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NAVFAC
Naval Facilities Engineering Command

Groundwater Sample Results, Level 4 Laboratory Report, and Data Validation Report, SDG K1602709

Naval Air Warfare Center Weapons Division China Lake
China Lake, California

November 2019

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April 14, 2016

Analytical Report for Service Request No: K1602709

Karin Kaiser
Kleinfelder/Gwen Vineyard
550 West C Street, Suite 1200
San Diego, CA 92101

RE: CCTO-067 - China Lake

Dear Karin,

Enclosed are the results of the sample(s) submitted to our laboratory March 17, 2016
For your reference, these analyses have been assigned our service request number **K1602709.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3376. You may also contact me via email at gregory.salata@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Gregory Salata, Ph.D.
Senior Project
Manager

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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEC UST	http://dec.alaska.gov/applications/eh/ehllabreports/USTLabs.aspx	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	Not available	-
Idaho DHW	http://www.healthandwelfare.idaho.gov/Health/Labs/CertificationDrinkingWaterLabs/tabid/1833/Default.aspx	-
ISO 17025	http://www.pjlabs.com/	L14-50
Louisiana DEQ	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	03016
Maine DHS	Not available	WA01276
Michigan DEQ	http://www.michigan.gov/deq/0,1607,7-135-3307_4131_4156---,00.html	9949
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Montana DPHHS	http://www.dphhs.mt.gov/publichealth/	CERT0047
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/oqa/	WA005
North Carolina DWQ	http://www.dwqlab.org/	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/envserv/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wisconsin DNR	http://dnr.wi.gov/	998386840
Wyoming (EPA Region 8)	http://www.epa.gov/region8/water/dwhome/wyomingdi.html	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Case Narrative

ALS Environmental—Kelso Laboratory
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www.alsglobal.com

ALS ENVIRONMENTAL

Client:	Kleinfelder	**Service Request No.:**	K1602709
Project:	CCTO-067 - China Lake	**Date Received:**	03/17/16
Sample Matrix:	Water		

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier IV validation deliverables including summary forms and all of the associated raw data for each of the analyses. When appropriate to the method, method blank results have been reported with each analytical test.

Sample Receipt

One water sample was received for analysis at ALS Environmental on 03/17/16. The sample was received in good condition and consistent with the accompanying chain of custody form. The sample was stored in a refrigerator at 4ºC upon receipt at the laboratory.

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Sample Notes and Discussion:
Manual integration of one or more chromatographic peaks was required to correct the integration performed by the automated data processing program. The manual integration was performed in accordance with ALS policy, which is consistent with the National Environmental Laboratory Accreditation Program (NELAP), Department of Defense (DOD), and other certifying agencies. The analytes that required manual integrations are identified on each sample report contained in this data package.

No other anomalies associated with the analysis of this sample were observed.

Approved by_____

Chain of Custody

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Chain of Custody Form

COC# 067-3/15
Page 1 of 1

NAWS China Lake,Groundwater and Soil Investigations,CTO 067	Sampler: Bill Bergeron	
Project Chemist: Karin Kaiser	Sampler Phone: 781-572 4574	Date: 3/15
Contact: kkaiser@kleinfelder.com; 720-612-0485	Signature:	

Analytical Laboratory ALS-KELSO 1317 South 13th Avenue Kelso, WA 98626 (360) 577-7222 Attn: Greg Salata	28-day LIV package & EQuIS LOD/LOQ EFWEDD Deliver data to kkaiser@kleinfelder.com & gkellar@kleinfelder.com	**General Comments:** P=Preserved; U=Unpreserved; FP=Filtered/Preserved

Sample ID	Location ID	Sample Matrix	Sample Date	Sample Time	# Containers	PFOA/PFOS/PFBS-LC/MS/MS	Sample Comments
KCH067-042	SWB	W	3/15/16	1440	2	U	
KCH067-							
KCH067-							
KCH067-				3/15/16			
KCH067-							
KCH067-							
KCH067-							
KCH067-							

