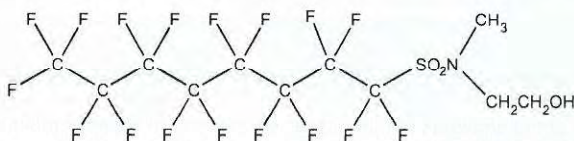


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: N-MeFOSE-M **LOT NUMBER:** NMeFOSE0417M
COMPOUND: 2-(N-methylperfluoro-1-octanesulfonamido)-ethanol

STRUCTURE: **CAS #:** 24448-09-7



MOLECULAR FORMULA: $C_{11}H_8F_{17}NO_3S$ **MOLECULAR WEIGHT:** 557.22
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **SOLVENT(S):** Methanol
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 04/24/2017 (HRGC/LRMS)
 04/21/2017 (LC/MS)
EXPIRY DATE: (mm/dd/yyyy) 04/24/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: HRGC/LRMS Data (TIC and Mass Spectrum)
 Figure 2: LC/MS Data (TIC and Mass Spectrum)
 Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- In order to see the molecular ion (adduct free), the LC mobile phase should be free of ammonium acetate buffer.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: 
 B.G. Chittim, General Manager

Date: 05/05/2017
 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
 519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1566

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QUALITY MANAGEMENT:

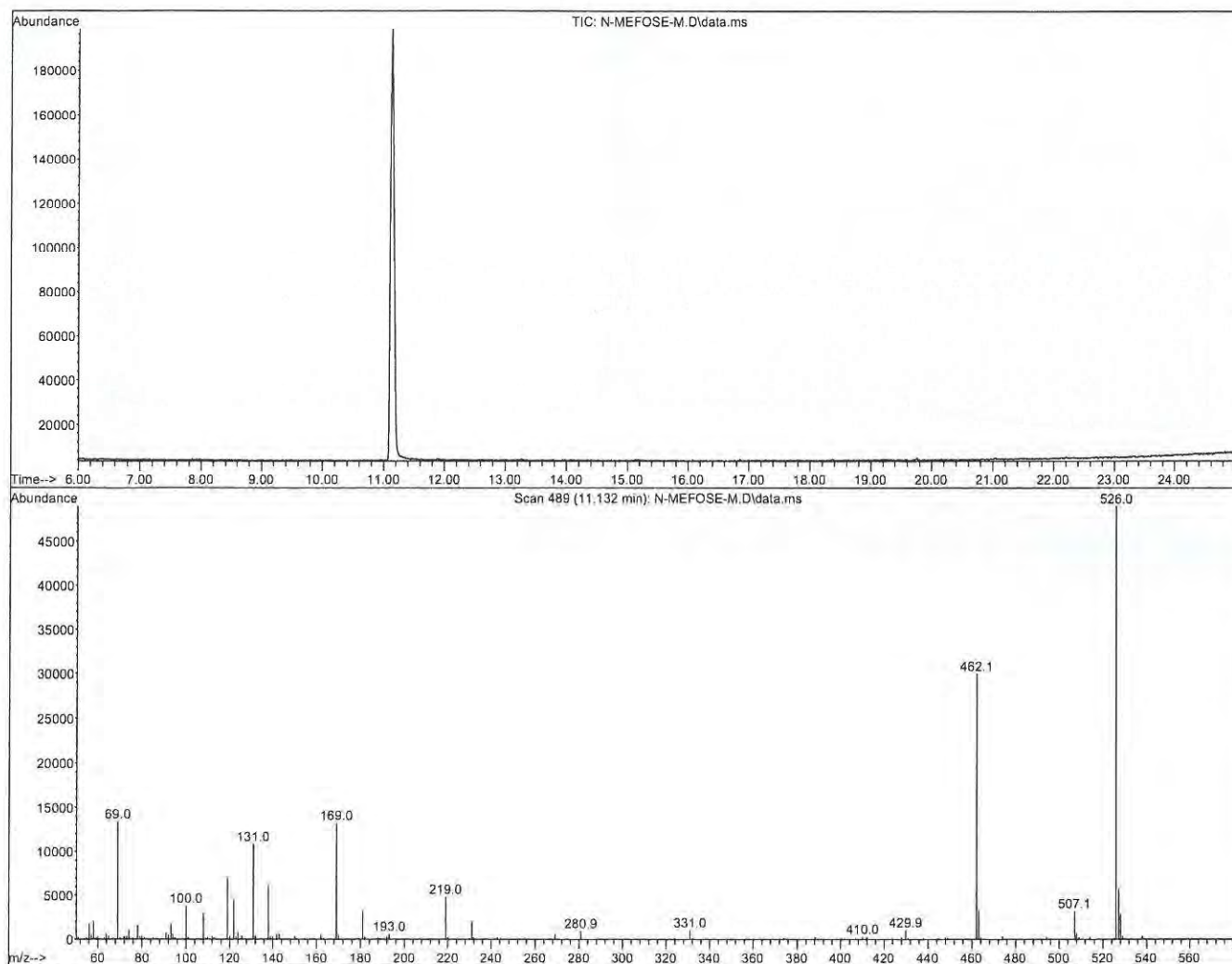
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18B1566

Figure 1: N-MeFOSE-M; HRGC/LRMS Data (TIC and Mass Spectrum)



HRGC/LRMS:

Agilent 7890A (HRGC)

Agilent 5975C (LRMS)

Chromatographic Conditions:

Column: 30 m DB-5 (0.25 mm id, 0.25 μ m film thickness) Agilent J&W

Injector: 250 $^{\circ}$ C (Splitless Injection)

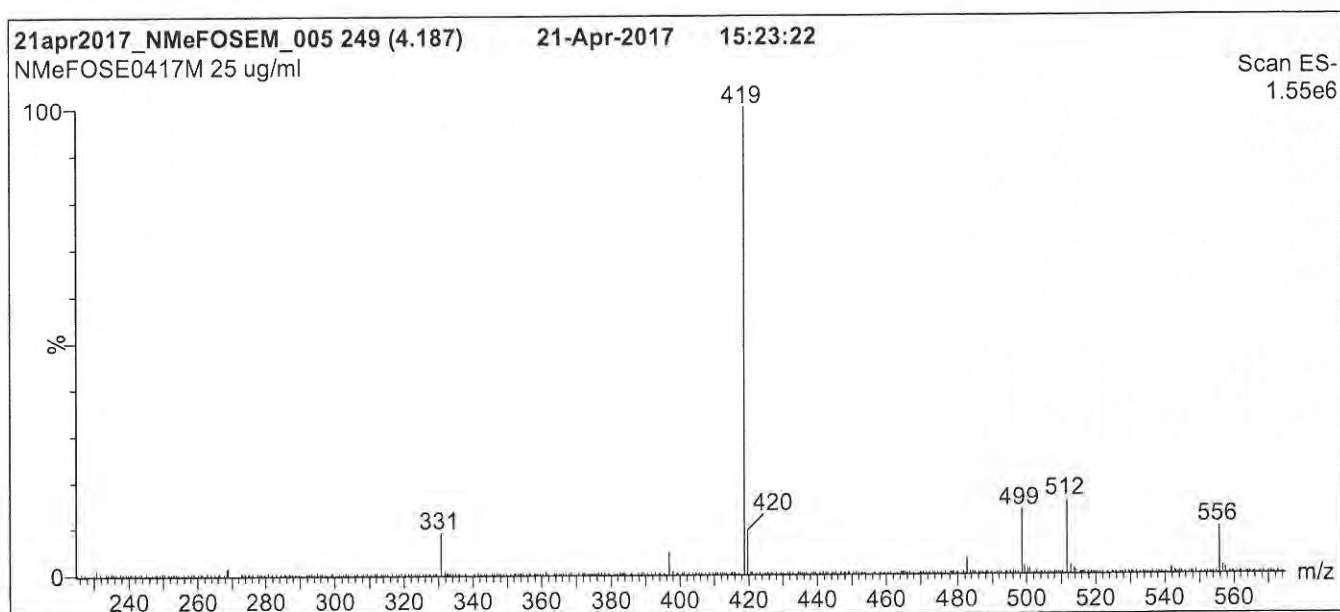
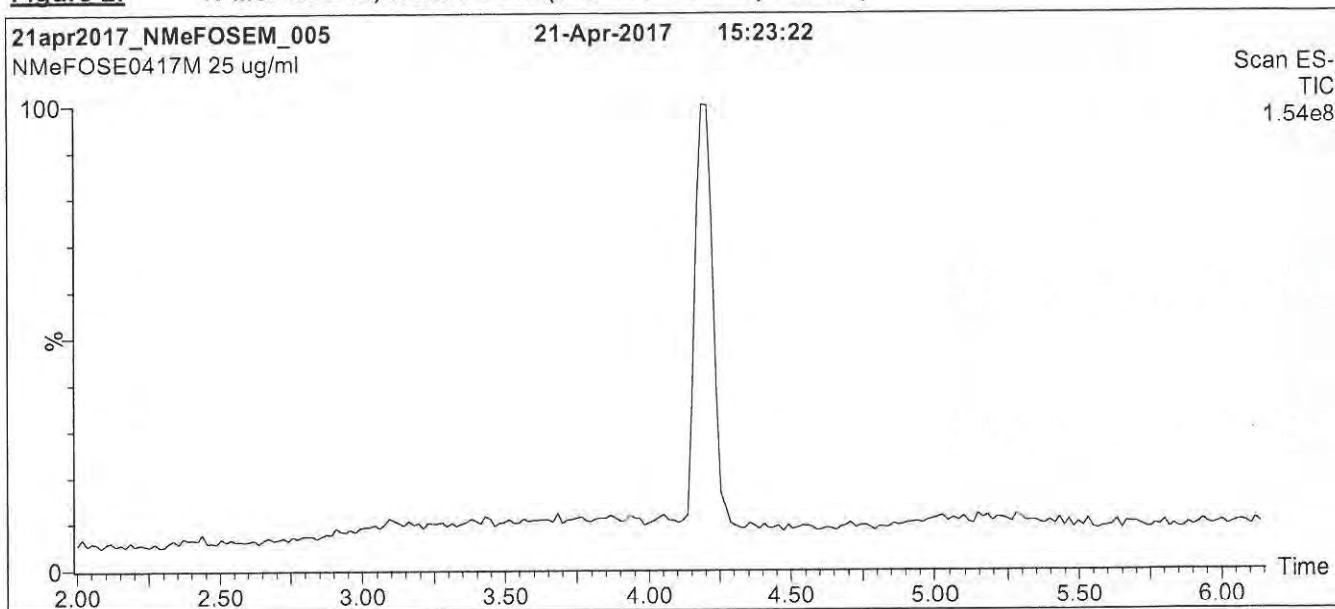
Oven: 100 $^{\circ}$ C (5 min)
10 $^{\circ}$ C/min to 325 $^{\circ}$ C
325 $^{\circ}$ C (20 min)

Ionization: EI+

Detector: 250 $^{\circ}$ C
Full Scan (50-1000 amu)

18B1566

Figure 2: N-MeFOSE-M; LC/MS Data (TIC and Mass Spectrum)



Conditions for Figure 2:

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 60% MeOH / 40% H₂O
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

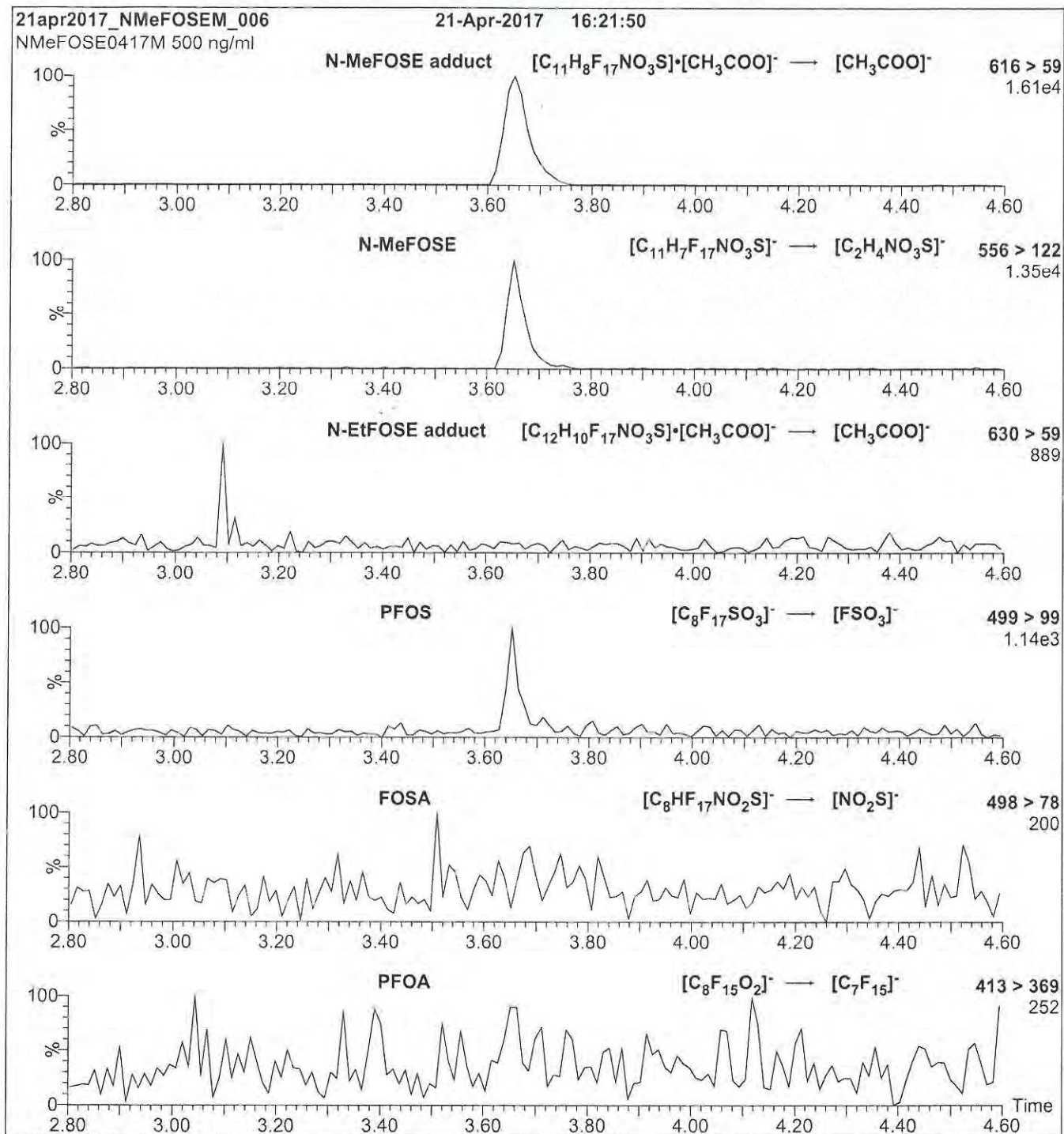
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.50
Cone Voltage (V) = 40.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

18B1566

Figure 3: N-MeFOSE-M; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 3:**

Injection: Direct loop injection
10 μ l (500 ng/ml N-MeFOSE-M)

Mobile phase: Isocratic 80% MeOH / 20% H₂O

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 35

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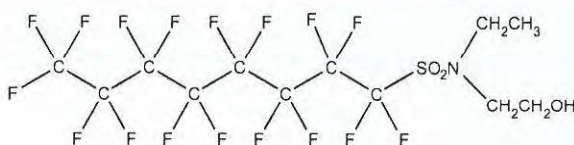


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: N-EtFOSE-M **LOT NUMBER:** NEtFOSE0417M
COMPOUND: 2-(N-ethylperfluoro-1-octanesulfonamido)-ethanol

STRUCTURE: **CAS #:** 1691-99-2



MOLECULAR FORMULA: $C_{12}H_{10}F_{17}NO_3S$ **MOLECULAR WEIGHT:** 571.25
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$ **SOLVENT(S):** Methanol
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 04/24/2017 (HRGC/LRMS)
 04/21/2017 (LC/MS)
EXPIRY DATE: (mm/dd/yyyy) 04/24/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: HRGC/LRMS Data (TIC and Mass Spectrum)
 Figure 2: LC/MS Data (TIC and Mass Spectrum)
 Figure 3: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- In order to see the molecular ion (adduct free), the LC mobile phase should be free of ammonium acetate buffer.

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Certified By: 
 B.G. Chittim, General Manager

Date: 04/26/2017
 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
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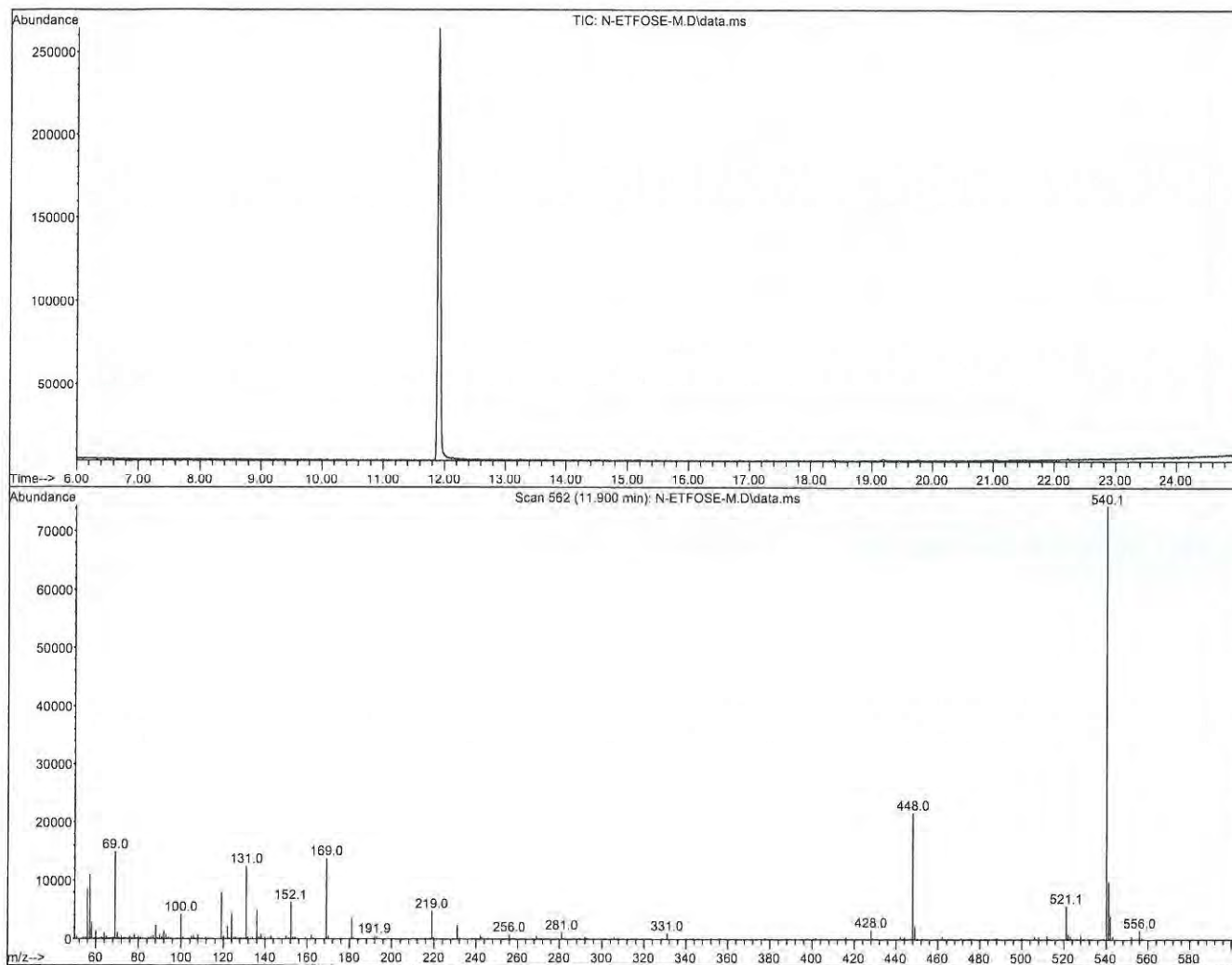
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18B1567

Figure 1: N-EtFOSE-M; HRGC/LRMS Data (TIC and Mass Spectrum)



HRGC/LRMS:

Agilent 7890A (HRGC)
Agilent 5975C (LRMS)

Chromatographic Conditions:

Column: 30 m DB-5 (0.25 mm id, 0.25 μ m film thickness) Agilent J&W

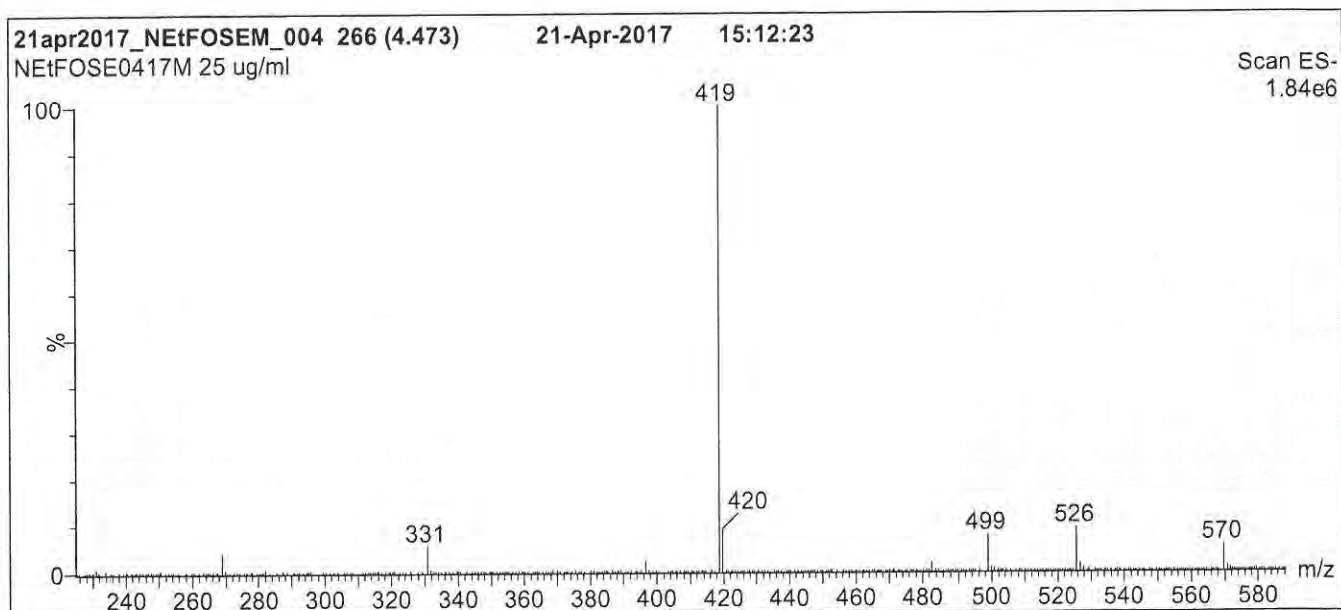
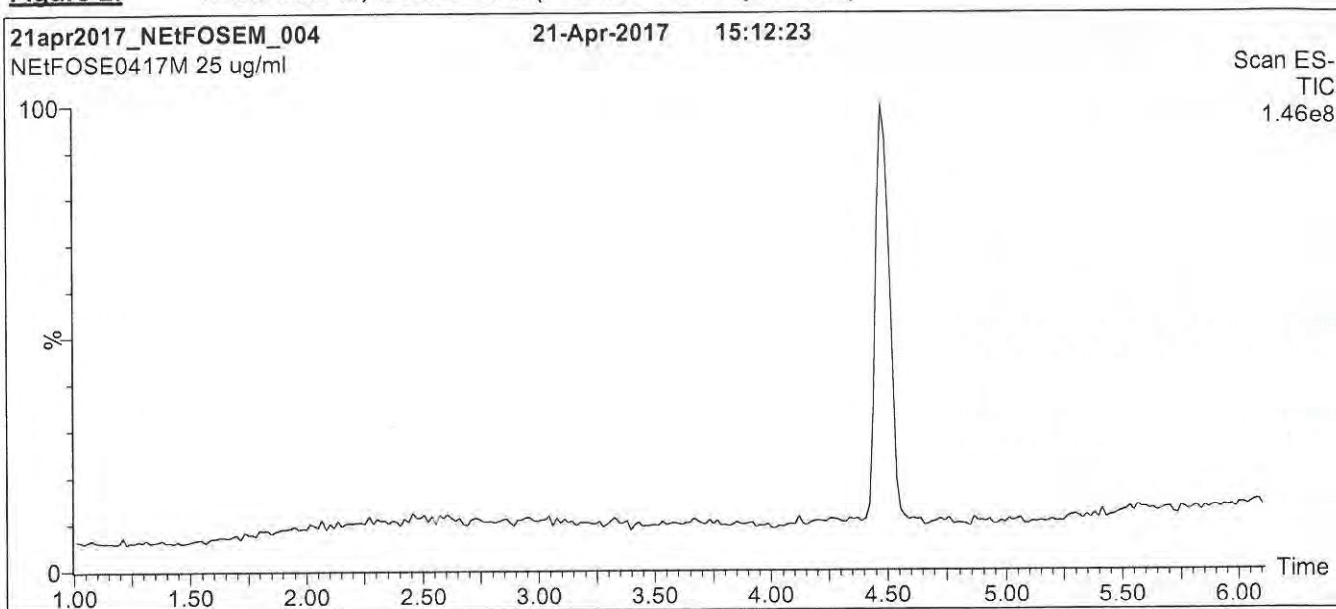
Injector: 250 $^{\circ}$ C (Splitless Injection)