Sample Transport:
Lab Courier ☐
Shipping Company: FEDEX

Sample Disposal
Disposal by Lab - 60 day retention
Tracking # 8092-1486-5607

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Bill Bergeron	3/16/16	~~1615~~ 1815		3/17/16	1020
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

PC_____

Cooler Receipt and Preservation Form

Client KCH Service Request K16

Received: 3/17/16 Opened: 3/17/16 By: UL Unloaded: 3/17/16 By: UL

1. Samples were received via? *Mail* (*Fed Ex*) *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) (*Cooler*) *Box* *Envelope* *Other*_____ *NA*
3. Were custody seals on coolers? NA (Y) N If yes, how many and where? 2 front
   If present, were custody seals intact? (Y) N If present, were they signed and dated? (Y) N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
-0.2	-0.3	1.1	1.0	-0.1	308		7826 0761 9726	

4. Packing material: *Inserts* (*Baggies*) *Bubble Wrap* *Gel Packs* (*Wet Ice*) *Dry Ice* *Sleeves*
5. Were custody papers properly filled out (ink, signed, etc.)? NA (Y) N
6. Did all bottles arrive in good condition (unbroken)? *Indicate in the table below.* NA (Y) N
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA (Y) N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y (N)
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA (Y) N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* (NA) Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* (NA) Y N
12. Was C12/Res negative? (NA) Y N

Sample ID on Bottle	Sample ID on COC	Identified by:
KCH067-041	KCH067-042	

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: ~~Received 1 blank not listed on the COC.~~ UL 3/17/16

*Page*____ *of*____

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

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Analytical Report

Client:	Kleinfelder	**Service Request:**	K1602709
Project:	CCTO-067 - China Lake	**Date Collected:**	03/15/16 14:40
Sample Matrix:	Water	**Date Received:**	03/17/16 10:20
Sample Name:	KCH067-042	**Units:**	ng/L
Lab Code:	K1602709-001	**Basis:**	NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result		LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluorobutane Sulfonate	ND	U	4.3	1.2	0.41	1	03/30/16 16:11	3/28/16	
Perfluorooctanoic Acid	**0.39**	**J**	4.3	0.80	0.27	1	03/30/16 16:11	3/28/16	
Perfluorooctane Sulfonate	ND	U	4.3	1.2	0.60	1	03/30/16 16:11	3/28/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Sodium perfluoro-1-hexane[18O2]sulfonate	84	20 - 128	03/30/16 16:11	
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	88	13 - 142	03/30/16 16:11	
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate	87	11 - 131	03/30/16 16:11	

Analytical Report

Client:	Kleinfelder	**Service Request:**	K1602709
Project:	CCTO-067 - China Lake	**Date Collected:**	NA
Sample Matrix:	Water	**Date Received:**	NA
Sample Name:	Method Blank	**Units:**	ng/L
Lab Code:	KQ1602838-04	**Basis:**	NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result		LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluorobutane Sulfonate	ND	U	5.0	1.2	0.41	1	03/30/16 15:33	3/28/16	
Perfluorooctanoic Acid	**0.35**	**J**	5.0	0.80	0.27	1	03/30/16 15:33	3/28/16	
Perfluorooctane Sulfonate	ND	U	5.0	1.2	0.60	1	03/30/16 15:33	3/28/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Sodium perfluoro-1-hexane[18O2]sulfonate	56	20 - 128	03/30/16 15:33	
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	72	13 - 142	03/30/16 15:33	
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate	62	11 - 131	03/30/16 15:33	

Client: Kleinfelder **Service Request:** K1602709

Project: CCTO-067 - China Lake

Sample Matrix: Water

SURROGATE RECOVERY SUMMARY

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M

Extraction Method: EPA 3535A

Sample Name	Lab Code	Sodium perfluoro-1-hexane [18O2]sulfonate 20 - 128	Perfluoro-n-[1,2,3,4-13C4] octanoic acid 13 - 142	Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate 11 - 131
KCH067-042	K1602709-001	84	88	87
Batch QC	K1602748-007	72	77	72
Batch QC	KQ1602838-01	67	70	68
Batch QC	KQ1602838-02	78	81	78
Lab Control Sample	KQ1602838-03	69	74	71
Method Blank	KQ1602838-04	56	72	62

Client: Kleinfelder **Service Request:** K1602709
Project: CCTO-067 - China Lake **Date Analyzed:** 03/30/16 14:54

Internal Standard Area and RT SUMMARY

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

File ID: 033016\1019.wiff **Lab Code:** KQ1603023-01
Instrument ID: K-LCMS-02 **Analysis Lot:** 490080
Analysis Method: PFC/537M **Signal ID:** 1

		N-methyl-d3-perfluoro-1-octanesulfonamide	
		Area	**RT**
	Results ==>	643,956	10.8
	Upper Limit ==>	965,934	11.80
	Lower Limit ==>	321,978	9.80
	ICAL Result ==>		
Associated Analyses			
Method Blank	KQ1602838-04	784449.00	10.8
Lab Control Sample	KQ1602838-03	803045.41	10.8
KCH067-042	K1602709-001	718306.39	10.8

Client: Kleinfelder **Service Request:** K1602709
Project: CCTO-067 - China Lake **Date Analyzed:** 03/30/16 14:54

Internal Standard Area and RT SUMMARY

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

File ID: 033016\1031.wiff **Lab Code:** KQ1603023-02
Instrument ID: K-LCMS-02 **Analysis Lot:** 490080
Analysis Method: PFC/537M **Signal ID:** 1

		N-methyl-d3-perfluoro-1-octanesulfonamide	
		Area	**RT**
	Results ==>	643,956	10.8
	Upper Limit ==>	965,934	11.80
	Lower Limit ==>	321,978	9.80
	ICAL Result ==>		
Associated Analyses			
Batch QCDMS	KQ1602838-02	787792.36	10.8
Batch QCMS	KQ1602838-01	905086.46	10.8
Batch QC	K1602748-007	872125.85	10.8

Client:	Kleinfelder	**Service Request:**	K1602709
Project:	CCTO-067 - China Lake	**Date Collected:**	N/A
Sample Matrix:	Water	**Date Received:**	N/A
		Date Analyzed:	03/30/16
		Date Extracted:	03/28/16

Duplicate Matrix Spike Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Sample Name:	Batch QC	**Units:**	ng/L
Lab Code:	K1602748-007	**Basis:**	NA
Analysis Method:	PFC/537M		
Prep Method:	EPA 3535A		

		Matrix Spike KQ1602838-01			Duplicate Matrix Spike KQ1602838-02					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Perfluorobutane Sulfonate	5.7 J	147	138	102	134	138	93	70-127	9	30
Perfluorooctane Sulfonate	4.7 J	134	138	94	122	138	85	74-135	9	30
Perfluorooctanoic Acid	4.9 J	139	138	97	132	138	92	72-130	5	30

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

Client:	Kleinfelder	**Service Request:**	K1602709
Project:	CCTO-067 - China Lake	**Date Analyzed:**	03/30/16
Sample Matrix:	Water	**Date Extracted:**	03/28/16

Lab Control Sample Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method:	PFC/537M	**Units:**	ng/L
Prep Method:	EPA 3535A	**Basis:**	NA
		Analysis Lot:	490080

Lab Control Sample
KQ1602838-03

Analyte Name	Result	Spike Amount	% Rec	% Rec Limits
Perfluorobutane Sulfonate	156	160	97	70-127
Perfluorooctane Sulfonate	160	160	100	74-135
Perfluorooctanoic Acid	158	160	99	72-130

Client: Kleinfelder
Project: CCTO-067 - China Lake
Sample Matrix: Water

Service Request:K1602709
Date Analyzed:03/30/16 15:33
Date Extracted:03/28/16

Method Blank Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Sample Name: Method Blank
Lab Code: KQ1602838-04