Oven: 100 $^{\circ}$ C (5 min)
10 $^{\circ}$ C/min to 325 $^{\circ}$ C
325 $^{\circ}$ C (20 min)

Ionization: EI+

Detector: 250 $^{\circ}$ C
Full Scan (50-1000 amu)

18B1567

Figure 2: N-EtFOSE-M; LC/MS Data (TIC and Mass Spectrum)**Conditions for Figure 2:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

Start: 60% MeOH / 40% H₂O
Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)

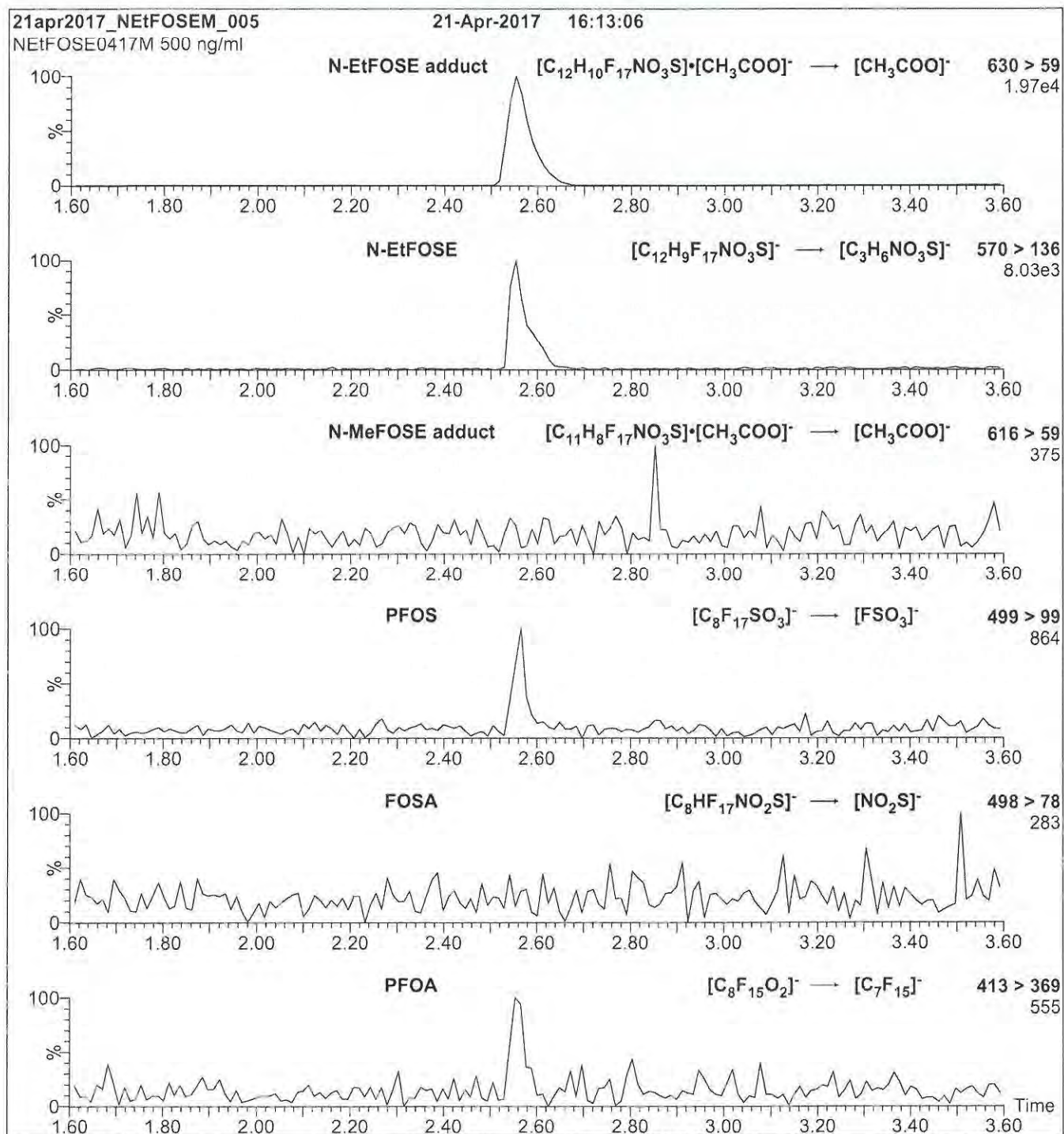
Capillary Voltage (kV) = 3.00

Cone Voltage (V) = 40.00

Cone Gas Flow (l/hr) = 100

Desolvation Gas Flow (l/hr) = 750

18B1567

Figure 3: N-EtFOSE-M; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 3:**

Injection: Direct loop injection
10 μ l (500 ng/ml N-EtFOSE-M)

Mobile phase: Isocratic 80% MeOH / 20% H_2O

Flow: 300 μ l/min

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 33

7-1338

Analytical Standard Record

Vista Analytical Laboratory

18D2005

Parent Standards used in this standard:

Standard	Description	Prepared	Prepared By	Expires	(mls)
18B1530	13C2-FOUEA	15-Feb-18	** Vendor **	14-Nov-19	1
18B1531	13C3-PFHxS	15-Feb-18	** Vendor **	05-Jul-22	1.06
18B1532	13C4-PFOS	15-Feb-18	** Vendor **	17-Oct-22	1.05
18B1533	13C7-PFUDa	15-Feb-18	** Vendor **	13-Jul-22	1
18B1534	13C5-PFHxA	15-Feb-18	** Vendor **	17-Oct-22	1
18B1535	13C6-PFDA	15-Feb-18	** Vendor **	17-Oct-22	1
18B1536	13C8-PFOA	15-Feb-18	** Vendor **	05-Jul-22	1.02
18B1537	13C4-PFBA	15-Feb-18	** Vendor **	12-Apr-22	1
18B1538	13C9-PFNA	15-Feb-18	** Vendor **	23-May-22	1

Description: PFC-RS

Standard Type: Reagent

Solvent: MeOH

Final Volume (mls): 40

Vials: 1

Expires: 20-Apr-20

Prepared: 20-Apr-18

Prepared By: Giana R. Bilotta

Department: LCMS

Last Edit: 20-Apr-18 10:41 by GRB

Analyte	CAS Number	Concentration	Units
13C9-PFNA		1.25	ug/mL
13C8-PFOA		1.25	ug/mL
13C7-PFUnA		1.25	ug/mL
13C6-PFDA		1.25	ug/mL
13C5-PFHxA		1.25	ug/mL
13C4-PFOS		1.25	ug/mL
13C4-PFBA		1.25	ug/mL
13C3-PFHxS		1.25	ug/mL
13C2-FOUEA		1.25	ug/mL

18B1530



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

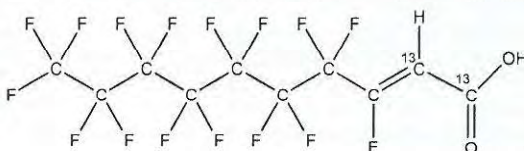
MFOUEA

LOT NUMBER:

MFOUEA1117

COMPOUND:2H-Perfluoro-[1,2-¹³C₂]-2-decenoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₂¹²C₈H₂F₁₈O₂**CONCENTRATION:**

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

460.08

SOLVENT(S):Anhydrous
Isopropanol**CHEMICAL PURITY:**

>98%

ISOTOPIC PURITY:≥99% ¹³C
(1,2-¹³C₂)**LAST TESTED:** (mm/dd/yyyy)

11/14/2017

EXPIRY DATE: (mm/dd/yyyy)

11/14/2019

RECOMMENDED STORAGE:

Refrigerate ampoule

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)

Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Dilution of this standard in methanol may lead to the formation of 2H-3-methoxy-perfluoro-[1,2-¹³C₂]-2-decenoic acid. This reaction can be catalyzed by the presence of acid or base. All dilutions should be routinely checked for degradation.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

Date:

11/15/2017
(mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1530

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters

x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of $\pm 5\%$ (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

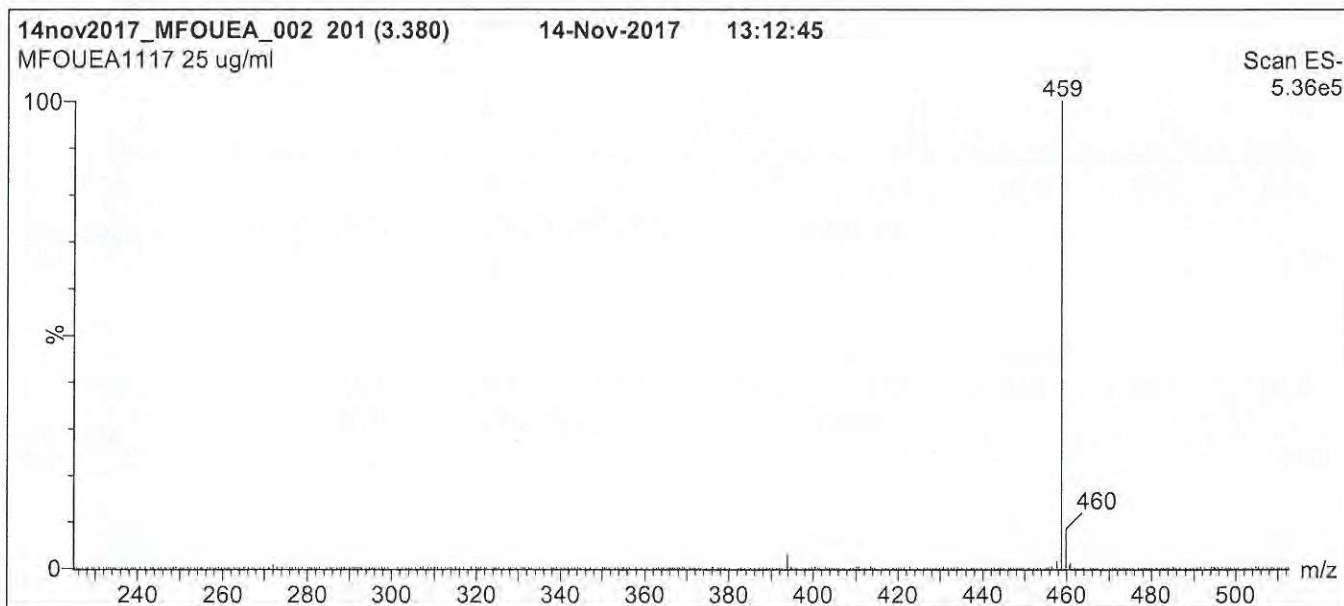
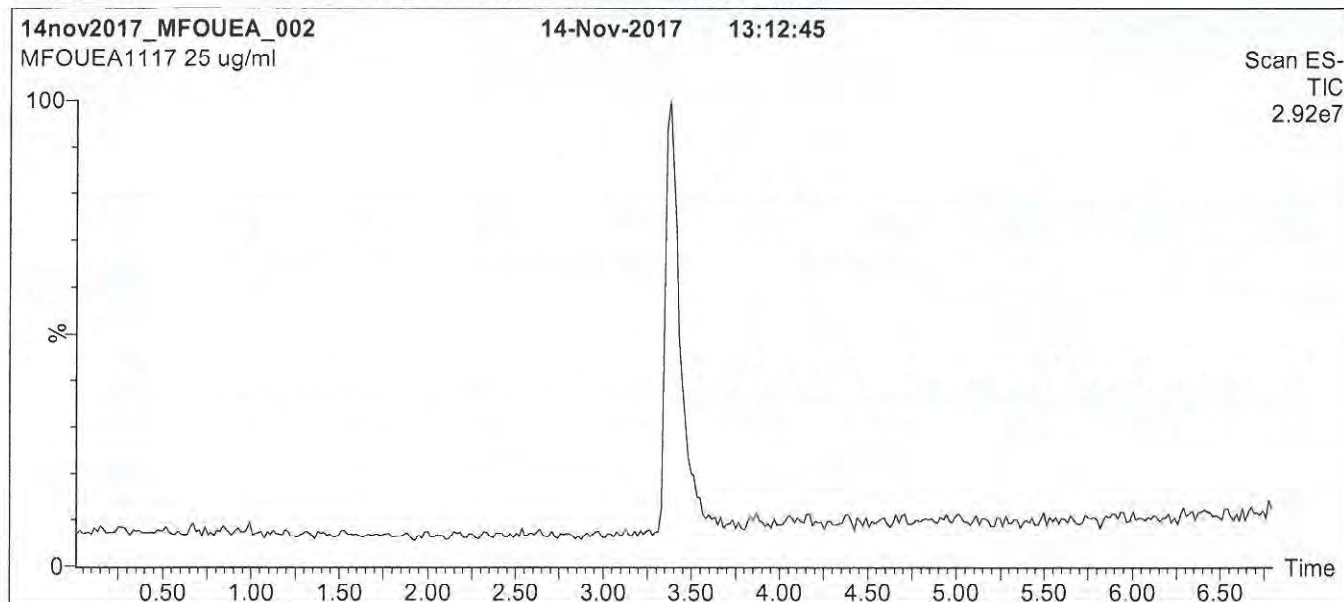
QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18B1530

Figure 1: MFOUEA; LC/MS Data (TIC and Mass Spectrum)**Conditions for Figure 1:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7.5 min and hold
for 1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

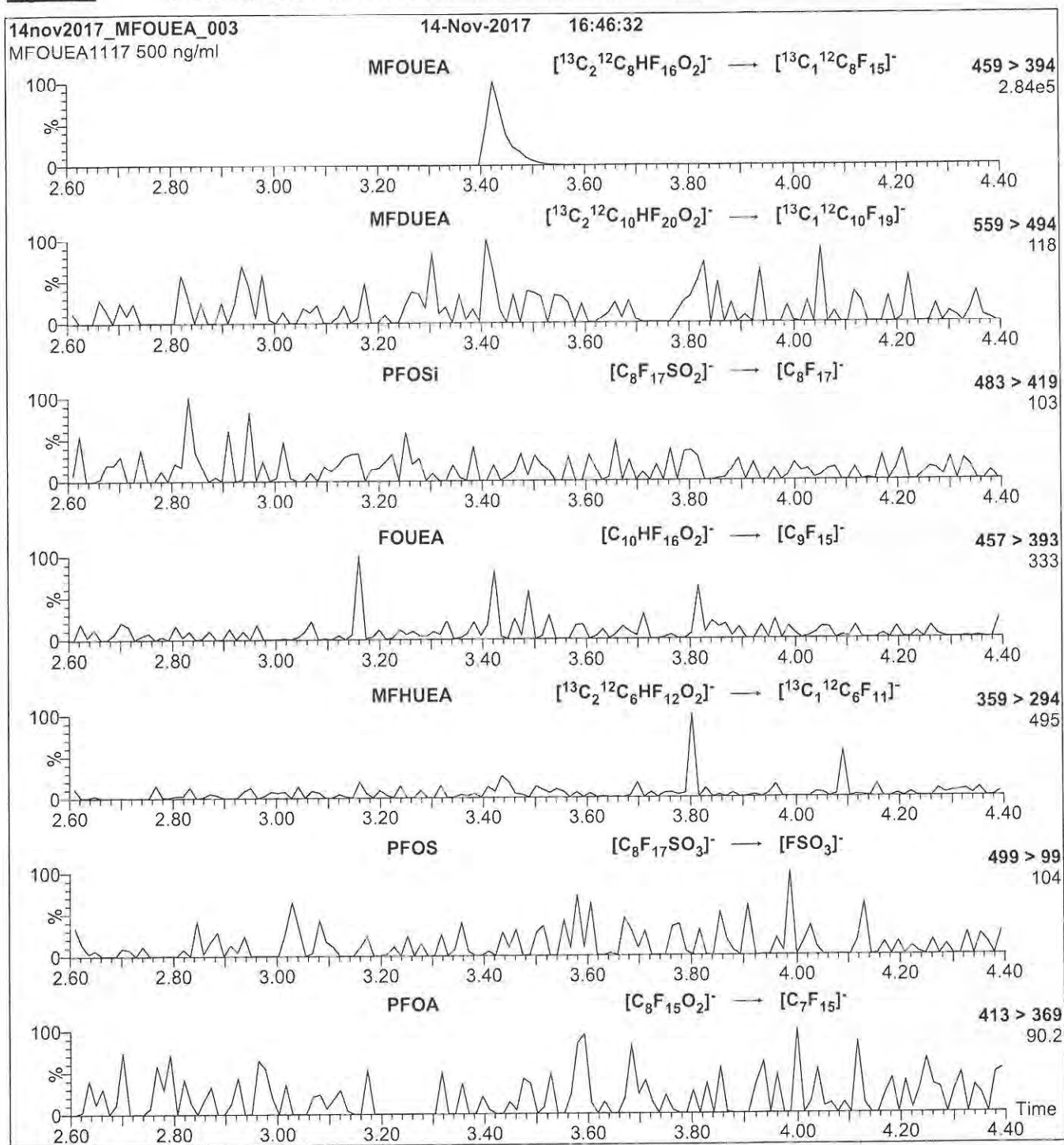
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 14.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

18B1530

Figure 2: MFOUEA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μl (500 ng/ml MFOUEA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.39e-3
Collision Energy (eV) = 21

18B1531

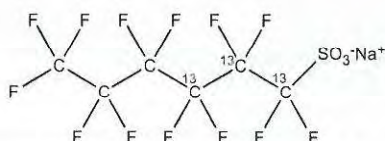


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M3PFHxS **LOT NUMBER:** M3PFHxS0717
COMPOUND: Sodium perfluoro-1-[1,2,3-¹³C₃]hexanesulfonate

STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₃¹²C₃F₁₃SO₃Na
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt)
 47.3 ± 2.4 µg/ml (M3PFHxS anion)
CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 07/05/2017
EXPIRY DATE: (mm/dd/yyyy) 07/05/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

MOLECULAR WEIGHT: 425.07
SOLVENT(S): Methanol
ISOTOPIC PURITY: ≥99% ¹³C
 (1,2,3-¹³C₃)

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
 Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: 
 B.G. Chittim, General Manager

Date: 07/14/2017
 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
 519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1531

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters

x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of $\pm 5\%$ (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

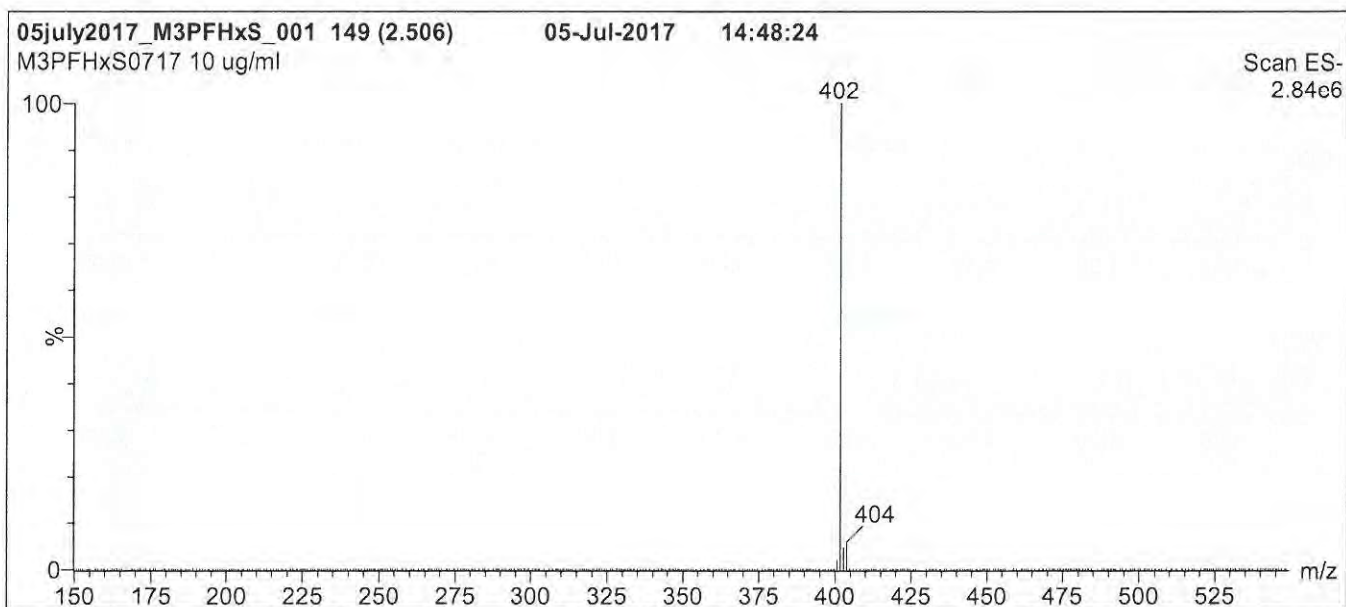
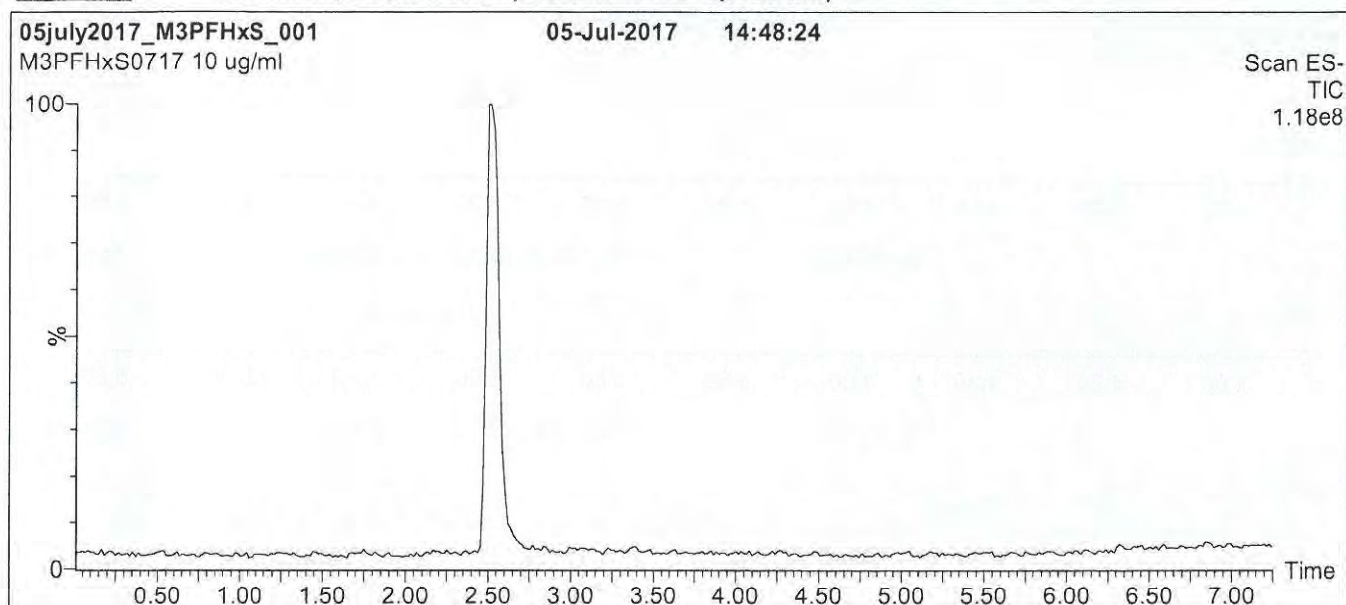
QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18B1531

Figure 1: M3PFHxS; LC/MS Data (TIC and Mass Spectrum)**Conditions for Figure 1:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7.5 min and hold for
1.5 min before returning to initial conditions in 0.5 min.
Time: 10 min

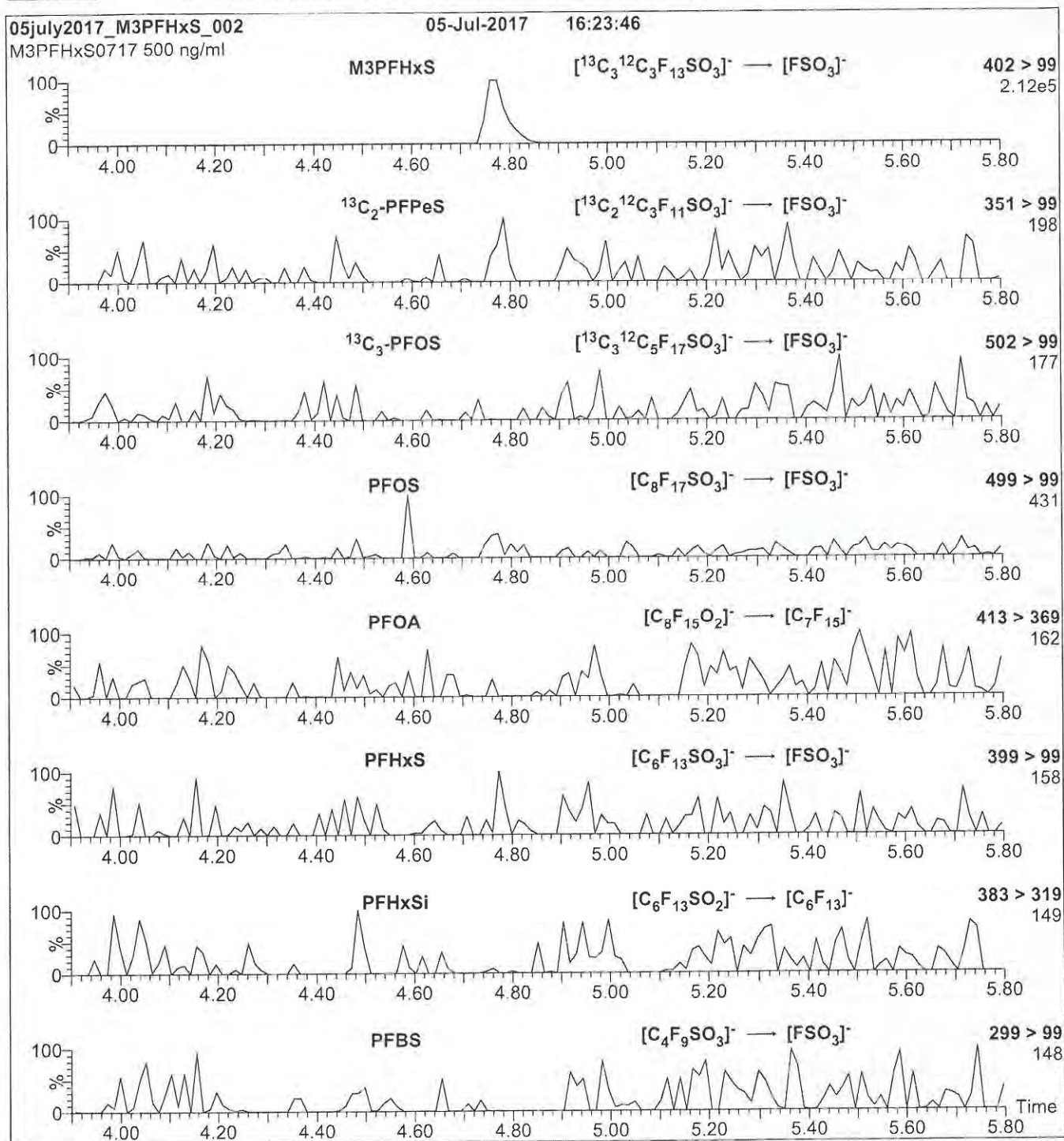
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 50.00
Cone Gas Flow (l/hr) = 60
Desolvation Gas Flow (l/hr) = 750

18B1531

Figure 2: M3PFHxS; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μl (500 ng/ml M3PFHxS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.43e-3
Collision Energy (eV) = 30

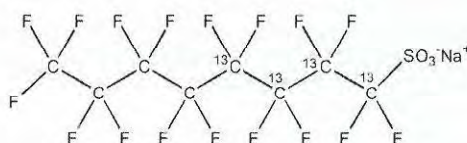
18B1532



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: MPFOS **LOT NUMBER:** MPFOS1017
COMPOUND: Sodium perfluoro-1-[1,2,3,4-¹³C₄]octanesulfonate
STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₄¹²C₄F₁₇SO₃Na **MOLECULAR WEIGHT:** 526.08
CONCENTRATION: 50.0 ± 2.5 µg/ml (Na salt) **SOLVENT(S):** Methanol
 47.8 ± 2.4 µg/ml (MPFOS anion)
CHEMICAL PURITY: >98% **ISOTOPIC PURITY:** ≥99% ¹³C
LAST TESTED: (mm/dd/yyyy) 10/17/2017 (1,2,3,4-¹³C₄)
EXPIRY DATE: (mm/dd/yyyy) 10/17/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
 Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains ~ 0.4% Sodium perfluoro-1-[1,2,3-¹³C₃]heptanesulfonate.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:
 B.G. Chittim, General Manager

Date: 10/18/2017
 (mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
 519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B153Z

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

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EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

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QUALITY MANAGEMENT:

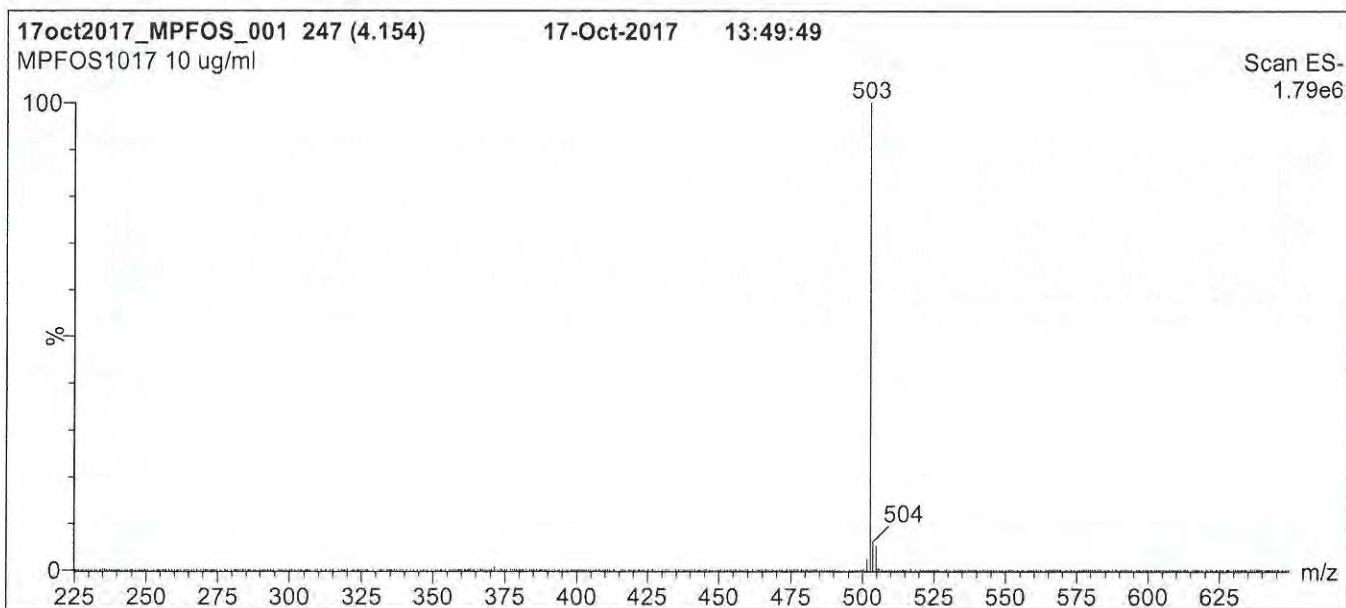
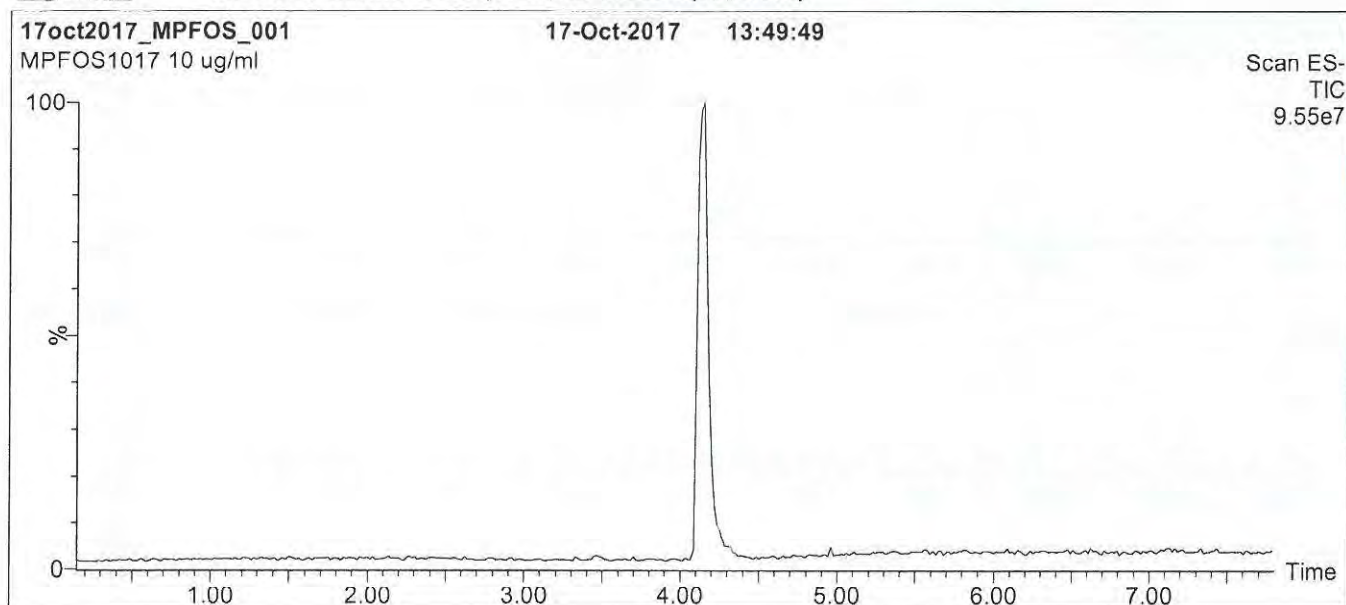
This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



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18B1532

Figure 1: MPFOS; LC/MS Data (TIC and Mass Spectrum)



Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

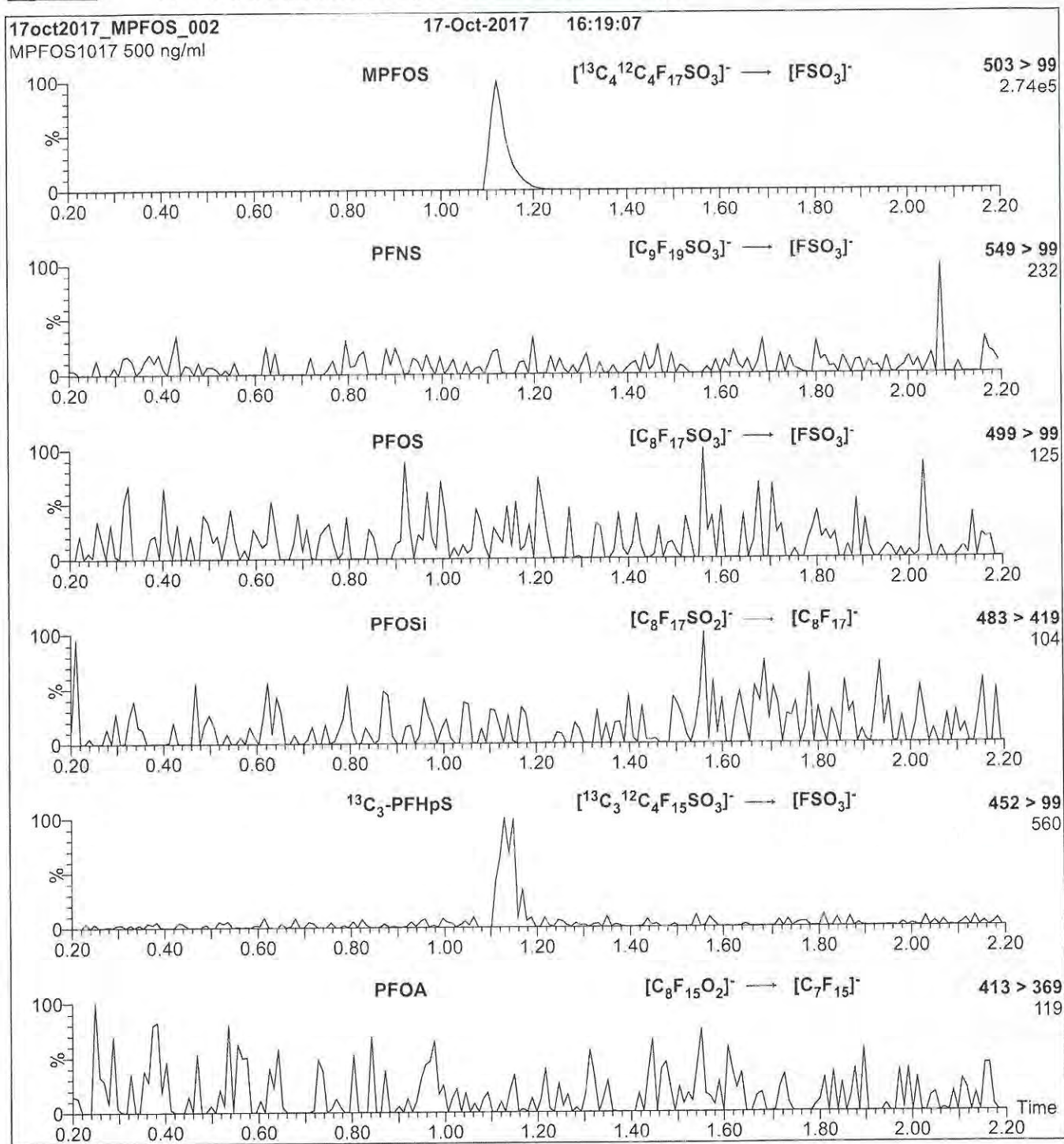
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 60.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18B1532

Figure 2: MPFOS; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μl (500 ng/ml MPFOS)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 40

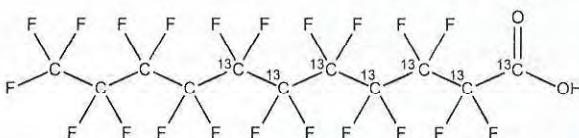


WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

18B1533

PRODUCT CODE: M7PFUdA **LOT NUMBER:** M7PFUdA0717
COMPOUND: Perfluoro-n-[1,2,3,4,5,6,7-¹³C₇]undecanoic acid
STRUCTURE: **CAS #:** Not available



MOLECULAR FORMULA: ¹³C₇¹²C₄HF₂₁O₂ **MOLECULAR WEIGHT:** 571.04
CONCENTRATION: 50 ± 2.5 µg/ml **SOLVENT(S):** Methanol
Water (<1%)
CHEMICAL PURITY: >98% **ISOTOPIC PURITY:** ≥99% ¹³C
LAST TESTED: (mm/dd/yyyy) 07/13/2017 (1,2,3,4,5,6,7-¹³C₇)
EXPIRY DATE: (mm/dd/yyyy) 07/13/2022
RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: 
B.G. Chittim, General Manager

Date: 07/14/2017
(mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1533

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

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The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters

x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of $\pm 5\%$ (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

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EXPIRY DATE / PERIOD OF VALIDITY:

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LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

QUALITY MANAGEMENT:

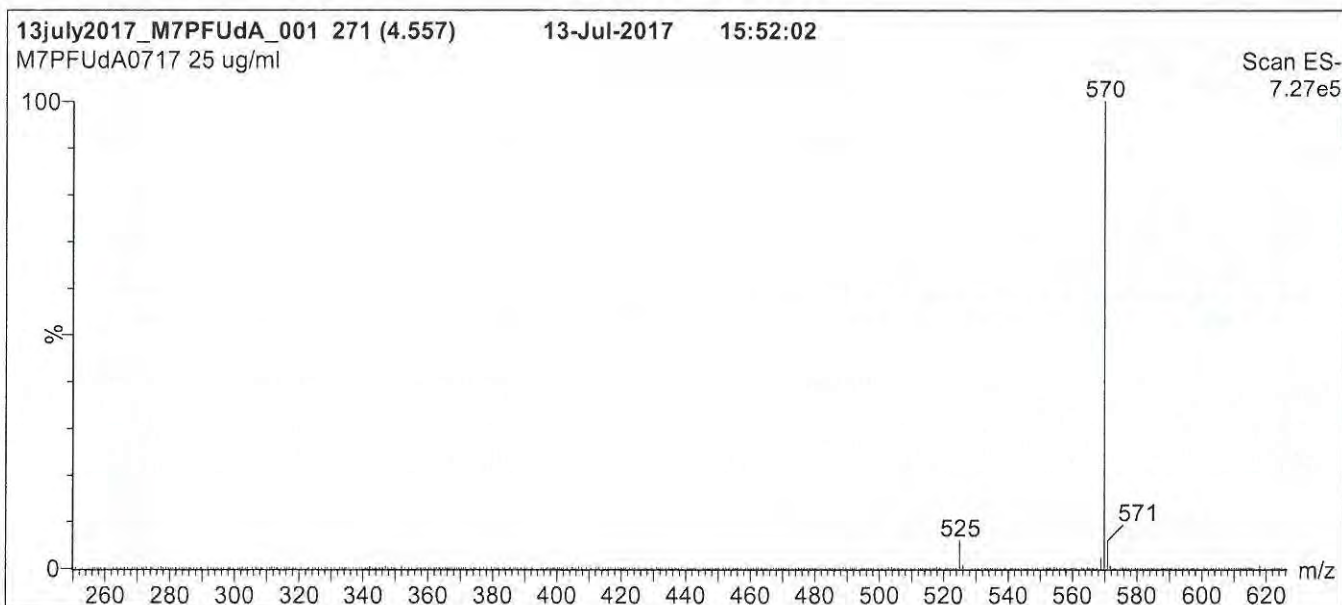
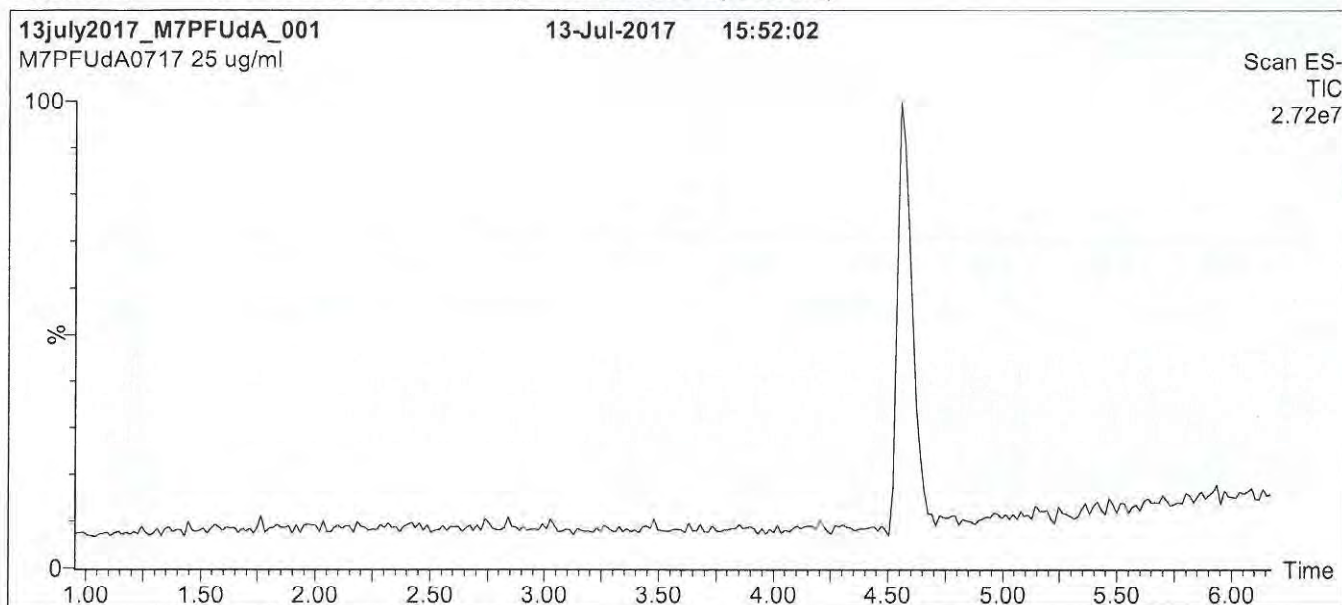
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18B1533

Figure 1: M7PFUdA; LC/MS Data (TIC and Mass Spectrum)



Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

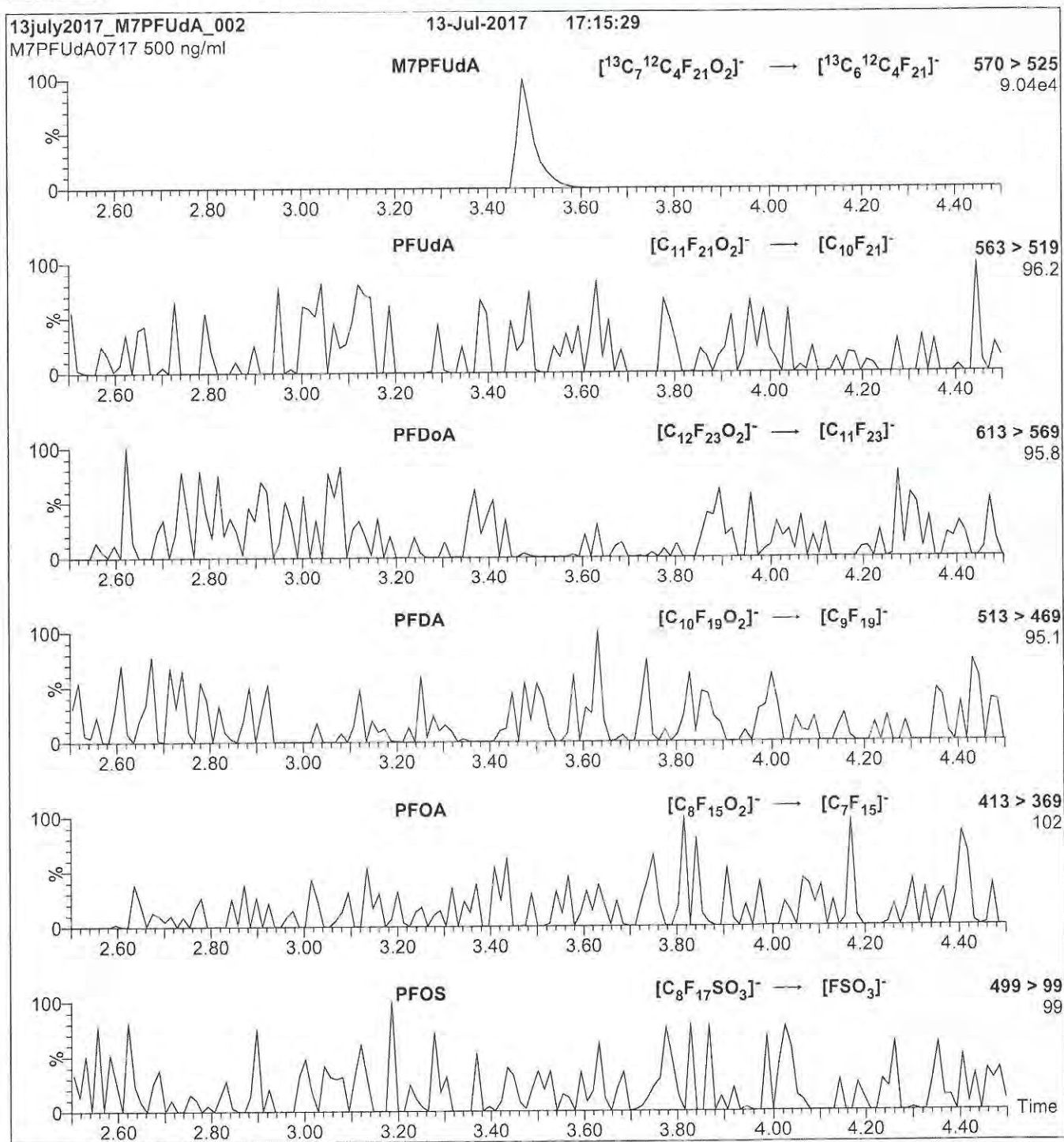
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (250 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 65
Desolvation Gas Flow (l/hr) = 750