Instrument ID:K-LCMS-02
File ID:033016\1021.wiff

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analysis Lot:490080
Extraction Lot:258211

This Method Blank applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Lab Control Sample	KQ1602838-03	033016\1022.wiff	03/30/16 15:52
KCH067-042	K1602709-001	033016\1023.wiff	03/30/16 16:11
Batch QC	KQ1602838-02	033016\1033.wiff	03/30/16 19:25
Batch QC	KQ1602838-01	033016\1034.wiff	03/30/16 19:44
Batch QC	K1602748-007	033016\1035.wiff	03/30/16 20:03

Client: Kleinfelder **Service Request:**K1602709
Project: CCTO-067 - China Lake **Date Analyzed:**03/30/16 15:52
Sample Matrix: Water **Date Extracted:**03/28/16

Lab Control Sample Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Sample Name: Lab Control Sample **Instrument ID:**K-LCMS-02
Lab Code: KQ1602838-03 **File ID:**033016\1022.wiff

Analysis Method: PFC/537M **Analysis Lot:**490080
Prep Method: EPA 3535A **Extraction Lot:**258211

This Lab Control Sample applies to the following analyses.

Sample Name	Lab Code	File ID	Date Analyzed
Method Blank	KQ1602838-04	033016\1021.wiff	03/30/16 15:33
KCH067-042	K1602709-001	033016\1023.wiff	03/30/16 16:11
Batch QC	KQ1602838-02	033016\1033.wiff	03/30/16 19:25
Batch QC	KQ1602838-01	033016\1034.wiff	03/30/16 19:44
Batch QC	K1602748-007	033016\1035.wiff	03/30/16 20:03

Client: Kleinfelder **Service Request:** K1602709
Project: CCTO-067 - China Lake **Calibration Date:** 3/30/2016

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1600038 **Signal ID:** 1
Instrument ID: K-LCMS-02

#	Lab Code	Sample Name	File Location	Aquisition Date
01	KC1600038-01	PFC 0.02ppb	033016\1008.wiff	03/30/2016 11:22
02	KC1600038-02	PFC 0.05ppb	033016\1009.wiff	03/30/2016 11:41
03	KC1600038-03	PFC 0.10ppb	033016\1010.wiff	03/30/2016 12:00
04	KC1600038-04	PFC 0.25ppb	033016\1011.wiff	03/30/2016 12:20
05	KC1600038-05	PFC 0.50ppb	033016\1012.wiff	03/30/2016 12:39
06	KC1600038-06	PFC 1.0ppb	033016\1013.wiff	03/30/2016 12:58
07	KC1600038-07	PFC 5.0ppb	033016\1014.wiff	03/30/2016 13:18
08	KC1600038-08	PFC 10ppb	033016\1015.wiff	03/30/2016 13:37
09	KC1600038-09	PFC 20ppb	033016\1016.wiff	03/30/2016 13:56
10	KC1600038-10	PFC 50ppb	033016\1017.wiff	03/30/2016 14:16

Analyte **Curve Fit** **Weighting**

Perfluorobutane Sulfonate **Average RF** **RSD = 10.30** **Control Criteria ≤** **Average RF = 3.759**

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.0200	3.99	02	0.0500	4.078	03	0.100	3.498	04	0.250	3.824
05	0.500	3.561	06	1.00	3.905	07	5.00	3.555	08	10.0	3.608
09	20.0	3.079	10	50.0	4.49						

Perfluorooctanoic Acid **Average RF** **RSD = 9.52** **Control Criteria ≤** **Average RF = 0.540**

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
02	0.0500	0.6107	03	0.100	0.5487	04	0.250	0.557	05	0.500	0.5337
06	1.00	0.5949	07	5.00	0.5145	08	10.0	0.5121	09	20.0	0.4471

Perfluorooctane Sulfonate **Average RF** **RSD = 8.35** **Control Criteria ≤** **Average RF = 0.882**

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	0.0200	0.9971	02	0.0500	0.9358	03	0.100	0.873	04	0.250	0.8589
05	0.500	0.8327	06	1.00	0.9504	07	5.00	0.8712	08	10.0	0.879
09	20.0	0.7425									