18B1533

Figure 2: M7PFUdA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μl (500 ng/ml M7PFUdA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 11

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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

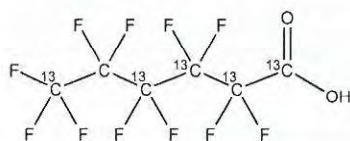
M5PFHxA

LOT NUMBER:

M5PFHxA1017

COMPOUND:Perfluoro-n-[1,2,3,4,6-¹³C₅]hexanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₅¹²C₁HF₁₁O₂**CONCENTRATION:**

50 ± 2.5 µg/ml

MOLECULAR WEIGHT:

319.02

SOLVENT(S):Methanol
Water (<1%)**CHEMICAL PURITY:**

>98%

ISOTOPIC PURITY:≥99% ¹³C
(1,2,3,4,6-¹³C₅)**LAST TESTED:** (mm/dd/yyyy)

10/17/2017

EXPIRY DATE: (mm/dd/yyyy)

10/17/2022

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)

Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
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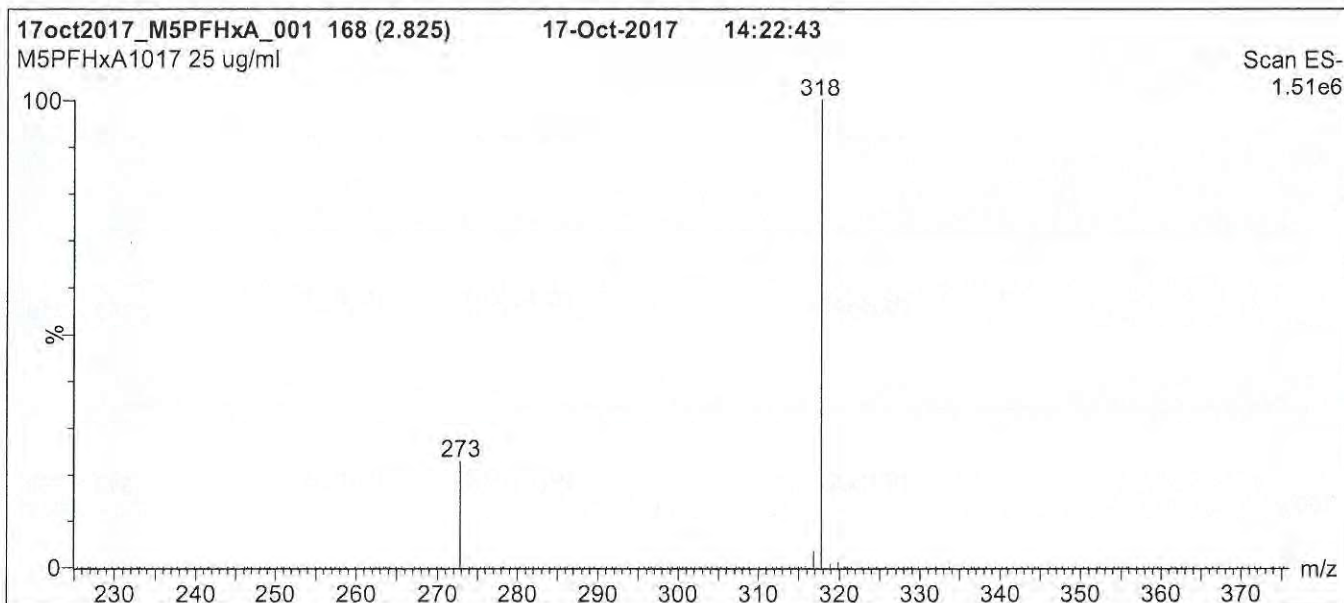
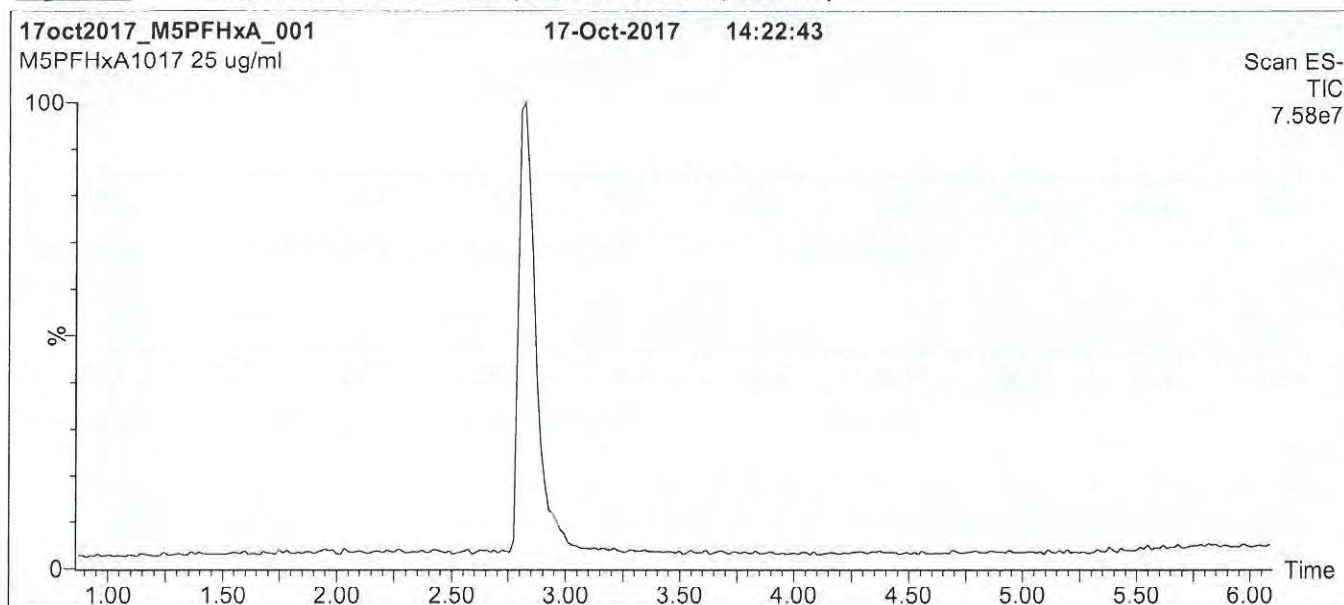
QUALITY MANAGEMENT:

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Figure 1: M5PFHxA; LC/MS Data (TIC and Mass Spectrum)**Conditions for Figure 1:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
 Start: 40% (80:20 MeOH:ACN) / 60% H₂O
 (both with 10 mM NH₄OAc buffer)
 Ramp to 90% organic over 7 min and hold for 2 min
 before returning to initial conditions in 0.5 min.
 Time: 10 min

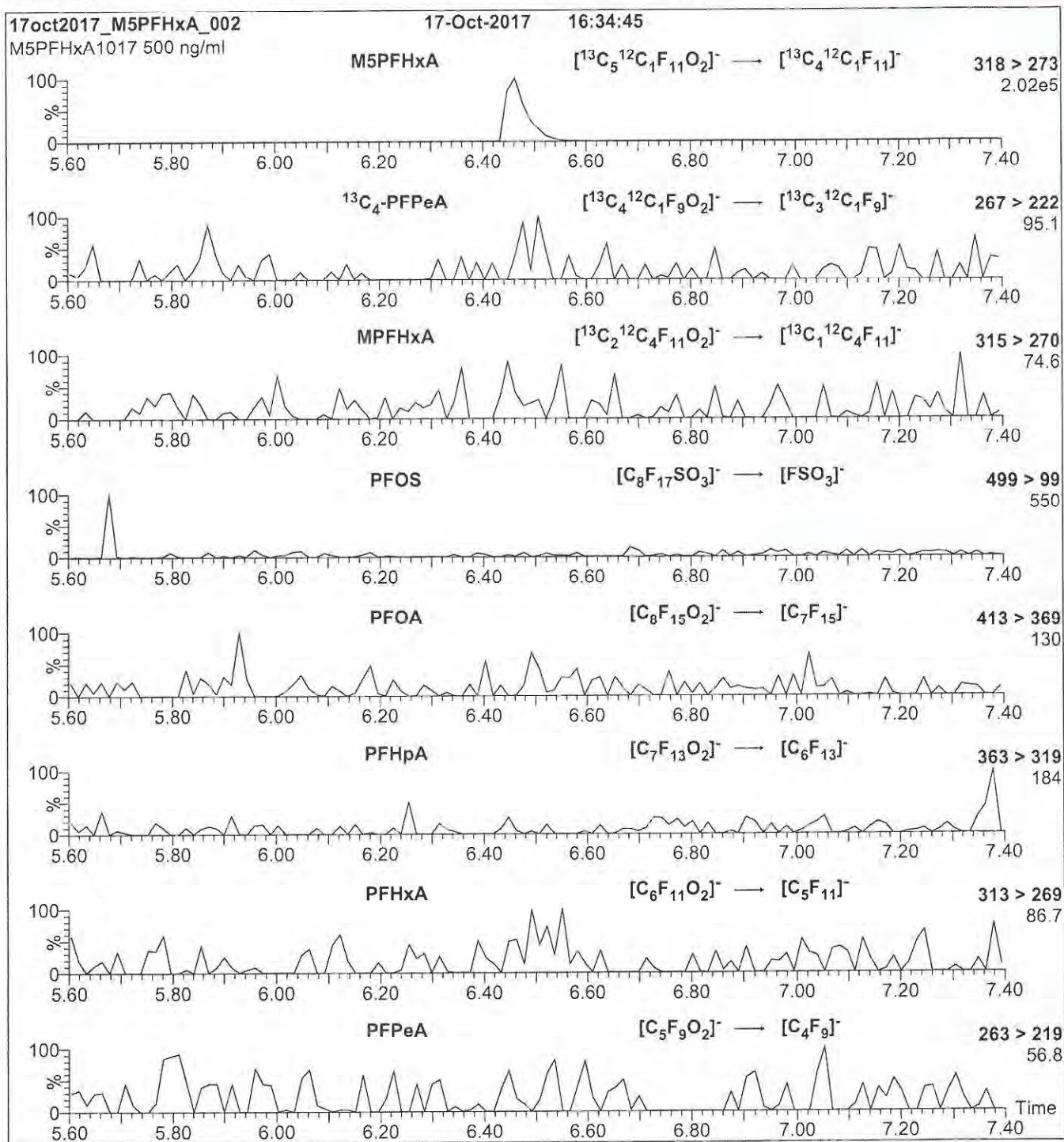
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
 Capillary Voltage (kV) = 2.00
 Cone Voltage (V) = 15.00
 Cone Gas Flow (l/hr) = 100
 Desolvation Gas Flow (l/hr) = 750

18B1534

Figure 2: M5PFHxA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μl (500 ng/ml M5PFHxA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.31e-3
Collision Energy (eV) = 9

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CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

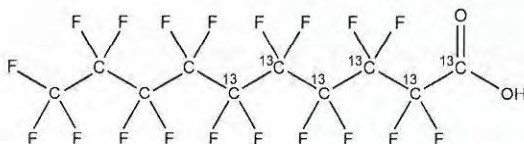
M6PFDA

LOT NUMBER:

M6PFDA1017

COMPOUND:Perfluoro-n-[1,2,3,4,5,6-¹³C₆]decanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₆¹²C₄H₁₉O₂**MOLECULAR WEIGHT:**

520.04

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

Water (<1%)

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99% ¹³C**LAST TESTED:** (mm/dd/yyyy)

10/17/2017

(1,2,3,4,5,6-¹³C₆)**EXPIRY DATE:** (mm/dd/yyyy)

10/17/2022

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)

Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE**Certified By:**

B.G. Chittim, General Manager
Date: 10/20/2017

(mm/dd/yyyy)

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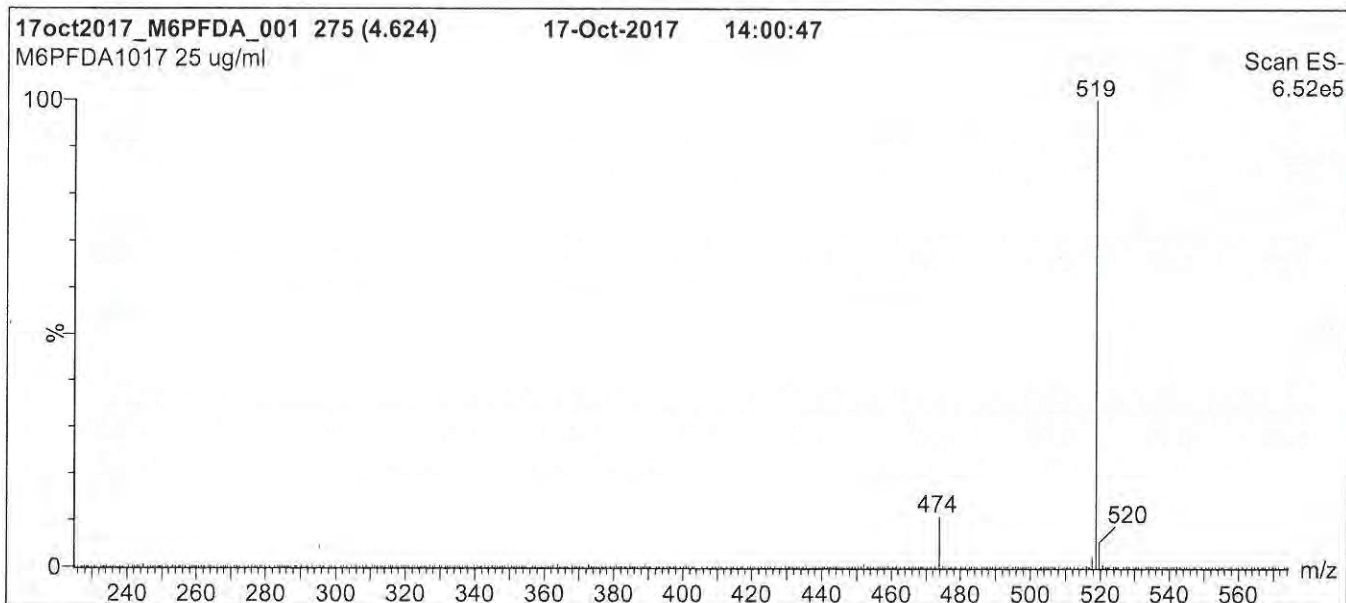
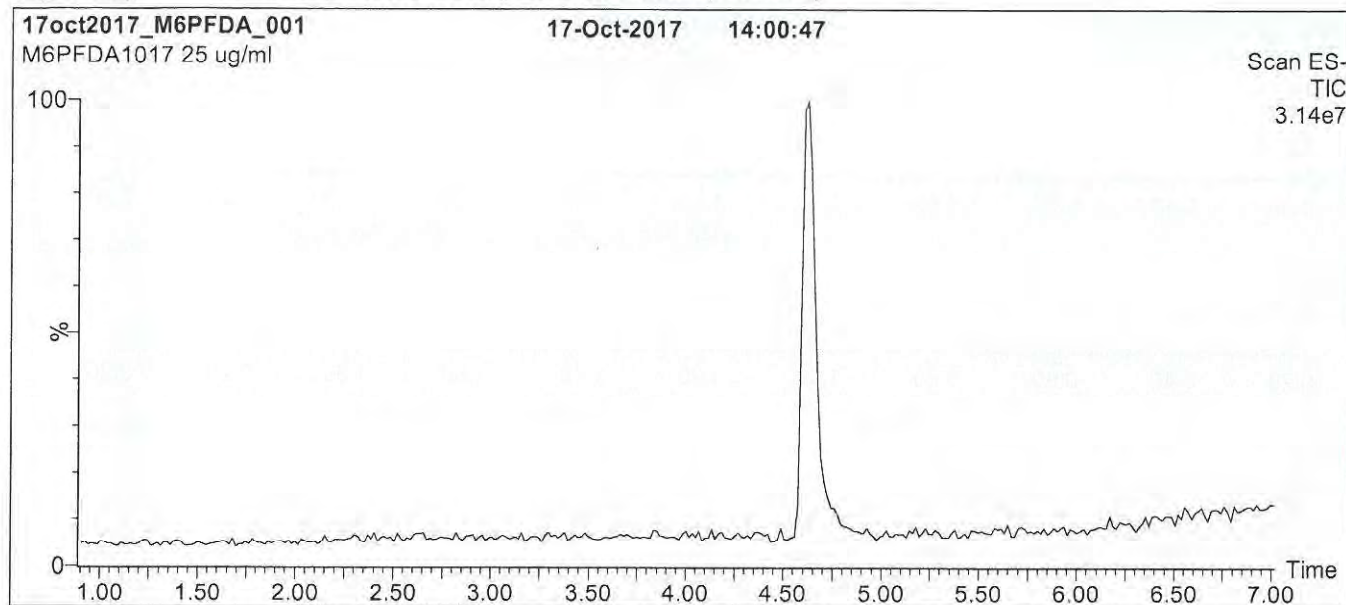
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Figure 1: M6PFDA; LC/MS Data (TIC and Mass Spectrum)



Conditions for Figure 1:

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient
Start: 50% (80:20 MeOH:ACN) / 50% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7 min and hold for 2 min
before returning to initial conditions in 0.5 min.
Time: 10 min

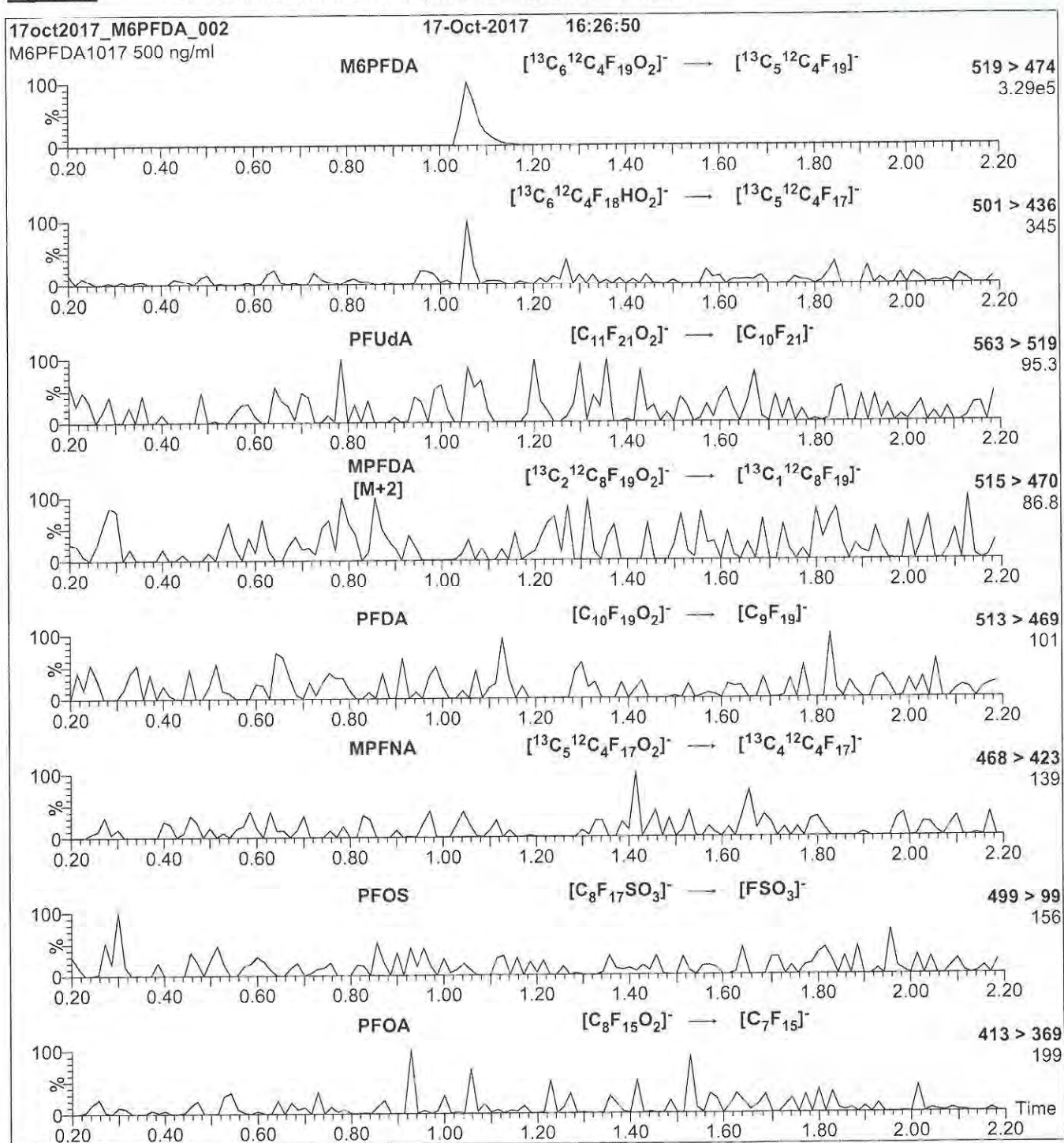
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 50
Desolvation Gas Flow (l/hr) = 750

18B1535

Figure 2: M6PFDA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μl (500 ng/ml M6PFDA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.24e-3
Collision Energy (eV) = 13

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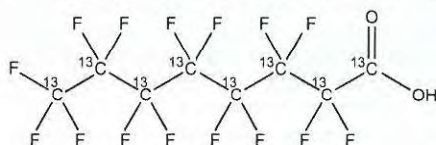
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M8PFOA
COMPOUND: Perfluoro-n-[¹³C₈]octanoic acid

LOT NUMBER: M8PFOA0717

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: ¹³C₈H₁₅O₂
CONCENTRATION: 49 ± 2.45 µg/ml

MOLECULAR WEIGHT: 422.01
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: 97.9% (M8PFOA)
2.1% (MPFOA [M+4])

ISOTOPIC PURITY: ≥99% ¹³C
(¹³C₈)

LAST TESTED: (mm/dd/yyyy) 07/05/2017

EXPIRY DATE: (mm/dd/yyyy) 07/05/2022

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)

Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains < 0.1% of native perfluoro-n-octanoic acid (PFOA) and ~ 2.1% of [M+4] perfluoro-n-octanoic acid.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By: 
B.G. Chittim, General Manager

Date: 07/14/2017
(mm/dd/yyyy)