Sodium perfluoro-1-hexane[18O2]sulfonate **Average RF** **RSD = 10.37** **Control Criteria ≤** **Average RF = 1.985**

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5.00	1.851	02	5.00	2.293	03	5.00	1.948	04	5.00	1.93
05	5.00	2.139	06	5.00	2.128	07	5.00	2.232	08	5.00	1.864
09	5.00	1.819	10	5.00	1.644						

Perfluoro-n-[1,2,3,4-13C4] octanoic acid **Average RF** **RSD = 11.21** **Control Criteria ≤** **Average RF = 3.339**

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF
01	5.00	3.182	02	5.00	3.927	03	5.00	3.291	04	5.00	3.482
05	5.00	3.535	06	5.00	3.492	07	5.00	3.695	08	5.00	3.197
09	5.00	2.983	10	5.00	2.608						

Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate **Average RF** **RSD = 11.67** **Control Criteria ≤** **Average RF = 4.859**

#	Amount	RF	#	Amount	RF	#	Amount	RF	#	Amount	RF

Client: Kleinfelder **Service Request:** K1602709
Project: CCTO-067 - China Lake **Calibration Date:** 3/30/2016

Initial Calibration Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1600038 **Signal ID:** 1
Instrument ID: K-LCMS-02

Analyte			Curve Fit			Weighting					
01	5.00	4.684	02	5.00	5.687	03	5.00	4.646	04	5.00	4.95
05	5.00	5.265	06	5.00	5.324	07	5.00	5.364	08	5.00	4.44
09	5.00	4.429	10	5.00	3.798						

Client: Kleinfelder **Service Request:** K1602709
Project: CCTO-067 - China Lake **Calibration Date:** 3/30/2016

Initial Calibration Verification Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Calibration ID: KC1600038 **Signal ID:** 1
Instrument ID: K-LCMS-02

#	Lab Code	Sample Name	File Location	Aquisition Date
11	KC1600038-11	PFC 2ppb ICV	033016\1019.wiff	03/30/2016 14:54

Analyte Name	Expected	Result	Average RF	SSV RF	% D	Criteria	Curve Fit
Perfluorobutane Sulfonate	2.00	2.27	3.759	4.274	13.71	±25	Average RF
Perfluorooctanoic Acid	2.00	2.25	0.540	0.607	12.39	±25	Average RF
Perfluorooctane Sulfonate	2.00	2.34	0.882	1.034	17.20	±25	Average RF
Sodium perfluoro-1-hexane[18O2]sulfonate	5.00	5.36	1.985	2.126	7.12	±25	Average RF
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	5.00	5.47	3.339	3.653	9.38	±25	Average RF
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate	5.00	5.31	4.859	5.160	6.19	±25	Average RF

Client: Kleinfelder
Project: CCTO-067 - China Lake

Service Request: K1602709
Date Analyzed: 03/30/16 14:54

Continuing Calibration Verification (CCV) Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
File ID: 033016\1019.wiff

Calibration Date: 3/30/2016 12:00:00 AM
Calibration ID: KC1600038
Analysis Lot: 490080
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
Perfluorobutane Sulfonate	2.00	2.27	3.759	4.274	13.7	NA	±25	Average RF
Perfluorooctanoic Acid	2.00	2.25	0.540	0.607	12.4	NA	±25	Average RF
Perfluorooctane Sulfonate	2.00	2.34	0.882	1.034	17.2	NA	±25	Average RF
Sodium perfluoro-1-hexane[18O2] sulfonate	5.00	5.36	1.985	2.126	7.1	NA	±25	Average RF
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	5.00	5.47	3.339	3.653	9.4	NA	±25	Average RF
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate	5.00	5.31	4.859	5.160	6.2	NA	±25	Average RF

Client: Kleinfelder
Project: CCTO-067 - China Lake

Service Request: K1602709
Date Analyzed: 03/30/16 18:46

Continuing Calibration Verification (CCV) Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
File ID: 033016\1031.wiff