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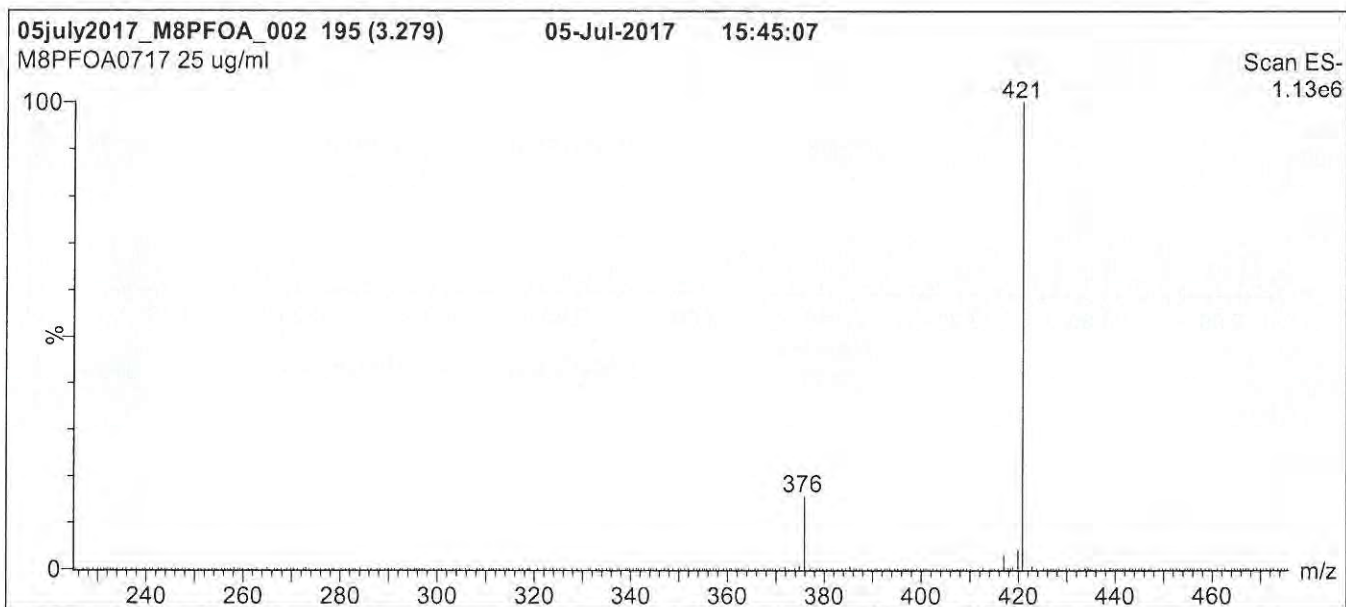
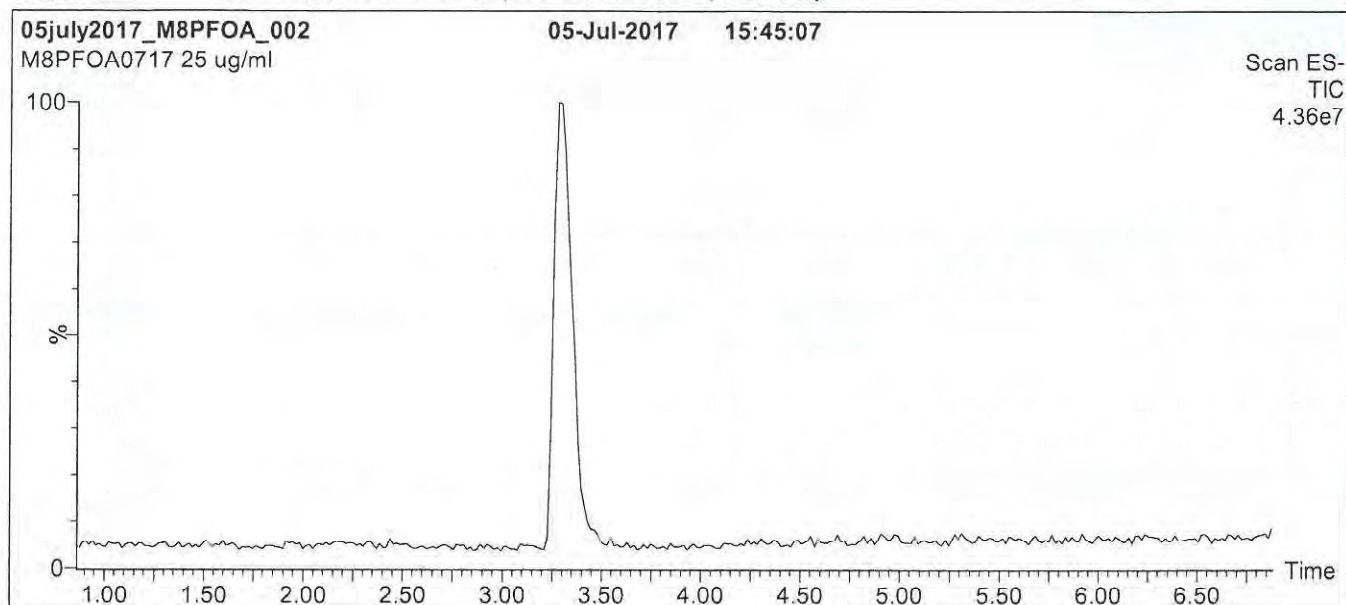
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18B1536

Figure 1: M8PFOA; LC/MS Data (TIC and Mass Spectrum)**Conditions for Figure 1:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

Start: 55% (80:20 MeOH:ACN) / 45% H₂O
(both with 10 mM NH₄OAc buffer)
Ramp to 90% organic over 7.5 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.
Time: 10 min

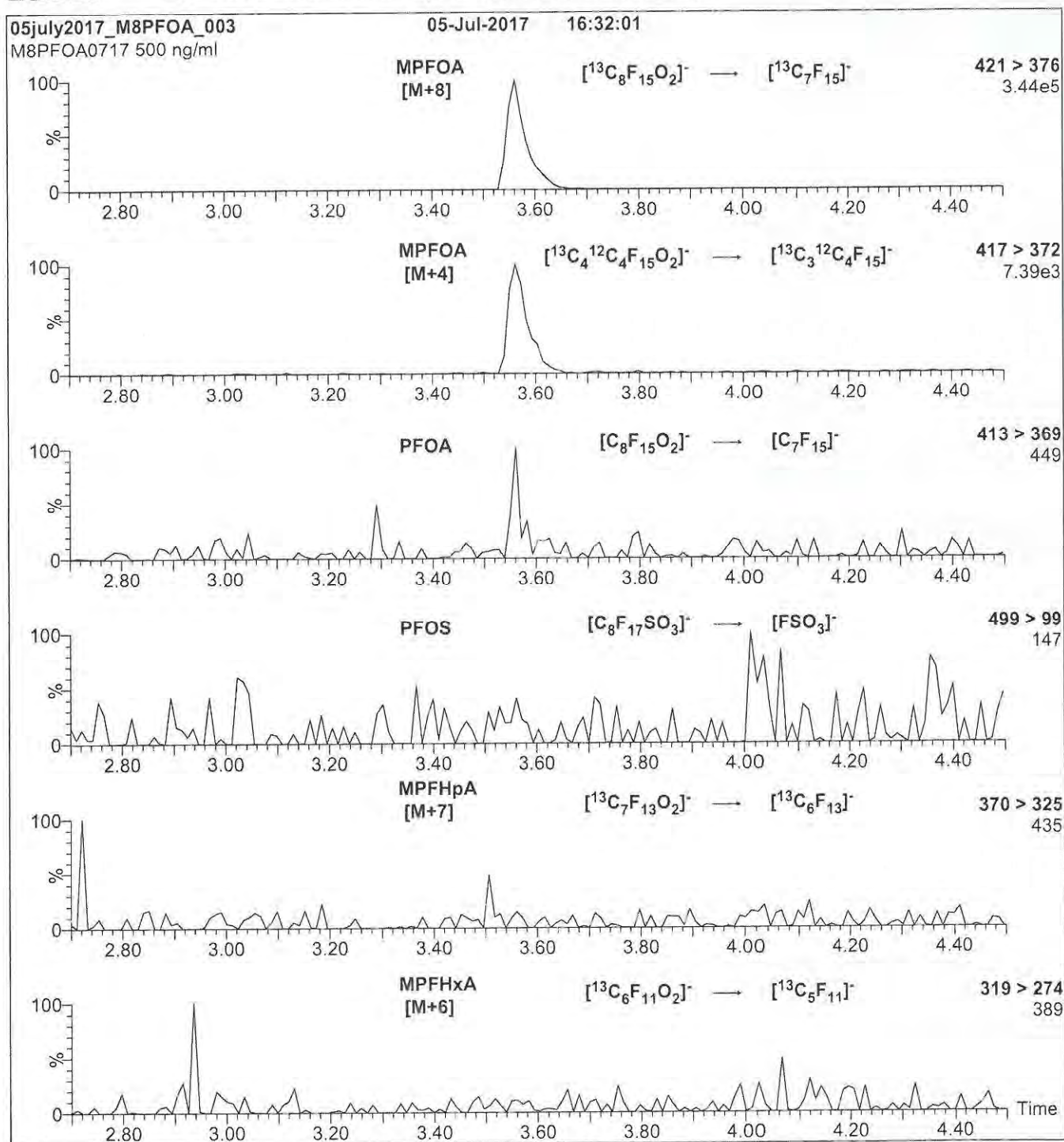
Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)
Capillary Voltage (kV) = 3.00
Cone Voltage (V) = 15.00
Cone Gas Flow (l/hr) = 100
Desolvation Gas Flow (l/hr) = 750

18B1536

Figure 2: M8PFOA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μl (500 ng/ml M8PFOA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.28e-3
Collision Energy (eV) = 10



WELLINGTON LABORATORIES

CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE:

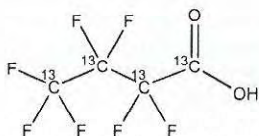
MPFBA

LOT NUMBER:

MPFBA0417

COMPOUND:Perfluoro-n-[1,2,3,4-¹³C₄]butanoic acid**STRUCTURE:****CAS #:**

Not available

**MOLECULAR FORMULA:**¹³C₄HF₇O₂**MOLECULAR WEIGHT:**

218.01

CONCENTRATION:

50 ± 2.5 µg/ml

SOLVENT(S):

Methanol

CHEMICAL PURITY:

>98%

ISOTOPIC PURITY:≥99% ¹³C**LAST TESTED:** (mm/dd/yyyy)

04/12/2017

(1,2,3,4-¹³C₄)**EXPIRY DATE:** (mm/dd/yyyy)

04/12/2022

RECOMMENDED STORAGE:

Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)

Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:

B.G. Chittim, General Manager

Date:

04/20/2017
(mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1537

INTENDED USE:

The products prepared by Wellington Laboratories Inc. are for laboratory use only. This certified reference material (CRM) was designed to be used as a standard for the identification and/or quantification of the specific chemical compound it contains.

HAZARDS:

This product should only be used by qualified personnel familiar with its potential hazards and trained in the handling of hazardous chemicals. Due care should be exercised to prevent unnecessary human contact or ingestion. All procedures should be carried out in a well-functioning fume hood and suitable gloves, eye protection, and clothing should be worn at all times. Waste should be disposed of according to national and regional regulations. Safety Data Sheets (SDSs) are available upon request.

SYNTHESIS / CHARACTERIZATION:

Where possible, all of our products are synthesized using single-product unambiguous routes. They are then characterized, and their structures and purities confirmed, using a combination of the most relevant techniques, such as NMR, GC/MS, LC/MS/MS, SFC/UV/MS/MS, x-ray crystallography, and melting point. Isotopic purities of mass-labelled compounds are also confirmed using HRGC/HRMS and/or LC/MS/MS.

HOMOGENEITY:

Prior to solution preparation, crystalline material is tested for homogeneity using a variety of techniques (as stated above) and its solubility in a given diluent is taken into consideration. Duplicate solutions of a new product are prepared from the same crystalline lot and, after the addition of an appropriate internal standard, they are compared by GC/MS, LC/MS/MS and/or SFC/UV/MS/MS. The relative response factors of the analyte of interest in each solution are required to be <5% RSD. New solution lots of existing products are compared to older lots in the same manner, which further confirms the homogeneity of the crystalline material as well as the stability and homogeneity of the solutions in the storage containers. In order to maintain the integrity of the assigned value(s), and associated uncertainty, the dilution or injection of a subsample of this product should be performed using calibrated measuring equipment.

UNCERTAINTY:

The maximum combined relative standard uncertainty of our reference standard solutions is calculated using the following equation:

The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters

x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of $\pm 5\%$ (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

TRACEABILITY:

All reference standard solutions are traceable to specific crystalline lots. The microbalances used for solution preparation are regularly tested by an external ISO/IEC 17025 accredited calibration company. In addition, their calibration is verified prior to each weighing using calibrated NIST and/or NRC traceable external weights. All volumetric glassware used is calibrated, of Class A tolerance, and has been tested according to the appropriate ASTM procedures, which are ultimately traceable to NIST. For certain products, traceability to international interlaboratory studies has also been established.

EXPIRY DATE / PERIOD OF VALIDITY:

Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

LIMITED WARRANTY:

At the time of shipment, all products are warranted to be free of defects in material and workmanship and to conform to the stated technical and purity specifications.

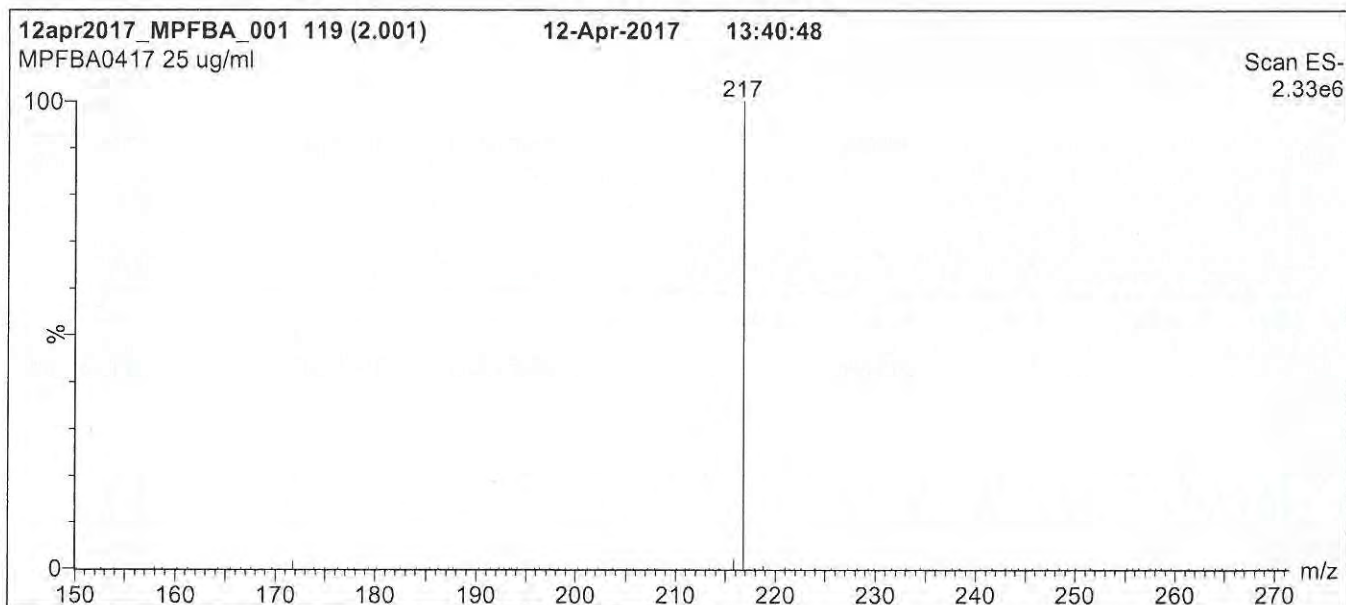
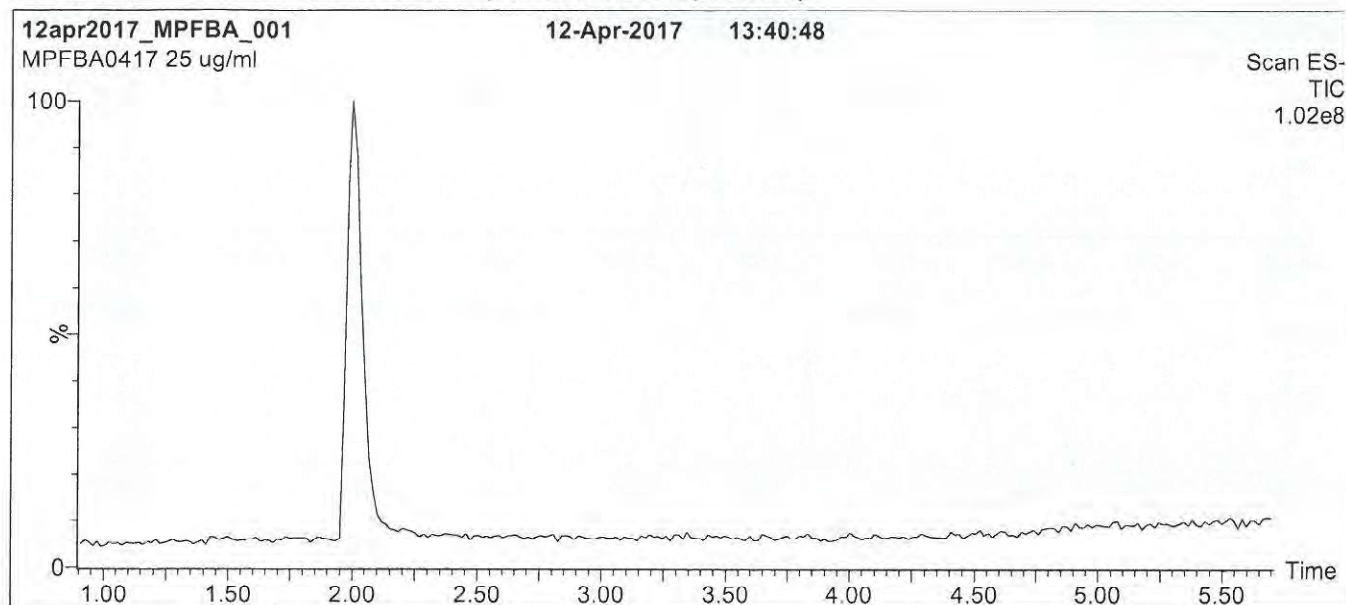
QUALITY MANAGEMENT:

This product was produced using a Quality Management System registered to the latest versions of ISO 9001 by SAI Global, ISO/IEC 17025 by the Canadian Association for Laboratory Accreditation Inc. (CALA; A 1226), and ISO GUIDE 34 by ANSI-ASQ National Accreditation Board (ANAB; AR-1523).



For additional information or assistance concerning this or any other products from Wellington Laboratories Inc., please visit our website at www.well-labs.com or contact us directly at info@well-labs.com

18B1537

Figure 1: MPFBA; LC/MS Data (TIC and Mass Spectrum)**Conditions for Figure 1:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
 1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

Start: 30% (80:20 MeOH:ACN) / 70% H₂O
 (both with 10 mM NH₄OAc buffer)
 Ramp to 90% organic over 7 min and hold for 1.5 min
 before returning to initial conditions in 0.5 min.
 Time: 10 min

Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (150 - 850 amu)

Source: Electrospray (negative)

Capillary Voltage (kV) = 3.00

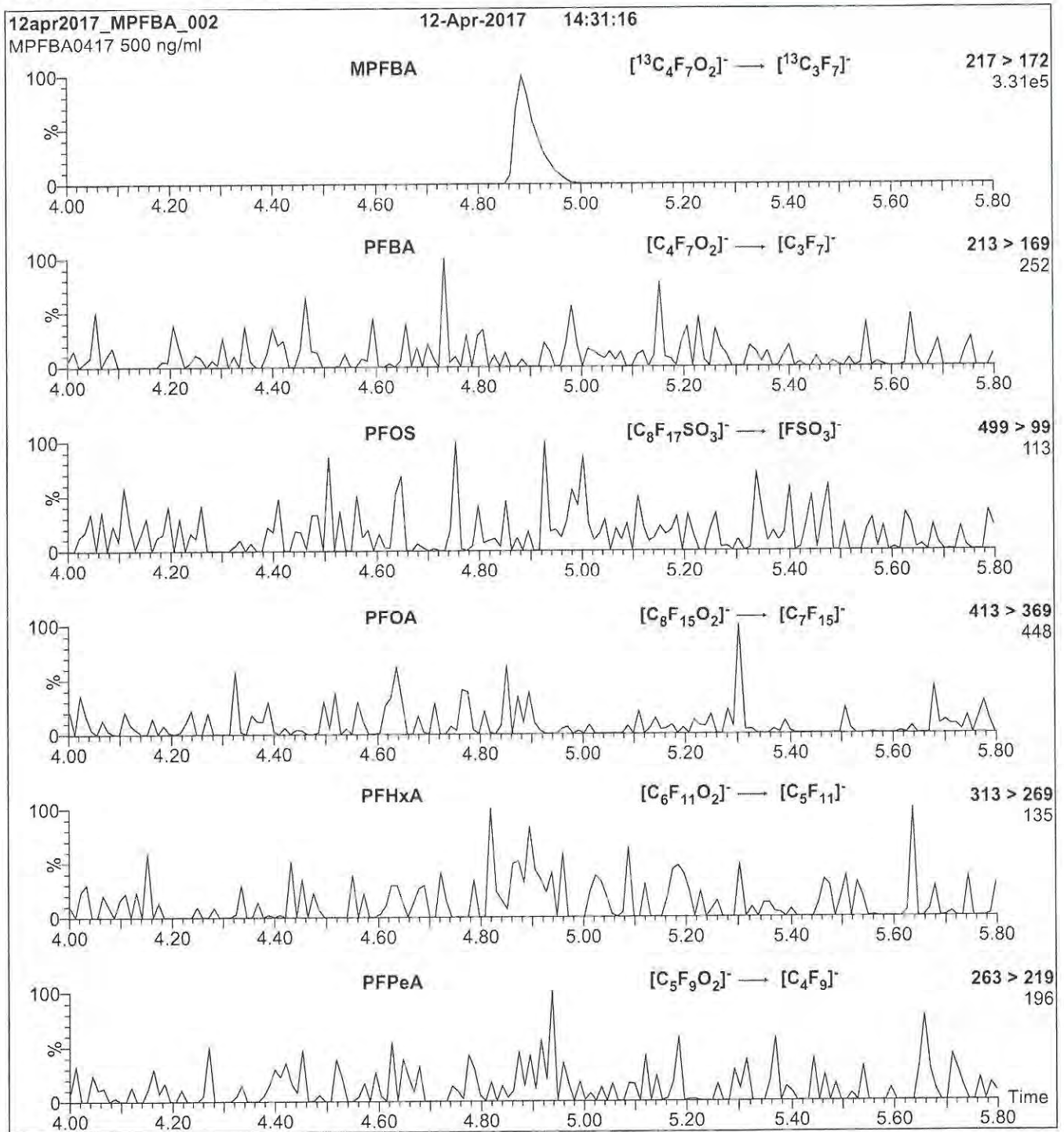
Cone Voltage (V) = 10.00

Cone Gas Flow (l/hr) = 100

Desolvation Gas Flow (l/hr) = 750

18B1537

Figure 2: MPFBA; LC/MS/MS Data (Selected MRM Transitions)



Conditions for Figure 2:

Injection: Direct loop injection
10 μl (500 ng/ml MPFBA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.35e-3
Collision Energy (eV) = 10

18B1538



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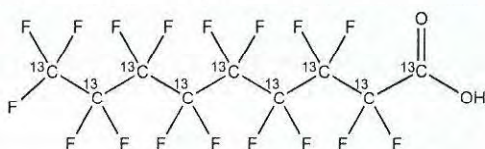
CERTIFICATE OF ANALYSIS DOCUMENTATION

PRODUCT CODE: M9PFNA
COMPOUND: Perfluoro-n-[$^{13}\text{C}_9$]nonanoic acid

LOT NUMBER: M9PFNA0517

STRUCTURE:

CAS #: Not available



MOLECULAR FORMULA: $^{13}\text{C}_9\text{HF}_{17}\text{O}_2$
CONCENTRATION: $50 \pm 2.5 \mu\text{g/ml}$

MOLECULAR WEIGHT: 473.01
SOLVENT(S): Methanol
Water (<1%)

CHEMICAL PURITY: >98%
LAST TESTED: (mm/dd/yyyy) 05/23/2017
EXPIRY DATE: (mm/dd/yyyy) 05/23/2022

ISOTOPIC PURITY: $\geq 99\%$ ^{13}C
($^{13}\text{C}_9$)

RECOMMENDED STORAGE: Store ampoule in a cool, dark place

DOCUMENTATION/ DATA ATTACHED:

Figure 1: LC/MS Data (TIC and Mass Spectrum)
Figure 2: LC/MS/MS Data (Selected MRM Transitions)

ADDITIONAL INFORMATION:

- See page 2 for further details.
- Contains 4 mole eq. of NaOH to prevent conversion of the carboxylic acid to the methyl ester.
- Contains ~ 0.9% of $^{13}\text{C}_5^{12}\text{C}_4\text{HF}_{17}\text{O}_2$ (MPFNA).

FOR LABORATORY USE ONLY: NOT FOR HUMAN OR DRUG USE

Certified By:
B.G. Chittim, General Manager

Date: 05/25/2017
(mm/dd/yyyy)

Wellington Laboratories Inc., 345 Southgate Dr. Guelph ON N1G 3M5 CANADA
519-822-2436 • Fax: 519-822-2849 • info@well-labs.com

18B1538

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HAZARDS:

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The combined relative standard uncertainty, $u_c(y)$, of a value y and the uncertainty of the independent parameters

x_1, x_2, \dots, x_n on which it depends is:

$$u_c(y(x_1, x_2, \dots, x_n)) = \sqrt{\sum_{i=1}^n u(y, x_i)^2}$$

where x is expressed as a relative standard uncertainty of the individual parameter.

The individual uncertainties taken into account include those associated with weights (calibration of the balance) and volumes (calibration of the volumetric glassware). An expanded maximum combined percent relative uncertainty of $\pm 5\%$ (calculated with a coverage factor of 2 and a level of confidence of 95%) is stated on the Certificate of Analysis for all of our products.

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Ongoing stability studies of this product have demonstrated stability in its composition and concentration, until the specified expiry date, in the unopened ampoule. Monitoring for any degradation or change in concentration of the listed analyte(s) is performed on a routine basis.

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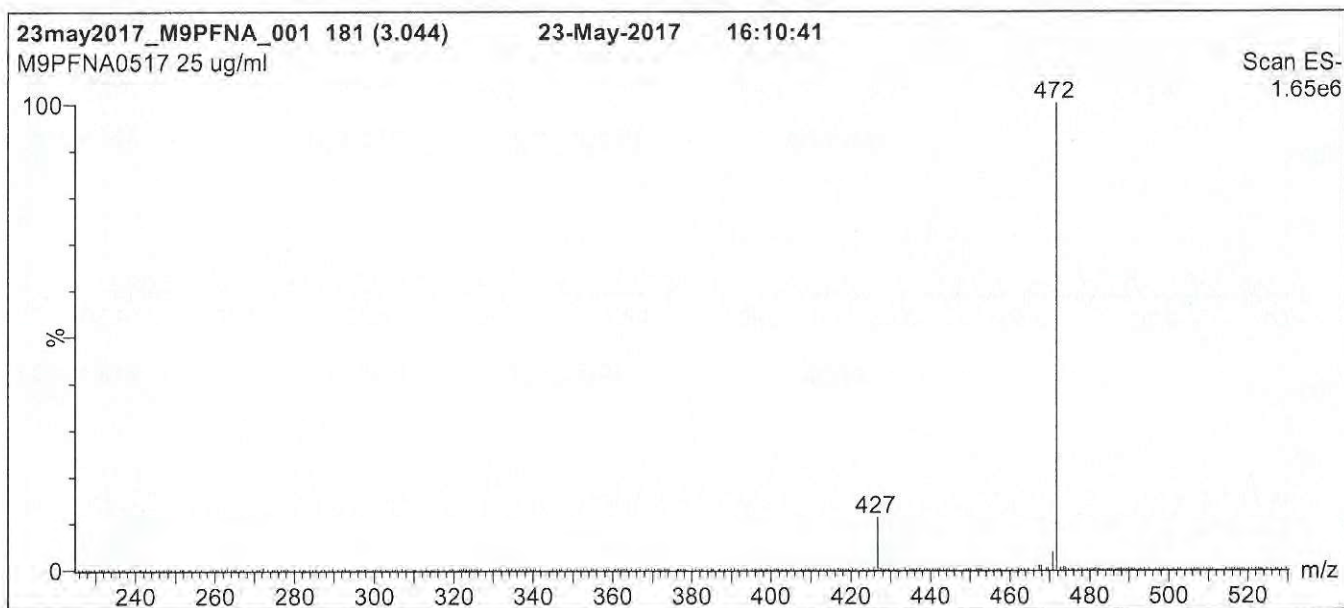
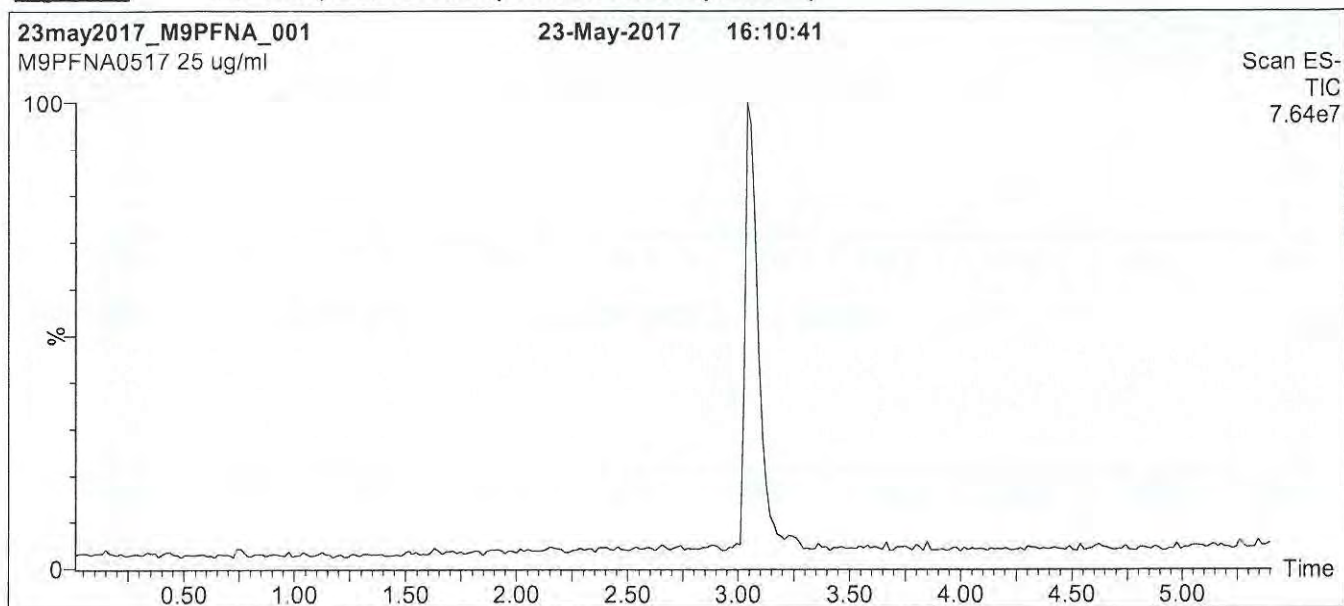
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18B1538

Figure 1: M9PFNA; LC/MS Data (TIC and Mass Spectrum)**Conditions for Figure 1:**

LC: Waters Acquity Ultra Performance LC
MS: Micromass Quattro *micro* API MS

Chromatographic Conditions

Column: Acquity UPLC BEH Shield RP₁₈
1.7 μ m, 2.1 x 100 mm

Mobile phase: Gradient

Start: 60% (80:20 MeOH:ACN) / 40% H₂O
(both with 10 mM NH₄OAc buffer)

Ramp to 90% organic over 7 min and hold for 1.5 min
before returning to initial conditions in 0.5 min.

Time: 10 min

Flow: 300 μ l/min

MS Parameters

Experiment: Full Scan (225 - 850 amu)

Source: Electrospray (negative)

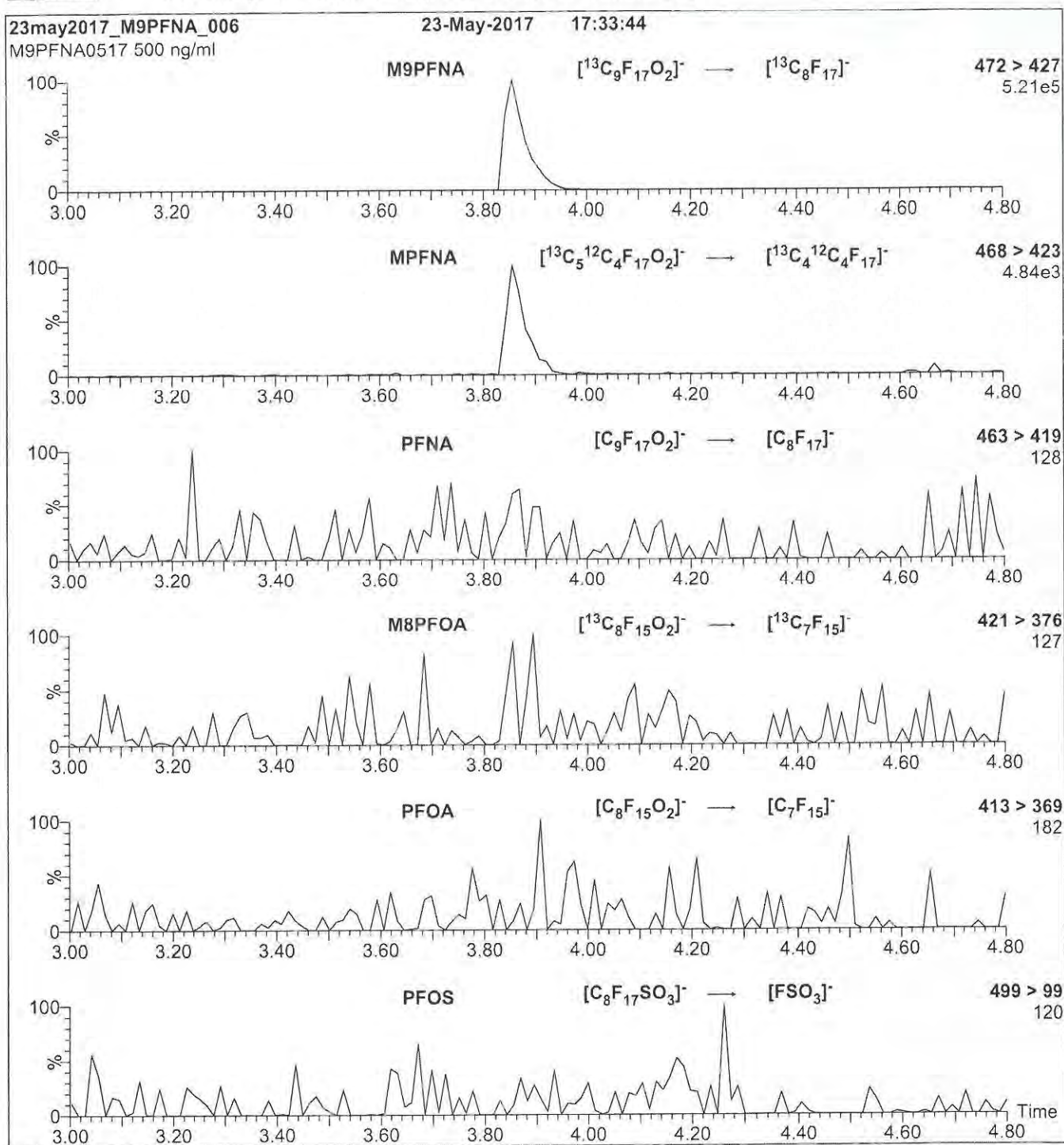
Capillary Voltage (kV) = 2.00

Cone Voltage (V) = 15.00

Cone Gas Flow (l/hr) = 50

Desolvation Gas Flow (l/hr) = 750

18B1538

Figure 2: M9PFNA; LC/MS/MS Data (Selected MRM Transitions)**Conditions for Figure 2:**

Injection: Direct loop injection
10 μl (500 ng/ml M9PFNA)

Mobile phase: Isocratic 80% (80:20 MeOH:ACN) / 20% H_2O
(both with 10 mM NH_4OAc buffer)

Flow: 300 $\mu\text{l}/\text{min}$

MS Parameters

Collision Gas (mbar) = 3.20e-3
Collision Energy (eV) = 11

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"BP-MH-SW4001-South-20180501","Modified EPA 537","Initial","1800859-01","Vista","307-24-4","PFHxA","30.2","ng/L","","1.36","LOD","","TRG","","","3.96","LOQ","YES","-99","","0.253","0.001","2.47",""

"BP-MH-SW4001-South-20180501","Modified EPA 537","Initial","1800859-01","Vista","375-85-9","PFHpA","18.5","ng/L","","1.36","LOD","","TRG","","","3.96","LOQ","YES","-99","","0.253","0.001","2.47",""

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"BP-MH-SW4001-South-20180501","Modified EPA 537","Initial","1800859-01","Vista","375-92-8","PFHpS","2.47","ng/L","UU","1.36","LOD","","TRG","","","3.96","LOQ","YES","-99","","0.253","0.001","2.47",""

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"BP-MH-SW4001-South-20180501","Modified EPA 537","Initial","1800859-01","Vista","39108-34-4","8:2 FTS","6.07","ng/L","","1.36","LOD","","TRG","","","3.96","LOQ","YES","-99","","0.253","0.001","2.47",""

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"BP-MH-SW4001-South-20180501","Modified EPA 537","Initial","1800859-01","Vista","13C2-PFUnA","13C2-
PFUnA","74.1","%R","","-99","NA","","IS","74.1","","-99","NA","YES","100","","0.253","0.001","-99",""
"BP-MH-SW4001-South-20180501","Modified EPA 537","Initial","1800859-01","Vista","d5-EtFOSAA","d5-
EtFOSAA","92.0","%R","","-99","NA","","IS","92.0","","-99","NA","YES","100","","0.253","0.001","-99",""
"BP-MH-SW4001-South-20180501","Modified EPA 537","Initial","1800859-01","Vista","13C2-PFDoA","13C2-
PFDoA","67.7","%R","","-99","NA","","IS","67.7","","-99","NA","YES","100","","0.253","0.001","-99",""
"BP-MH-SW4001-South-20180501","Modified EPA 537","Initial","1800859-01","Vista","13C2-PFTeDA","13C2-
PFTeDA","73.6","%R","","-99","NA","","IS","73.6","","-99","NA","YES","100","","0.253","0.001","-99",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","375-22-
4","PFBA","15.9","ng/L","","1.33","LOD","","TRG","","","3.88","LOQ","YES","-99","","0.258","0.001","2.42",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","2706-90-
3","PFPeA","37.9","ng/L","","1.33","LOD","","TRG","","","3.88","LOQ","YES","-99","","0.258","0.001","2.42",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","375-73-
5","PFBS","2.14","ng/L","J","1.33","LOD","","TRG","","","3.88","LOQ","YES","-99","","0.258","0.001","2.42",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","307-24-
4","PFHxA","28.9","ng/L","","1.33","LOD","","TRG","","","3.88","LOQ","YES","-99","","0.258","0.001","2.42",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","375-85-
9","PFHpA","21.7","ng/L","","1.33","LOD","","TRG","","","3.88","LOQ","YES","-99","","0.258","0.001","2.42",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","355-46-
4","PFHxS","4.90","ng/L","","1.33","LOD","","TRG","","","3.88","LOQ","YES","-99","","0.258","0.001","2.42",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","27619-97-2","6:2
FTS","16.0","ng/L","","1.33","LOD","","TRG","","","3.88","LOQ","YES","-99","","0.258","0.001","2.42",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","335-67-
1","PFOA","21.4","ng/L","","1.33","LOD","","TRG","","","3.88","LOQ","YES","-99","","0.258","0.001","2.42",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","375-92-
8","PFHpS","2.42","ng/L","UU","1.33","LOD","","TRG","","","3.88","LOQ","YES","-99","","0.258","0.001","2.42",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","1763-23-
1","PFOS","19.0","ng/L","","1.33","LOD","","TRG","","","3.88","LOQ","YES","-99","","0.258","0.001","2.42",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","375-95-
1","PFNA","9.45","ng/L","","1.33","LOD","","TRG","","","3.88","LOQ","YES","-99","","0.258","0.001","2.42",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","335-76-
2","PFDA","1.48","ng/L","J","1.33","LOD","","TRG","","","3.88","LOQ","YES","-99","","0.258","0.001","2.42",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","39108-34-4","8:2
FTS","8.77","ng/L","","1.33","LOD","","TRG","","","3.88","LOQ","YES","-99","","0.258","0.001","2.42",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","754-91-

6","PFOSA","2.42","ng/L","UU","1.33","LOD","","","TRG","","","3.88","LOQ","YES","-99","","","0.258","0.001","2.42",""
"
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","2355-31-
9","MeFOSAA","2.42","ng/L","UU","1.33","LOD","","","TRG","","","3.88","LOQ","YES","-99","","","0.258","0.001","2.4
2",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","335-77-
3","PFDS","2.42","ng/L","UU","1.33","LOD","","","TRG","","","3.88","LOQ","YES","-99","","","0.258","0.001","2.42",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","2058-94-
8","PFUnA","2.54","ng/L","J","1.33","LOD","","","TRG","","","3.88","LOQ","YES","-99","","","0.258","0.001","2.42",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","2991-50-
6","EtFOSAA","2.42","ng/L","UU","1.33","LOD","","","TRG","","","3.88","LOQ","YES","-99","","","0.258","0.001","2.42
",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","307-55-
1","PFDaA","2.42","ng/L","UU","1.33","LOD","","","TRG","","","3.88","LOQ","YES","-99","","","0.258","0.001","2.42",""
"
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","72629-94-
8","PFTDA","2.42","ng/L","UU","1.33","LOD","","","TRG","","","3.88","LOQ","YES","-99","","","0.258","0.001","2.42",""
"
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","376-06-
7","PFTeDA","2.42","ng/L","UU","1.33","LOD","","","TRG","","","3.88","LOQ","YES","-99","","","0.258","0.001","2.42",""
"
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","13C3-PFBA","13C3-
PFBA","97.1","%R","","-99","NA","","IS","97.1","","-99","NA","YES","100","","","0.258","0.001","-99",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","13C3-PFPeA","13C3-
PFPeA","94.0","%R","","-99","NA","","IS","94.0","","-99","NA","YES","100","","","0.258","0.001","-99",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","13C3-PFBS","13C3-
PFBS","127","%R","","-99","NA","","IS","127","","-99","NA","YES","100","","","0.258","0.001","-99",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","13C2-PFHxA","13C2-
PFHxA","101","%R","","-99","NA","","IS","101","","-99","NA","YES","100","","","0.258","0.001","-99",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","13C4-PFHpA","13C4-
PFHpA","89.8","%R","","-99","NA","","IS","89.8","","-99","NA","YES","100","","","0.258","0.001","-99",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","18O2-PFHxS","18O2-
PFHxS","92.3","%R","","-99","NA","","IS","92.3","","-99","NA","YES","100","","","0.258","0.001","-99",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","13C2-PFOA","13C2-
PFOA","85.7","%R","","-99","NA","","IS","85.7","","-99","NA","YES","100","","","0.258","0.001","-99",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","13C8-PFOS","13C8-
PFOS","99.6","%R","","-99","NA","","IS","99.6","","-99","NA","YES","100","","","0.258","0.001","-99",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","13C5-PFNA","13C5-
PFNA","82.0","%R","","-99","NA","","IS","82.0","","-99","NA","YES","100","","","0.258","0.001","-99",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","13C2-PFDA","13C2-
PFDA","77.0","%R","","-99","NA","","IS","77.0","","-99","NA","YES","100","","","0.258","0.001","-99",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","13C8-PFOSA","13C8-
PFOSA","61.7","%R","","-99","NA","","IS","61.7","","-99","NA","YES","100","","","0.258","0.001","-99",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","d3-MeFOSAA","d3-
MeFOSAA","93.8","%R","","-99","NA","","IS","93.8","","-99","NA","YES","100","","","0.258","0.001","-99",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","13C2-PFUnA","13C2-
PFUnA","82.0","%R","","-99","NA","","IS","82.0","","-99","NA","YES","100","","","0.258","0.001","-99",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","d5-EtFOSAA","d5-
EtFOSAA","96.5","%R","","-99","NA","","IS","96.5","","-99","NA","YES","100","","","0.258","0.001","-99",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","13C2-PFDaA","13C2-
PFDaA","86.3","%R","","-99","NA","","IS","86.3","","-99","NA","YES","100","","","0.258","0.001","-99",""
"BP-TT-SW4002-20180501","Modified EPA 537","Initial","1800859-02","Vista","13C2-PFTeDA","13C2-
PFTeDA","71.0","%R","","-99","NA","","IS","71.0","","-99","NA","YES","100","","","0.258","0.001","-99",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","375-22-

4","PFBA","16.4","ng/L","",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","2706-90-
3","PFPeA","37.8","ng/L","",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","375-73-
5","PFBS","2.22","ng/L","J",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","307-24-
4","PFHxA","29.1","ng/L","",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","375-85-
9","PFHpA","20.1","ng/L","",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","355-46-
4","PFHxS","4.81","ng/L","",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","27619-97-2","6:2
FTS","15.9","ng/L","",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","335-67-
1","PFOA","20.0","ng/L","",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","375-92-
8","PFHpS","2.37","ng/L","UU",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","1763-23-
1","PFOS","16.1","ng/L","",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","375-95-
1","PFNA","8.71","ng/L","",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","335-76-
2","PFDA","2.37","ng/L","UU",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","39108-34-4","8:2
FTS","7.59","ng/L","",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","754-91-
6","PFOSA","2.37","ng/L","UU",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",""
"
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","2355-31-
9","MeFOSAA","2.37","ng/L","UU",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.3
7",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","335-77-
3","PFDS","2.37","ng/L","UU",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","2058-94-
8","PFUnA","2.03","ng/L","J",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","2991-50-
6","EtFOSAA","2.37","ng/L","UU",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37
",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","307-55-
1","PFDaA","2.37","ng/L","UU",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",""
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"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","72629-94-
8","PFTTrDA","2.37","ng/L","UU",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",
,""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","376-06-
7","PFTeDA","2.37","ng/L","UU",1.30,"LOD","",TRG","",3.79,"LOQ","YES",-99,"",0.264,"0.001","2.37",
,""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","13C3-PFBA","13C3-
PFBA","95.3","%R","",-99,"NA","",IS","95.3","",-99,"NA","YES","100","",0.264,"0.001","-99",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","13C3-PFPeA","13C3-
PFPeA","90.3","%R","",-99,"NA","",IS","90.3","",-99,"NA","YES","100","",0.264,"0.001","-99",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","13C3-PFBS","13C3-
PFBS","123","%R","",-99,"NA","",IS","123","",-99,"NA","YES","100","",0.264,"0.001","-99",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","13C2-PFHxA","13C2-

PFHxA","90.3","%R","",-99","NA","","IS","90.3","",-99","NA","YES","100","","0.264","0.001","-99",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","13C4-PFHpA","13C4-
PFHpA","92.4","%R","",-99","NA","","IS","92.4","",-99","NA","YES","100","","0.264","0.001","-99",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","18O2-PFHxS","18O2-
PFHxS","86.1","%R","",-99","NA","","IS","86.1","",-99","NA","YES","100","","0.264","0.001","-99",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","13C2-PFOA","13C2-
PFOA","81.3","%R","",-99","NA","","IS","81.3","",-99","NA","YES","100","","0.264","0.001","-99",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","13C8-PFOS","13C8-
PFOS","96.9","%R","",-99","NA","","IS","96.9","",-99","NA","YES","100","","0.264","0.001","-99",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","13C5-PFNA","13C5-
PFNA","85.6","%R","",-99","NA","","IS","85.6","",-99","NA","YES","100","","0.264","0.001","-99",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","13C2-PFDA","13C2-
PFDA","81.9","%R","",-99","NA","","IS","81.9","",-99","NA","YES","100","","0.264","0.001","-99",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","13C8-PFOSA","13C8-
PFOSA","48.2","%R","H","-99","NA","","IS","48.2","",-99","NA","YES","100","","0.264","0.001","-99",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","d3-MeFOSAA","d3-
MeFOSAA","87.1","%R","",-99","NA","","IS","87.1","",-99","NA","YES","100","","0.264","0.001","-99",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","13C2-PFUnA","13C2-
PFUnA","71.8","%R","",-99","NA","","IS","71.8","",-99","NA","YES","100","","0.264","0.001","-99",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","d5-EtFOSAA","d5-
EtFOSAA","85.9","%R","",-99","NA","","IS","85.9","",-99","NA","YES","100","","0.264","0.001","-99",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","13C2-PFDoA","13C2-
PFDoA","80.1","%R","",-99","NA","","IS","80.1","",-99","NA","YES","100","","0.264","0.001","-99",""
"BP-DUP06-20180501","Modified EPA 537","Initial","1800859-03","Vista","13C2-PFTeDA","13C2-
PFTeDA","77.8","%R","",-99","NA","","IS","77.8","",-99","NA","YES","100","","0.264","0.001","-99",""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","375-22-
4","PFBA","2.39","ng/L","UU","1.31","LOD","","TRG","","","3.84","LOQ","YES","-99","","0.261","0.001","2.39",""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","2706-90-
3","PFPeA","2.39","ng/L","UU","1.31","LOD","","TRG","","","3.84","LOQ","YES","-99","","0.261","0.001","2.39",""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","375-73-
5","PFBS","2.39","ng/L","UU","1.31","LOD","","TRG","","","3.84","LOQ","YES","-99","","0.261","0.001","2.39",""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","307-24-
4","PFHxA","2.39","ng/L","UU","1.31","LOD","","TRG","","","3.84","LOQ","YES","-99","","0.261","0.001","2.39",""
"
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","375-85-
9","PFHpA","2.39","ng/L","UU","1.31","LOD","","TRG","","","3.84","LOQ","YES","-99","","0.261","0.001","2.39",""
"
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","355-46-
4","PFHxS","2.39","ng/L","UU","1.31","LOD","","TRG","","","3.84","LOQ","YES","-99","","0.261","0.001","2.39",""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","27619-97-2","6:2
FTS","2.39","ng/L","UU","1.31","LOD","","TRG","","","3.84","LOQ","YES","-99","","0.261","0.001","2.39",""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","335-67-
1","PFOA","2.39","ng/L","UU","1.31","LOD","","TRG","","","3.84","LOQ","YES","-99","","0.261","0.001","2.39",""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","375-92-
8","PFHpS","2.39","ng/L","UU","1.31","LOD","","TRG","","","3.84","LOQ","YES","-99","","0.261","0.001","2.39",""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","1763-23-
1","PFOS","2.39","ng/L","UU","1.31","LOD","","TRG","","","3.84","LOQ","YES","-99","","0.261","0.001","2.39",""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","375-95-
1","PFNA","2.39","ng/L","UU","1.31","LOD","","TRG","","","3.84","LOQ","YES","-99","","0.261","0.001","2.39",""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","335-76-
2","PFDA","2.39","ng/L","UU","1.31","LOD","","TRG","","","3.84","LOQ","YES","-99","","0.261","0.001","2.39",""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","39108-34-4","8:2
FTS","2.39","ng/L","UU","1.31","LOD","","TRG","","","3.84","LOQ","YES","-99","","0.261","0.001","2.39",""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","754-91-