Calibration Date: 3/30/2016 12:00:00 AM
Calibration ID: KC1600038
Analysis Lot: 490080
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
Perfluorobutane Sulfonate	1.00	1.08	3.759	4.068	8.2	NA	±25	Average RF
Perfluorooctanoic Acid	1.00	1.07	0.540	0.579	7.2	NA	±25	Average RF
Perfluorooctane Sulfonate	1.00	1.08	0.882	0.953	8.1	NA	±25	Average RF
Sodium perfluoro-1-hexane[18O2] sulfonate	5.00	5.31	1.985	2.109	6.3	NA	±25	Average RF
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	5.00	5.41	3.339	3.612	8.2	NA	±25	Average RF
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate	5.00	5.57	4.859	5.415	11.5	NA	±25	Average RF

Client: Kleinfelder
Project: CCTO-067 - China Lake

Service Request: K1602709
Date Analyzed: 03/30/16 22:38

Continuing Calibration Verification (CCV) Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
File ID: 033016\1043.wiff

Calibration Date: 3/30/2016 12:00:00 AM
Calibration ID: KC1600038
Analysis Lot: 490080
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
Perfluorobutane Sulfonate	1.00	1.07	3.759	4.031	7.2	NA	±25	Average RF
Perfluorooctanoic Acid	1.00	1.13	0.540	0.611	13.2	NA	±25	Average RF
Perfluorooctane Sulfonate	1.00	1.05	0.882	0.922	4.6	NA	±25	Average RF
Sodium perfluoro-1-hexane[18O2] sulfonate	5.00	5.60	1.985	2.224	12.0	NA	±25	Average RF
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	5.00	5.24	3.339	3.499	4.8	NA	±25	Average RF
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate	5.00	5.57	4.859	5.410	11.3	NA	±25	Average RF

Client: Kleinfelder
Project: CCTO-067 - China Lake

Service Request: K1602709
Date Analyzed: 03/31/16 00:34

Continuing Calibration Verification (CCV) Summary
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
File ID: 033016\1049.wiff

Calibration Date: 3/30/2016 12:00:00 AM
Calibration ID: KC1600038
Analysis Lot: 490080
Units: ng/mL

Analyte Name	Expected	Result	Average RF	CCV RF	% D	% Drift	Criteria	Curve Fit
Perfluorobutane Sulfonate	1.00	1.09	3.759	4.085	8.7	NA	±25	Average RF
Perfluorooctanoic Acid	1.00	1.12	0.540	0.605	12.1	NA	±25	Average RF
Perfluorooctane Sulfonate	1.00	1.07	0.882	0.941	6.6	NA	±25	Average RF
Sodium perfluoro-1-hexane[18O2] sulfonate	5.00	5.30	1.985	2.105	6.1	NA	±25	Average RF
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	5.00	5.31	3.339	3.545	6.2	NA	±25	Average RF
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate	5.00	5.46	4.859	5.302	9.1	NA	±25	Average RF

Client: Kleinfelder **Service Request:**K1602709
Project: CCTO-067 - China Lake

Analysis Run Log
Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M **Analysis Lot:**490080
Instrument ID:K-LCMS-02