6","PFOSA","2.39","ng/L","UU","1.31","LOD","","","TRG","","","3.84","LOQ","YES",-99","","0.261","0.001","2.39","
","
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","2355-31-
9","MeFOSAA","2.39","ng/L","UU","1.31","LOD","","","TRG","","","3.84","LOQ","YES",-99","","0.261","0.001","2.3
9",""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","335-77-
3","PFDS","2.39","ng/L","UU","1.31","LOD","","","TRG","","","3.84","LOQ","YES",-99","","0.261","0.001","2.39",""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","2058-94-
8","PFUnA","2.39","ng/L","UU","1.31","LOD","","","TRG","","","3.84","LOQ","YES",-99","","0.261","0.001","2.39","
"
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","2991-50-
6","EtFOSAA","2.39","ng/L","UU","1.31","LOD","","","TRG","","","3.84","LOQ","YES",-99","","0.261","0.001","2.39
",""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","307-55-
1","PFDoA","2.39","ng/L","UU","1.31","LOD","","","TRG","","","3.84","LOQ","YES",-99","","0.261","0.001","2.39","
"
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","72629-94-
8","PFTTrDA","2.39","ng/L","UU","1.31","LOD","","","TRG","","","3.84","LOQ","YES",-99","","0.261","0.001","2.39",
"
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","376-06-
7","PFTeDA","2.39","ng/L","UU","1.31","LOD","","","TRG","","","3.84","LOQ","YES",-99","","0.261","0.001","2.39",
"
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","13C3-PFBA","13C3-
PFBA","92.3","%R","","-99","NA","","IS","92.3","","-99","NA","YES","100","","0.261","0.001",-99,""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","13C3-PFPeA","13C3-
PFPeA","90.9","%R","","-99","NA","","IS","90.9","","-99","NA","YES","100","","0.261","0.001",-99,""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","13C3-PFBS","13C3-
PFBS","109","%R","","-99","NA","","IS","109","","-99","NA","YES","100","","0.261","0.001",-99,""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","13C2-PFHxA","13C2-
PFHxA","91.8","%R","","-99","NA","","IS","91.8","","-99","NA","YES","100","","0.261","0.001",-99,""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","13C4-PFHpA","13C4-
PFHpA","98.7","%R","","-99","NA","","IS","98.7","","-99","NA","YES","100","","0.261","0.001",-99,""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","18O2-PFHxS","18O2-
PFHxS","94.6","%R","","-99","NA","","IS","94.6","","-99","NA","YES","100","","0.261","0.001",-99,""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","13C2-PFOA","13C2-
PFOA","77.5","%R","","-99","NA","","IS","77.5","","-99","NA","YES","100","","0.261","0.001",-99,""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","13C8-PFOS","13C8-
PFOS","92.6","%R","","-99","NA","","IS","92.6","","-99","NA","YES","100","","0.261","0.001",-99,""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","13C5-PFNA","13C5-
PFNA","81.0","%R","","-99","NA","","IS","81.0","","-99","NA","YES","100","","0.261","0.001",-99,""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","13C2-PFDA","13C2-
PFDA","66.1","%R","","-99","NA","","IS","66.1","","-99","NA","YES","100","","0.261","0.001",-99,""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","13C8-PFOSA","13C8-
PFOSA","44.3","%R","H",-99,"NA","","IS","44.3","","-99","NA","YES","100","","0.261","0.001",-99,""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","d3-MeFOSAA","d3-
MeFOSAA","64.0","%R","","-99","NA","","IS","64.0","","-99","NA","YES","100","","0.261","0.001",-99,""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","13C2-PFUnA","13C2-
PFUnA","67.0","%R","","-99","NA","","IS","67.0","","-99","NA","YES","100","","0.261","0.001",-99,""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","d5-EtFOSAA","d5-
EtFOSAA","68.2","%R","","-99","NA","","IS","68.2","","-99","NA","YES","100","","0.261","0.001",-99,""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","13C2-PFDoA","13C2-
PFDoA","71.9","%R","","-99","NA","","IS","71.9","","-99","NA","YES","100","","0.261","0.001",-99,""
"BP-EB04-20180501","Modified EPA 537","Initial","1800859-04","Vista","13C2-PFTeDA","13C2-
PFTeDA","68.0","%R","","-99","NA","","IS","68.0","","-99","NA","YES","100","","0.261","0.001",-99,""

"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","375-22-4","PFBA","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","2706-90-3","PFPeA","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","375-73-5","PFBS","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","307-24-4","PFHxA","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","375-85-9","PFHpA","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","355-46-4","PFHxS","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","27619-97-2","6:2 FTS","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","335-67-1","PFOA","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","375-92-8","PFHpS","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","1763-23-1","PFOS","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","375-95-1","PFNA","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","335-76-2","PFDA","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","39108-34-4","8:2 FTS","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","754-91-6","PFOSA","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","2355-31-9","MeFOSAA","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","335-77-3","PFDS","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","2058-94-8","PFUnA","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","2991-50-6","EtFOSAA","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","307-55-1","PFDoA","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","72629-94-8","PFTTrDA","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","376-06-7","PFTeDA","2.50","ng/L","UU","1.37","LOD","","TRG","","","4.00","LOQ","YES",-99","","0.250","0.001","2.50",""
"
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","13C3-PFBA","13C3-PFBA","93.2","%R","","-99","NA","","IS","93.2","","-99","NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","13C3-PFPeA","13C3-

PFPeA","93.5","%R","",-99,"NA","","IS","93.5","",-99,"NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","13C3-PFBS","13C3-
PFBS","101","%R","",-99,"NA","","IS","101","",-99,"NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","13C2-PFHxA","13C2-
PFHxA","98.3","%R","",-99,"NA","","IS","98.3","",-99,"NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","13C4-PFHpA","13C4-
PFHpA","106","%R","",-99,"NA","","IS","106","",-99,"NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","18O2-PFHxS","18O2-
PFHxS","81.4","%R","",-99,"NA","","IS","81.4","",-99,"NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","13C2-PFOA","13C2-
PFOA","95.8","%R","",-99,"NA","","IS","95.8","",-99,"NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","13C8-PFOS","13C8-
PFOS","97.0","%R","",-99,"NA","","IS","97.0","",-99,"NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","13C5-PFNA","13C5-
PFNA","89.3","%R","",-99,"NA","","IS","89.3","",-99,"NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","13C2-PFDA","13C2-
PFDA","91.8","%R","",-99,"NA","","IS","91.8","",-99,"NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","13C8-PFOSA","13C8-
PFOSA","50.7","%R","",-99,"NA","","IS","50.7","",-99,"NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","d3-MeFOSAA","d3-
MeFOSAA","73.0","%R","",-99,"NA","","IS","73.0","",-99,"NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","13C2-PFUnA","13C2-
PFUnA","73.1","%R","",-99,"NA","","IS","73.1","",-99,"NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","d5-EtFOSAA","d5-
EtFOSAA","76.7","%R","",-99,"NA","","IS","76.7","",-99,"NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","13C2-PFDoA","13C2-
PFDoA","90.8","%R","",-99,"NA","","IS","90.8","",-99,"NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BLK1","Modified EPA 537","Initial","B8E0075-BLK1","Vista","13C2-PFTeDA","13C2-
PFTeDA","72.2","%R","",-99,"NA","","IS","72.2","",-99,"NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","375-22-
4","PFBA","42.5","ng/L","","1.37","LOD","","TRG","106","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","2706-90-
3","PFPeA","41.2","ng/L","","1.37","LOD","","TRG","103","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","375-73-
5","PFBS","42.4","ng/L","","1.37","LOD","","TRG","106","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","307-24-
4","PFHxA","41.9","ng/L","","1.37","LOD","","TRG","105","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","375-85-
9","PFHpA","41.5","ng/L","","1.37","LOD","","TRG","104","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","355-46-
4","PFHxS","43.1","ng/L","","1.37","LOD","","TRG","108","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","27619-97-2","6:2
FTS","48.1","ng/L","","1.37","LOD","","TRG","120","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","335-67-
1","PFOA","41.6","ng/L","","1.37","LOD","","TRG","104","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","375-92-
8","PFHpS","36.7","ng/L","","1.37","LOD","","TRG","91.8","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","1763-23-

1","PFOS","42.2","ng/L","","1.37","LOD","","TRG","105","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","375-95-
1","PFNA","39.3","ng/L","","1.37","LOD","","TRG","98.3","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","335-76-
2","PFDA","36.6","ng/L","","1.37","LOD","","TRG","91.5","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","39108-34-4","8:2
FTS","37.7","ng/L","","1.37","LOD","","TRG","94.3","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","754-91-
6","PFOSA","44.0","ng/L","","1.37","LOD","","TRG","110","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","2355-31-
9","MeFOSAA","46.0","ng/L","","1.37","LOD","","TRG","115","","4.00","LOQ","YES","40.0","","0.250","0.001","2.5
50",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","335-77-
3","PFDS","42.6","ng/L","","1.37","LOD","","TRG","107","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","2058-94-
8","PFUnA","37.7","ng/L","","1.37","LOD","","TRG","94.1","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","2991-50-
6","EtFOSAA","48.8","ng/L","","1.37","LOD","","TRG","122","","4.00","LOQ","YES","40.0","","0.250","0.001","2.5
0",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","307-55-
1","PFDoA","40.8","ng/L","","1.37","LOD","","TRG","102","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","72629-94-
8","PFTTrDA","35.0","ng/L","","1.37","LOD","","TRG","87.6","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50
",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","376-06-
7","PFTeDA","40.9","ng/L","","1.37","LOD","","TRG","102","","4.00","LOQ","YES","40.0","","0.250","0.001","2.50
",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","13C3-PFBA","13C3-
PFBA","108","%R","","-99","NA","","IS","108","","-99","NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","13C3-PFPeA","13C3-
PFPeA","103","%R","","-99","NA","","IS","103","","-99","NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","13C3-PFBS","13C3-
PFBS","107","%R","","-99","NA","","IS","107","","-99","NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","13C2-PFHxA","13C2-
PFHxA","107","%R","","-99","NA","","IS","107","","-99","NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","13C4-PFHpA","13C4-
PFHpA","107","%R","","-99","NA","","IS","107","","-99","NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","18O2-PFHxS","18O2-
PFHxS","107","%R","","-99","NA","","IS","107","","-99","NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","13C2-PFOA","13C2-
PFOA","96.4","%R","","-99","NA","","IS","96.4","","-99","NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","13C8-PFOS","13C8-
PFOS","107","%R","","-99","NA","","IS","107","","-99","NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","13C5-PFNA","13C5-
PFNA","108","%R","","-99","NA","","IS","108","","-99","NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","13C2-PFDA","13C2-
PFDA","107","%R","","-99","NA","","IS","107","","-99","NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","13C8-PFOSA","13C8-
PFOSA","61.8","%R","","-99","NA","","IS","61.8","","-99","NA","YES","100","","0.250","0.001","-99",""

"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","d3-MeFOSAA","d3-MeFOSAA","92.7","%R","","-99","NA","","IS","92.7","","-99","NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","13C2-PFUnA","13C2-PFUnA","90.8","%R","","-99","NA","","IS","90.8","","-99","NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","d5-EtFOSAA","d5-EtFOSAA","95.9","%R","","-99","NA","","IS","95.9","","-99","NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","13C2-PFDoA","13C2-PFDoA","101","%R","","-99","NA","","IS","101","","-99","NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BS1","Modified EPA 537","Initial","B8E0075-BS1","Vista","13C2-PFTeDA","13C2-PFTeDA","88.9","%R","","-99","NA","","IS","88.9","","-99","NA","YES","100","","0.250","0.001","-99",""
"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","375-22-4","PFBA","43.2","ng/L","","1.37","LOD","","TRG","108","1.63","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","2706-90-3","PFPeA","44.6","ng/L","","1.37","LOD","","TRG","112","8.00","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","375-73-5","PFBS","43.4","ng/L","","1.37","LOD","","TRG","108","2.28","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","307-24-4","PFHxA","47.4","ng/L","","1.37","LOD","","TRG","119","12.3","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","375-85-9","PFHpA","41.5","ng/L","","1.37","LOD","","TRG","104","0.027","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","355-46-4","PFHxS","41.2","ng/L","","1.37","LOD","","TRG","103","4.38","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","27619-97-2","6:2 FTS","44.2","ng/L","","1.37","LOD","","TRG","111","8.37","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","335-67-1","PFOA","44.0","ng/L","","1.37","LOD","","TRG","110","5.64","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","375-92-8","PFHpS","41.3","ng/L","","1.37","LOD","","TRG","103","11.7","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","1763-23-1","PFOS","45.9","ng/L","","1.37","LOD","","TRG","115","8.48","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","375-95-1","PFNA","40.1","ng/L","","1.37","LOD","","TRG","100","1.85","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","335-76-2","PFDA","40.4","ng/L","","1.37","LOD","","TRG","101","9.78","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","39108-34-4","8:2 FTS","41.1","ng/L","","1.37","LOD","","TRG","103","8.65","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","754-91-6","PFOSA","43.6","ng/L","","1.37","LOD","","TRG","109","0.942","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","2355-31-9","MeFOSAA","44.3","ng/L","","1.37","LOD","","TRG","111","3.71","4.00","LOQ","YES","40.0","","0.250","0.001","2.50",""
"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","335-77-

3","PFDS","35.3","ng/L","","1.37","LOD","","TRG","88.4","18.6","4.00","LOQ","YES","40.0","","0.250","0.001","2.50", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","2058-94-8","PFUnA","37.3","ng/L","","1.37","LOD","","TRG","93.3","0.926","4.00","LOQ","YES","40.0","","0.250","0.001","2.50", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","2991-50-6","EtFOSAA","50.4","ng/L","","1.37","LOD","","TRG","126","3.36","4.00","LOQ","YES","40.0","","0.250","0.001","2.50", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","307-55-1","PFDoA","48.6","ng/L","","1.37","LOD","","TRG","122","17.6","4.00","LOQ","YES","40.0","","0.250","0.001","2.50", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","72629-94-8","PFTTrDA","42.2","ng/L","","1.37","LOD","","TRG","105","18.5","4.00","LOQ","YES","40.0","","0.250","0.001","2.50", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","376-06-7","PFTeDA","44.6","ng/L","","1.37","LOD","","TRG","112","8.75","4.00","LOQ","YES","40.0","","0.250","0.001","2.50", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","13C3-PFBA","13C3-PFBA","102","%R","","-99","NA","","IS","102","","-99","NA","YES","100","","0.250","0.001","-99", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","13C3-PFPeA","13C3-PFPeA","94.0","%R","","-99","NA","","IS","94.0","","-99","NA","YES","100","","0.250","0.001","-99", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","13C3-PFBS","13C3-PFBS","99.6","%R","","-99","NA","","IS","99.6","","-99","NA","YES","100","","0.250","0.001","-99", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","13C2-PFHxA","13C2-PFHxA","95.7","%R","","-99","NA","","IS","95.7","","-99","NA","YES","100","","0.250","0.001","-99", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","13C4-PFHpA","13C4-PFHpA","112","%R","","-99","NA","","IS","112","","-99","NA","YES","100","","0.250","0.001","-99", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","18O2-PFHxS","18O2-PFHxS","106","%R","","-99","NA","","IS","106","","-99","NA","YES","100","","0.250","0.001","-99", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","13C2-PFOA","13C2-PFOA","101","%R","","-99","NA","","IS","101","","-99","NA","YES","100","","0.250","0.001","-99", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","13C8-PFOS","13C8-PFOS","97.7","%R","","-99","NA","","IS","97.7","","-99","NA","YES","100","","0.250","0.001","-99", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","13C5-PFNA","13C5-PFNA","101","%R","","-99","NA","","IS","101","","-99","NA","YES","100","","0.250","0.001","-99", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","13C2-PFDA","13C2-PFDA","100","%R","","-99","NA","","IS","100","","-99","NA","YES","100","","0.250","0.001","-99", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","13C8-PFOSA","13C8-PFOSA","56.7","%R","","-99","NA","","IS","56.7","","-99","NA","YES","100","","0.250","0.001","-99", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","d3-MeFOSAA","d3-MeFOSAA","90.1","%R","","-99","NA","","IS","90.1","","-99","NA","YES","100","","0.250","0.001","-99", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","13C2-PFUnA","13C2-PFUnA","93.3","%R","","-99","NA","","IS","93.3","","-99","NA","YES","100","","0.250","0.001","-99", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","d5-EtFOSAA","d5-EtFOSAA","84.0","%R","","-99","NA","","IS","84.0","","-99","NA","YES","100","","0.250","0.001","-99", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","13C2-PFDoA","13C2-PFDoA","79.4","%R","","-99","NA","","IS","79.4","","-99","NA","YES","100","","0.250","0.001","-99", ""

"B8E0075-BSD1","Modified EPA 537","Initial","B8E0075-BSD1","Vista","13C2-PFTeDA","13C2-PFTeDA","75.2","%R","","-99","NA","","IS","75.2","","-99","NA","YES","100","","0.250","0.001","-99", ""

"112G08005-WE09","112G08005-WE09","BP-MH-SW4001-South-20180501","05/01/2018 07:50","AQ","1800859-01","NM","","1.70","Modified EPA 537","METHOD","Initial","05/11/2018 09:30","05/28/2018 04:51","Vista","COA","WET","NA","1","NA","NA","01/01/1900 00:00","100","B8E0075","B8E0075","NA","S8E0067","1800859","05/02/2018 10:02","01/01/1900 00:00", ""

"112G08005-WE09","112G08005-WE09","BP-TT-SW4002-20180501","05/01/2018 08:30","AQ","1800859-

02","NM","","1.70","Modified EPA 537","METHOD","Initial","05/11/2018 09:30","05/28/2018
05:02","Vista","COA","WET","NA","1","NA","NA","01/01/1900
00:00","100","B8E0075","B8E0075","NA","S8E0067","1800859","05/02/2018 10:02","01/01/1900 00:00",""
"112G08005-WE09","112G08005-WE09","BP-DUP06-20180501","05/01/2018 12:00","AQ","1800859-
03","NM","","1.70","Modified EPA 537","METHOD","Initial","05/11/2018 09:30","05/28/2018
05:12","Vista","COA","WET","NA","1","NA","NA","01/01/1900
00:00","100","B8E0075","B8E0075","NA","S8E0067","1800859","05/02/2018 10:02","01/01/1900 00:00",""
"112G08005-WE09","112G08005-WE09","BP-EB04-20180501","05/01/2018 10:40","AQ","1800859-
04","NM","","1.70","Modified EPA 537","METHOD","Initial","05/11/2018 09:30","05/28/2018
05:23","Vista","COA","WET","NA","1","NA","NA","01/01/1900
00:00","100","B8E0075","B8E0075","NA","S8E0067","1800859","05/02/2018 10:02","01/01/1900 00:00",""
"112G08005-WE09","112G08005-WE09","B8E0075-BLK1","01/01/1900 00:00","AQ","B8E0075-
BLK1","MB","","-99","Modified EPA 537","METHOD","Initial","05/11/2018 09:30","05/28/2018
02:35","Vista","COA","WET","NA","1","NA","NA","01/01/1900
00:00","100","B8E0075","B8E0075","NA","S8E0067","1800859","01/01/1900 00:00","01/01/1900 00:00",""
"112G08005-WE09","112G08005-WE09","B8E0075-BS1","01/01/1900 00:00","AQ","B8E0075-
BS1","LCS","","-99","Modified EPA 537","METHOD","Initial","05/11/2018 09:30","05/28/2018
02:14","Vista","COA","WET","NA","1","NA","NA","01/01/1900
00:00","100","B8E0075","B8E0075","NA","S8E0067","1800859","01/01/1900 00:00","01/01/1900 00:00",""
"112G08005-WE09","112G08005-WE09","B8E0075-BSD1","01/01/1900 00:00","AQ","B8E0075-
BSD1","LCSD","","-99","Modified EPA 537","METHOD","Initial","05/11/2018 09:30","05/28/2018
02:25","Vista","COA","WET","NA","1","NA","NA","01/01/1900
00:00","100","B8E0075","B8E0075","NA","S8E0067","1800859","01/01/1900 00:00","01/01/1900 00:00",""

DATA VALIDATION REPORT

Project:	Naval Weapons Industrial Reserve Plant Bethpage
Laboratory:	Vista Analytical Laboratory
Sample Delivery Groups:	1800802, 1800803, 1800822, 1800824, 1800859, and 1800860
Analyses/Method:	Per- and Polyfluoroalkyl Substances (PFAS) via Modified U.S. EPA Method 537 compliant with Department of Defense Quality System's Manual Version 5.1 Table B-15
Validation Level:	Stage 4 Validation Electronic and Manual
Project Number:	0888812477.SA.DV

SUMMARY

This report summarizes data review findings for the PFAS groundwater sampling event (samples listed below) collected by Tetra Tech at Naval Weapons Industrial Reserve Plant (NWIRP) Bethpage Site between on 24 April and 1 May 2018 in accordance with the following Uniform Federal Policy (UFP) Sampling and Analysis Plan (SAP):

- *Sampling and Analysis Plan for Per- and Polyfluoroalkyl Substances Investigation, Facility Wide, Naval Weapons Industrial Reserve Plant, Bethpage, New York. (Tetra Tech February 2018).*

Sample Summary Per- and Polyfluoroalkyl Substances via Modified U.S. EPA Method 537				
Sample Delivery Group	Lab Identification	Sample Identification	Sample Date	Matrix/Sample Type
1800802	1800802-01	BP-TT-AOC22-MW10-20180424	4/24/2018	Groundwater
1800802	1800802-02	BP-HN-MW24S-20180424	4/24/2018	Groundwater
1800802	1800802-03	BPS1-TT-MW309S-20180425	4/25/2018	Groundwater
1800802	1800802-04	BPS1-TT-MW313S-20180425	4/25/2018	Groundwater
1800802	1800802-05	BPS1-TT-MW301S-20180425	4/25/2018	Groundwater
1800802	1800802-06	BP-DUP02-20180425	4/25/2018	Duplicate of BPS1-TT-MW309S-20180425
1800802	1800802-07	BP-EB01-20180425	4/25/2018	Equipment Blank
1800802	1800802-08	BPS1-TT-MW307I-20180426	4/26/2018	Groundwater
1800802	1800802-09	BPS1-TT-MW306S-20180426	4/26/2018	Groundwater
1800802	1800802-10	BPS1-TT-MW307D-20180426	4/26/2018	Groundwater
1800802	1800802-11	BPS1-TT-MW306I-20180426	4/26/2018	Groundwater
1800802	1800802-12	BPS1-TT-MW307S-20180426	4/26/2018	Groundwater
1800802	1800802-13	BPS1-TT-MW306D-20180426	4/26/2018	Groundwater
1800802	1800802-14	BPS1-TT-MW308I-20180426	4/26/2018	Groundwater
1800802	1800802-15	BPS1-TT-MW309I-20180426	4/26/2018	Groundwater
1800802	1800802-16	BPS1-DUP03-20180426	4/26/2018	Duplicate of BPS1-TT-MW307D-20180426
1800803	1800803-01	BPS1-TT-MW308S-20180426	4/26/2018	Groundwater
1800803	1800803-02	BPS1-TT-MW305D-20180427	4/27/2018	Groundwater
1800803	1800803-03	BPS1-TT-MW305S-20180427	4/27/2018	Groundwater

Sample Summary Per- and Polyfluoroalkyl Substances via Modified U.S. EPA Method 537				
Sample Delivery Group	Lab Identification	Sample Identification	Sample Date	Matrix/Sample Type
1800803	1800803-04	BP-HN-MW24IR-20180427	4/27/2018	Groundwater
1800803	1800803-05	BPS1-TT-MW305I-20180427	4/27/2018	Groundwater
1800803	1800803-06	BP-MH-SW4001-SOUTH-20180427	4/27/2018	Surface water
1800803	1800803-07	BP-TT-SW4002-20180427	4/27/2018	Surface water
1800803	1800803-08	BP-TT-SW4004-20180427	4/27/2018	Surface water
1800822	1800822-01	BPS1-TT-MW306D-FRB-20180426	4/26/2018	Groundwater
1800822	1800822-02	BPS1-TT-MW309S-FRB-20180425	4/25/2018	Groundwater
1800822	1800822-03	BP-TT-AOC22-MW10-FRB-20180424	4/24/2018	Groundwater
1800822	1800822-04	BP-TT-SW4004-FRB-20180427	4/27/2018	Surface water
1800824	1800824-01	BPS1-TT-MW309D-20180429	4/29/2018	Groundwater
1800824	1800824-02	BPS1-TT-MW301D-20180429	4/29/2018	Groundwater
1800824	1800824-03	BP-EB02-20180429	4/29/2018	Equipment Blank
1800824	1800824-04	BPS1-TT-MW311S-20180429	4/29/2018	Groundwater
1800824	1800824-05	BPS1-TT-MW312S-20180429	4/29/2018	Groundwater
1800824	1800824-06	BP-DUP05-20180429	4/29/2018	Duplicate of BPS1-TT-MW311S-20180429
1800824	1800824-07	BPS1-TT-MW310S-20180430	4/30/2018	Groundwater
1800824	1800824-08	BPS1-TT-MW301I-20180430	4/30/2018	Groundwater
1800824	1800824-09	BPS1-TT-MW314S-20180430	4/30/2018	Groundwater
1800824	1800824-10	BPS1-TT-MW314I-20180430	4/30/2018	Groundwater
1800824	1800824-11	BP-EB03-20180430	4/30/2018	Equipment Blank
1800824	1800824-12	BPS1-TT-MW308D-20180430	4/30/2018	Groundwater
1800859	1800859-01	BP-MH-SW4001-SOUTH-20180501	5/1/2018	Surface water
1800859	1800859-02	BP-TT-SW4002-20180501	5/1/2018	Surface water
1800859	1800859-03	BP-DUP06-20180501	5/1/2018	Duplicate of BP-MH-SW4001-SOUTH-20180501
1800859	1800859-04	BP-EB04-20180501	5/1/2018	Equipment Blank
1800860	1800860-01	BP-MH-SW4001-SOUTH-FRB-20180501	5/1/2018	Surface water

Data validation activities were conducted using the measurement performance criteria identified in the project UFP SAP and the following guidance documents: *General Data Validation Guidelines* (DoD 2018), *National Functional Guidelines for Superfund Organic Methods Data Review* (U.S. EPA January 2017), *Guidance for Labeling Externally Validated Laboratory Analytical Data for Superfund Use* (U.S. EPA January 2009), *Department of Defense (DoD) Quality Systems Manual for Environmental Laboratories*, Version 5.1 (DoD February 2017). In the absence of method-specific information, laboratory quality control (QC) limits, project-specific requirements, and/or professional judgment were used as appropriate.