Raw Data File	Sample Name	Lab Code	Date Analyzed	Time Analyzed	Q
033016\1019.wiff	Continuing Calibration Verification	KQ1603023-01	3/30/2016	14:54:42	
033016\1021.wiff	Method Blank	KQ1602838-04	3/30/2016	15:33:18	
033016\1022.wiff	Lab Control Sample	KQ1602838-03	3/30/2016	15:52:39	
033016\1023.wiff	KCH067-042	K1602709-001	3/30/2016	16:11:58	
033016\1024.wiff	ZZZZZZZ	ZZZZZZZ	3/30/2016	16:31:18	
033016\1025.wiff	ZZZZZZZ	ZZZZZZZ	3/30/2016	16:50:38	
033016\1026.wiff	ZZZZZZZ	ZZZZZZZ	3/30/2016	17:09:59	
033016\1027.wiff	ZZZZZZZ	ZZZZZZZ	3/30/2016	17:29:19	
033016\1028.wiff	ZZZZZZZ	ZZZZZZZ	3/30/2016	17:48:39	
033016\1029.wiff	ZZZZZZZ	ZZZZZZZ	3/30/2016	18:07:59	
033016\1030.wiff	ZZZZZZZ	ZZZZZZZ	3/30/2016	18:27:17	
033016\1031.wiff	Continuing Calibration Verification	KQ1603023-02	3/30/2016	18:46:36	
033016\1033.wiff	Batch QC DMS	KQ1602838-02	3/30/2016	19:25:12	
033016\1034.wiff	Batch QC MS	KQ1602838-01	3/30/2016	19:44:30	
033016\1035.wiff	Batch QC	K1602748-007	3/30/2016	20:03:52	
033016\1036.wiff	ZZZZZZZ	ZZZZZZZ	3/30/2016	20:23:09	
033016\1037.wiff	ZZZZZZZ	ZZZZZZZ	3/30/2016	20:42:31	
033016\1038.wiff	ZZZZZZZ	ZZZZZZZ	3/30/2016	21:01:48	
033016\1039.wiff	ZZZZZZZ	ZZZZZZZ	3/30/2016	21:21:11	
033016\1040.wiff	ZZZZZZZ	ZZZZZZZ	3/30/2016	21:40:31	
033016\1041.wiff	ZZZZZZZ	ZZZZZZZ	3/30/2016	21:59:50	
033016\1042.wiff	ZZZZZZZ	ZZZZZZZ	3/30/2016	22:19:09	
033016\1043.wiff	Continuing Calibration Verification	KQ1603023-03	3/30/2016	22:38:29	
033016\1045.wiff	ZZZZZZZ	ZZZZZZZ	3/30/2016	23:17:09	
033016\1046.wiff	ZZZZZZZ	ZZZZZZZ	3/30/2016	23:36:29	
033016\1047.wiff	ZZZZZZZ	ZZZZZZZ	3/30/2016	23:55:48	
033016\1048.wiff	ZZZZZZZ	ZZZZZZZ	3/31/2016	00:15:08	
033016\1049.wiff	Continuing Calibration Verification	KQ1603023-04	3/31/2016	00:34:28	

Prep Summary Report

Client: Kleinfelder **Service Request:**K1602709
Project: CCTO-067 - China Lake
Sample Matrix: Water

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Prep Method: EPA 3535A **Extraction Lot:**258211
Analytical Method: PFC/537M

Sample Name	Lab Code	Date Collected	Date Received	Sample Amount	Final Amount	Percent Solids
KCH067-042	K1602709-001	3/15/16	3/17/16	290.0000	8 mL	
Batch QC	K1602748-007	NA	NA	290.0000	8 mL	
Batch QC	KQ1602838-01	NA	NA	290.0000	8 mL	
Batch QC	KQ1602838-02	NA	NA	290.0000	8 mL	
Lab Control Sample	KQ1602838-03	NA	NA	250.0000	8 mL	
Method Blank	KQ1602838-04	NA	NA	250.0000	8 mL	

Raw Data

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

ALS Environmental—Kelso Laboratory
1317 South 13th Avenue, Kelso, WA 98626
Phone (360)577-7222 Fax (360)636-1068
www.alsglobal.com

Quantitation Report

Data File:	033016\1023.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/30/16 16:11:58	**Vial:**	4
Run Type:	N/A	**Dilution:**	1
Lab ID:	K1602709-001	**Raw Units:**	ng/mL

Bottle ID:	K1602709-001.01	**Tier:**	IV	**Matrix:**	Water
Prod Code:	PFOA	**Collect Date:**	3/15/16	**Receive Date:**	3/17/16