REVIEW ELEMENTS

The data were evaluated based on the following parameters:

✓	Data completeness (chain-of-custody)/sample integrity
✓	Holding times and sample preservation
✓	Gas chromatography/mass spectrometer performance checks
✓	Ion transitions
✓	Initial calibration/initial calibration verification/continuing calibration verification
✓	Instrument sensitivity check
✓	Laboratory blanks/equipment blanks
✗	Extracted and injection internal standard analytes recoveries
✗	Matrix spike and/or matrix spike duplicate result
✓	Laboratory control sample /laboratory control sample duplicate result
✓	Field duplicate
✓	Sample results/reporting issues

The symbol (✓) indicates that no validation qualifiers were applied based on this parameter. Acceptable data parameters for which all criteria were met, no qualification was performed, and/or non-conformance or other issues that were noted during validation, but did not result in qualification of data are not discussed further. The symbol (✗) indicates that a QC non-conformance resulted in the qualification of data. Any QC non-conformance that resulted in the qualification of data is discussed below.

RESULTS

Extracted and Injection Internal Standard Analytes Recoveries

Internal standards are pure chemicals, structurally similar to the method analytes, which are added to each sample prior to extraction (extracted internal standard) or just prior to analysis (injection internal standard). The internal standard percent recoveries (%Rs) are used to measure the relative response of PFAS and extraction effectiveness. Extracted and injection internal standard %R non-conformances are summarized in Attachment A in Tables A-1 and A-2; respectively.

Data qualification on the basis of internal standard was as follows:

Internal Standard Non-Conformance Chart:

Criteria	Action		
	Detected	Non-Detected	Reason Code
$50\% \leq \%R \leq 150\%$	No qualification	No qualification	None
$\%R \geq 150\%$	J-	UJ	I10
$20\% \leq \%R \leq 50\%$	J+	No qualification	I9
$\%R \leq 20\%$	J+	X	I9

Notes:

ICAL = Initial calibration
 %R = Percent recovery
 UJ = Undetected and estimated
 I9 = Internal standard infraction, high bias
 X = Serious deficiency project team to decide data use

CCV = Continuing calibration verification
 J+ = Positive value estimated, high bias
 J- = Undetected value estimated, low bias
 I10 = Internal standard infraction, low bias

Matrix Spike/Matrix Spike Duplicate (MS/MSD) Results

MS/MSDs are generated to provide information about the effect of each sample matrix on the sample preparation and the measurement methodology. MS/MSD %Rs assess the effect of the sample matrix on the accuracy of the analytical results and %Rs above the control limit could indicate a potential high result bias while %Rs below QC limits could indicate a potential low result bias. The relative percent differences (RPDs) between the MS and MSD results are evaluated to assess sample precision. The MS/MSD %Rs and RPDs were reviewed for conformance with the QC acceptance criteria. Non-conformances are summarized in Attachment A in Table A-3. Data qualification to the analytes associated with the specific MS/MSD non-conformances were as follows:

MS/MSD Non-conformances Chart:

Criteria	Action		
	Detected	Non-detected	Reason Code
$\%R \geq 130\%$	J+	No qualification	M2
$\geq 70\% \leq \%R \leq 130\%$	No qualification	No qualification	None
$20\% \leq \%R \leq 70\%$	J-	UJ	M3
$\%R \leq 20\%$	J-	X	M3
$RPD \leq 30\%$	No qualification	No qualification	None
$RPD \geq 30\%$	J	UJ	M4

Notes:

%R = Percent recovery
 J+ = Positive value estimated, biased high
 J- = Undetected value estimated, low bias
 M2 = Percent recovery infraction, high bias
 M4 = Duplicate precision infraction

RPD = Relative percent difference
 UJ = Undetected and estimated
 X = Serious deficiency project team to decide data use
 M3 = Percent recovery infraction, low bias
 X = Serious deficiency; project team to decide data use

Qualification Actions

The data were reviewed independently from the laboratory to assess data quality. All analytes detected at concentrations less than the limit of quantitation but greater than the method detection limit were qualified by the laboratory as estimated (J). This "J" qualifier was retained during data validation. Any sample that was analyzed at a dilution because of high concentrations of target or non-target analytes was checked to confirm that the results and/or sample-specific limit of quantitation and limit of detections were adjusted accordingly by the laboratory.

No results were rejected; therefore, analytical completeness was calculated to be 100 percent. Data not qualified during data review are considered usable by the project. The remaining results qualified as estimated may be high or low, but the data are usable for their intended purpose, according to U.S. EPA and Department of Defense guidelines. Attachment B provides a summary of all qualified results during this data review.

ATTACHMENTS

Attachment A: Non-Conformance Summary Tables

Attachment B: Qualified Results Summary after Data Review

Attachment A
Non-Conformance Summary Tables

Table A-1 Extracted Internal Standard Recovery Non-Conformance							
SDG	Lab ID	Sample ID	Isotope	Associated Analyte	%R	Limits	Flags
1800824	1800824-10	BPS1-TT-MW314I-20180430	13C3-PFBS	Perfluorobutanesulfonic acid (PFBS)	153	50-150	J-
1800824	1800824-12	BPS1-TT-MW308D-20180430	13C3-PFBS	Perfluorobutanesulfonic acid (PFBS)	161	50-150	J-

Notes:

Results that are undetected with potential high bias were not qualified and are not summarized.

SDG = Sample delivery group

ID = Identification

%R = Percent recovery

J- = Result was qualified estimated and may be biased low.

Table A-2 Injected Internal Standard Recovery Non-Conformance							
SDG	Lab ID	Sample ID	Isotope	Associated Analyte	%R	Limits	Flags
1800802	1800802-05	PS1-TT-MW301S-20180425	13C8-PFOA	Perfluorooctanoic acid (PFOA)	49.9	50-150	J+
1800803	1800803-05	BPS1-TT-MW305I-20180427	13C9-PFNA	Perfluorononanoic acid (PFNA)	38.9	50-150	J+
1800803	1800803-05	BPS1-TT-MW305I-20180427	13C8-PFOA	Perfluorooctanoic acid (PFOA)	47.3	50-150	J+
1800803	1800803-06	BP-MH-SW4001-South-20180427	13C6-PFDA	Perfluorodecanoic acid (PFDA)	39.9	50-150	J+
1800803	1800803-06	BP-MH-SW4001-South-20180427	13C9-PFNA	Perfluorononanoic acid (PFNA)	45.1	50-150	J+
1800803	1800803-06	BP-MH-SW4001-South-20180427	13C8-PFOA	Perfluorooctanoic acid (PFOA)	44.2	50-150	J+
1800803	1800803-07	BP-TT-SW4002-20180427	13C8-PFOA	Perfluorooctanoic acid (PFOA)	47.8	50-150	J+
1800824	1800824-05	BPS1-TT-MW312S-20180429	13C4-PFBA	Perfluorobutanoic Acid (PFBA)	48.2	50-150	J+
1800824	1800824-05	BPS1-TT-MW312S-20180429	13C5-PFHxA	Perfluorohexanoic acid (PFHXA)	49	50-150	J+
1800824	1800824-05	BPS1-TT-MW312S-20180429	13C8-PFOA	Perfluorooctanoic acid (PFOA)	47.8	50-150	J+
1800824	1800824-06	BP-DUP05-20180429	13C8-PFOA	Perfluorooctanoic acid (PFOA)	49.3	50-150	J+
1800824	1800824-07	BPS1-TT-MW310S-20180430	13C4-PFBA	Perfluorobutanoic Acid (PFBA)	49	50-150	J+
1800824	1800824-07	BPS1-TT-MW310S-20180430	13C5-PFHxA	Perfluorohexanoic acid (PFHXA)	47.7	50-150	J+
1800824	1800824-07	BPS1-TT-MW310S-20180430	13C9-PFNA	Perfluorononanoic acid (PFNA)	49.9	50-150	J+
1800824	1800824-07	BPS1-TT-MW310S-20180430	13C8-PFOA	Perfluorooctanoic acid (PFOA)	45	50-150	J+
1800824	1800824-08	BPS1-TT-MW301I-20180430	13C4-PFBA	Perfluorobutanoic Acid (PFBA)	45	50-150	J+
1800824	1800824-08	BPS1-TT-MW301I-20180430	13C6-PFDA	Perfluorodecanoic acid (PFDA)	44.1	50-150	J+
1800824	1800824-08	BPS1-TT-MW301I-20180430	13C5-PFHxA	Perfluorohexanoic acid (PFHXA)	47.7	50-150	J+
1800824	1800824-08	BPS1-TT-MW301I-20180430	13C9-PFNA	Perfluorononanoic acid (PFNA)	42.9	50-150	J+
1800824	1800824-08	BPS1-TT-MW301I-20180430	13C8-PFOA	Perfluorooctanoic acid (PFOA)	46.4	50-150	J+
1800824	1800824-09	BPS1-TT-MW314S-20180430	13C4-PFBA	Perfluorobutanoic Acid (PFBA)	49.8	50-150	J+

Table A-2 Injected Internal Standard Recovery Non-Conformance							
SDG	Lab ID	Sample ID	Isotope	Associated Analyte	%R	Limits	Flags
1800824	1800824-09	BPS1-TT-MW314S-20180430	13C5-PFHxA	Perfluorohexanoic acid (PFHXA)	48.9	50-150	J+
1800824	1800824-10	BPS1-TT-MW314I-20180430	13C4-PFBA	Perfluorobutanoic Acid (PFBA)	35.4	50-150	J+
1800824	1800824-10	BPS1-TT-MW314I-20180430	13C6-PFDA	Perfluorodecanoic acid (PFDA)	37	50-150	J+
1800824	1800824-10	BPS1-TT-MW314I-20180430	13C5-PFHxA	Perfluorohexanoic acid (PFHXA)	39.8	50-150	J+
1800824	1800824-10	BPS1-TT-MW314I-20180430	13C9-PFNA	Perfluorononanoic acid (PFNA)	44.2	50-150	J+
1800824	1800824-10	BPS1-TT-MW314I-20180430	13C8-PFOA	Perfluorooctanoic acid (PFOA)	38.7	50-150	J+
1800824	1800824-10	BPS1-TT-MW314I-20180430	13C7-PFUDa	Perfluoroundecanoic acid (PFUNA)	35	50-150	J+
1800824	1800824-12	BPS1-TT-MW308D-20180430	13C4-PFBA	Perfluorobutanoic Acid (PFBA)	19.9	50-150	J+
1800824	1800824-12	BPS1-TT-MW308D-20180430	13C6-PFDA	Perfluorodecanoic acid (PFDA)	38.9	50-150	J+
1800824	1800824-12	BPS1-TT-MW308D-20180430	13C9-PFNA	Perfluorononanoic acid (PFNA)	42.7	50-150	J+
1800824	1800824-12	BPS1-TT-MW308D-20180430	13C8-PFOA	Perfluorooctanoic acid (PFOA)	41.6	50-150	J+

Notes:

Results that are undetected with potential high bias were not qualified and are not summarized.

SDG = Sample delivery group

ID = Identification

%R = Percent recovery

J+ = Result was qualified estimated and may be biased high.

Table A-3 Matrix Spike/Matrix Spike Duplicate Non-Conformance									
SDG	Lab ID	Spiked Sample	Analyte	MS %R	MSD %R	%R Limits	RPD	RPD Limits	Flags
1800802	1800802-02	BP-HN-MW24S-20180424	Perfluorooctanoic acid (PFOA)	74.8	115	70-130	42.4*	<30	J
1800824	1800824-05	BPS1-TT-MW312S-20180429	Perfluorooctane sulfonic acid (PFOS)	119	131*	70-130	9.6	<30	J+
1800824	1800824-05	BPS1-TT-MW312S-20180429	Perfluorohexanoic acid (PFHXA)	110	139*	70-130	23.3	<30	J+
1800824	1800824-05	BPS1-TT-MW312S-20180429	Perfluorodecanoic acid (PFDA)	87.8	120	70-130	31*	<30	J

Notes:

Results that are undetected with potential high bias were not qualified and are not summarized.

SDG = Sample delivery group

ID = Identification

%R = Percent recovery

RPD = Relative percent difference

* = Outside control limits

J+ = Result was qualified estimated and may be biased high.

J = Result was qualified as estimated due to potential poor precision.

Attachment B
Qualified Results Summary after Data Review

Table B-1
Qualified Results Summary after Data Review

SDG	Lab ID	Sample ID	Sample Date	CAS No	Analyte	Result (ng/L)	Lab Qualifier	Final Qualifier	Reason Code
1800802	1800802-02	BP-HN-MW24S-20180424	4/24/2018	335-67-1	Perfluorooctanoic acid (PFOA)	96.2		J	M4
1800802	1800802-05	BPS1-TT-MW301S-20180425	4/25/2018	335-67-1	Perfluorooctanoic acid (PFOA)	4.73		J+	I9
1800803	1800803-05	BPS1-TT-MW305I-20180427	4/27/2018	375-95-1	Perfluorononanoic acid (PFNA)	1.84	J	J+	I9
1800803	1800803-05	BPS1-TT-MW305I-20180427	4/27/2018	335-67-1	Perfluorooctanoic acid (PFOA)	16.2		J+	I9
1800803	1800803-06	BP-MH-SW4001-SOUTH-20180427	4/27/2018	335-76-2	Perfluorodecanoic acid (PFDA)	1.56	J	J+	I9
1800803	1800803-06	BP-MH-SW4001-SOUTH-20180427	4/27/2018	375-95-1	Perfluorononanoic acid (PFNA)	9.66		J+	I9
1800803	1800803-06	BP-MH-SW4001-SOUTH-20180427	4/27/2018	335-67-1	Perfluorooctanoic acid (PFOA)	20.7		J+	I9
1800803	1800803-07	BP-TT-SW4002-20180427	4/27/2018	335-67-1	Perfluorooctanoic acid (PFOA)	4.21		J+	I9
1800824	1800824-05	BPS1-TT-MW312S-20180429	4/29/2018	375-22-4	Perfluorobutanoic acid (PFBA)	14.5		J+	I9
1800824	1800824-05	BPS1-TT-MW312S-20180429	4/29/2018	335-76-2	Perfluorodecanoic acid (PFDA)	2.45	U	UJ	M4
1800824	1800824-05	BPS1-TT-MW312S-20180429	4/29/2018	307-24-4	Perfluorohexanoic acid (PFHXA)	21		J+	M2,I9
1800824	1800824-05	BPS1-TT-MW312S-20180429	4/29/2018	1763-23-1	Perfluorooctane sulfonic acid (PFOS)	3.72	J	J+	M2
1800824	1800824-05	BPS1-TT-MW312S-20180429	4/29/2018	335-67-1	Perfluorooctanoic acid (PFOA)	26		J+	I9
1800824	1800824-06	BP-DUP05-20180429	4/29/2018	335-67-1	Perfluorooctanoic acid (PFOA)	11.6		J+	I9
1800824	1800824-07	BPS1-TT-MW310S-20180430	4/30/2018	375-22-4	Perfluorobutanoic acid (PFBA)	10.8		J+	I9
1800824	1800824-07	BPS1-TT-MW310S-20180430	4/30/2018	307-24-4	Perfluorohexanoic acid (PFHXA)	10.8		J+	I9
1800824	1800824-07	BPS1-TT-MW310S-20180430	4/30/2018	375-95-1	Perfluorononanoic acid (PFNA)	6.84		J+	I9
1800824	1800824-07	BPS1-TT-MW310S-20180430	4/30/2018	335-67-1	Perfluorooctanoic acid (PFOA)	30.1		J+	I9
1800824	1800824-08	BPS1-TT-MW301I-20180430	4/30/2018	375-22-4	Perfluorobutanoic acid (PFBA)	4.48		J+	I9
1800824	1800824-08	BPS1-TT-MW301I-20180430	4/30/2018	335-76-2	Perfluorodecanoic acid (PFDA)	1.56	J	J+	I9
1800824	1800824-08	BPS1-TT-MW301I-20180430	4/30/2018	307-24-4	Perfluorohexanoic acid (PFHXA)	7.94		J+	I9
1800824	1800824-08	BPS1-TT-MW301I-20180430	4/30/2018	375-95-1	Perfluorononanoic acid (PFNA)	2.5	J	J+	I9
1800824	1800824-08	BPS1-TT-MW301I-20180430	4/30/2018	335-67-1	Perfluorooctanoic acid (PFOA)	6.31		J+	I9
1800824	1800824-09	BPS1-TT-MW314S-20180430	4/30/2018	375-22-4	Perfluorobutanoic acid (PFBA)	7.6		J+	I9
1800824	1800824-09	BPS1-TT-MW314S-20180430	4/30/2018	307-24-4	Perfluorohexanoic acid (PFHXA)	16.3		J+	I9
1800824	1800824-10	BPS1-TT-MW314I-20180430	4/30/2018	375-73-5	Perfluorobutanesulfonic acid (PFBS)	1.63	J	J-	I10
1800824	1800824-10	BPS1-TT-MW314I-20180430	4/30/2018	375-22-4	Perfluorobutanoic acid (PFBA)	16.7		J+	I9
1800824	1800824-10	BPS1-TT-MW314I-20180430	4/30/2018	335-76-2	Perfluorodecanoic acid (PFDA)	2.81	J	J+	I9
1800824	1800824-10	BPS1-TT-MW314I-20180430	4/30/2018	307-24-4	Perfluorohexanoic acid (PFHXA)	35		J+	I9
1800824	1800824-10	BPS1-TT-MW314I-20180430	4/30/2018	375-95-1	Perfluorononanoic acid (PFNA)	10		J+	I9
1800824	1800824-10	BPS1-TT-MW314I-20180430	4/30/2018	335-67-1	Perfluorooctanoic acid (PFOA)	16.8		J+	I9
1800824	1800824-10	BPS1-TT-MW314I-20180430	4/30/2018	2058-94-8	Perfluoroundecanoic acid (PFUNA)	2.14	J	J+	I9
1800824	1800824-12	BPS1-TT-MW308D-20180430	4/30/2018	375-73-5	Perfluorobutanesulfonic acid (PFBS)	2.42	U	UJ	I10
1800824	1800824-12	BPS1-TT-MW308D-20180430	4/30/2018	375-22-4	Perfluorobutanoic acid (PFBA)	21.3		J+	I9
1800824	1800824-12	BPS1-TT-MW308D-20180430	4/30/2018	335-76-2	Perfluorodecanoic acid (PFDA)	3.91		J+	I9

Table B-1
Qualified Results Summary after Data Review

SDG	Lab ID	Sample ID	Sample Date	CAS No	Analyte	Result (ng/L)	Lab Qualifier	Final Qualifier	Reason Code
1800824	1800824-12	BPS1-TT-MW308D-20180430	4/30/2018	375-95-1	Perfluorononanoic acid (PFNA)	4.34		J+	I9
1800824	1800824-12	BPS1-TT-MW308D-20180430	4/30/2018	335-67-1	Perfluorooctanoic acid (PFOA)	16.1		J+	I9

Notes:

SDG = Sample delivery group

ID = Identification

CAS No. = Chemical Abstracts Services number

ng/L = Nanograms liter

U = **Undetected** — The analyte was analyzed but undetected at the listed limit of detection.

UJ = Undetected and estimated

J = **Estimated Value** — One or more quality control parameters were outside control limits or the analyte concentration was less than the limit of quantitation.

J+ = Positive value estimated with potential high bias

J- = Undetected value estimated with potential low bias

Qualification Reason Codes:

I9 = Internal standard infraction with potential high bias

I10 = Internal standard infraction with potential low bias

M2 = Percent recovery infraction with potential high bias

M4 = Duplicate precision infraction

DODCMD_ID	INSTALLATION_ID	SDG	SITE_NAME	NORM_SITE_NAME	LOCATION_NAME	LOCATION_TYPE_DESC	COORD_X	COORD_Y	CONTRACT_ID	DO_CTO_NUMBER	CONTR_NAME	SAMPLE_NAME	SAMPLE_MATRIX_DESC	SAMPLE_TYPE_DESC	COLLECT_DATE	ANALYTICAL_METHOD	ANALYTICAL_METHOD_GRP_DESC
MID_ATLANTIC	BETHPAGE_NWIRP	1800859	SITE 00001	SITE 00001	BP-MH-SW4001	Surface water body - nonspecific	1125361.861	215372.779	N6247016D9008	WE09	TETRA TECH NUS, INC.	BP-MH-SW4001-SOUTH-20180501	Surface water	Normal (Regular)	1-May-18	537_MOD	Perfluoroalkyl Compounds
MID_ATLANTIC	BETHPAGE_NWIRP	1800859	SITE 00001	SITE 00001	BP-MH-SW4001	Surface water body - nonspecific	1125361.861	215372.779	N6247016D9008	WE09	TETRA TECH NUS, INC.	BP-MH-SW4001-SOUTH-20180501-D	Surface water	Field duplicate	1-May-18	537_MOD	Perfluoroalkyl Compounds
MID_ATLANTIC	BETHPAGE_NWIRP	1800859	SITE 00001	SITE 00001	BP-TT-SW4002	Surface water body - nonspecific	1125242.847	215038.8825	N6247016D9008	WE09	TETRA TECH NUS, INC.	BP-TT-SW4002-20180501	Surface water	Normal (Regular)	1-May-18	537_MOD	Perfluoroalkyl Compounds
MID_ATLANTIC	BETHPAGE_NWIRP	1800859							N6247016D9008	WE09	TETRA TECH NUS, INC.	BP-EB04-20180501	Water for QC samples	Equipment blank	1-May-18	537_MOD	Perfluoroalkyl Compounds