Analysis Lot:	490080	**Prep Lot:**	258211	**Report Group:**	K1602709
Analysis Method:	PFC/537M	**Prep Method:**	EPA 3535A		
		Prep Date:	3/28/16		

Title:	Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS	**Calibration ID:**	KC1600038
		Report List ID:	14945

Internal Standard Compounds

Parameter Name	RT	Response	Solution Conc	Area Criteria
N-methyl-d3-perfluoro-1-octanesulfonamide	10.8	718306.39	5.00	OK

Surrogate Compounds

Parameter Name	RT	Response	Solution Conc	% Rec	% Rec Criteria
Sodium perfluoro-1-hexane[18O2]sulfonate	7.72	1203259.71	4.220	84	20 - 128
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	8.37	2114612.22	4.408	88	13 - 142
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulf	8.97	3043452.09	4.360	87	11 - 131

Target Compounds

Final Conc.Units: ng/L

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorobutane Sulfonate	0.00	0.00	0	0	U
Perfluorooctanoic Acid	8.38	3097.01	0.014	0.39	J
Perfluorooctane Sulfonate	8.96	8703.05	0.016	0.44	U

Prep Amount:	290.0000 mL	**Dilution:**	1
Prep Final Amount:	8.00 mL	**Basis Factor:**	100.00

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Printed: 3/31/16 14:48

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Project	Ewan's Projects\PFCs
Data File	033016\1023.wiff
Result Table	033016.rdb
Instrument Name	LCMS02

Sample Name	K1602709-001	Injection Volume	10
Acquisition Date	3/30/2016 4:11:58 PM	Sample Type	Unknown
Acquisition Method	PFC_090315 schedule mrm.dam	Dilution Factor	1.00
Injection Vial	17	Weight to Volume	0.00

Results Summary

Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
Pfba 1	13c_pfba	3355149	2.64 (2.60)	17463	0.0330	No
Pfpea 1	13c_pfhxa	3868562	5.09 (5.06)	9913	0.0200	No
Pfbs 1	18o-pfhs	1203260	0.00 (5.53)	0	N/A	No
Pfhxa 1	13c_pfhxa	3868562	6.64 (6.63)	1042963	1.4050	No
Pfhpa 1	13c_pfhxa	3868562	0.00 (7.64)	0	N/A	No
Pfhxs 1	18o-pfhs	1203260	7.72 (7.72)	11701	0.0180	No
Pfoa 1	13c-pfoa	2114612	8.38 (8.36)	3097	0.0140	No
Pfna 1	13c-pfna	2468654	0.00 (8.95)	0	N/A	No
Pfos 1	13c-pfos	3043452	8.96 (8.96)	8703	0.0160	Yes
Pfda 1	13c-pfda	1448801	0.00 (9.44)	0	N/A	No
Pfuna 1	13c-pfuna	323399	9.86 (9.86)	2739	0.0180	No
Pfds 1	13c-pfos	3043452	9.84 (9.84)	628	0.0010	No
Pfdoa 1	13c-pfdoda	19427	10.20 (10.20)	3012	0.0140	No
Fosa 1	d5-NEtFOSA	699834	9.95 (9.94)	3122	0.0060	No
Pfteda 1	13c-pfdoda	19427	10.80 (10.80)	939	0.0190	No
PFHpS 1	18o-pfhs	1203260	0.00 (8.39)	0	N/A	No
NMeFOSE 1	d7-NMeFOSE	1312712	0.00 (10.80)	0	N/A	No
NMeFOSA 1	d7-NMeFOSE	1312712	0.00 (10.80)	0	N/A	No
NEtFOSE 1	d9-EtFOSE	1520094	0.00 (11.00)	0	N/A	No
NEtFOSA 1	d5-NEtFOSA	699834	0.00 (11.00)	0	N/A	No

Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
d9-EtFOSE 1	N_mefosa_d3	718306	11.00 (11.00)	1520094	4.2710	No
d5-NEtFOSA 1	N_mefosa_d3	718306	11.00 (11.00)	699834	3.6820	No
d7-NMeFOSE 1	N_mefosa_d3	718306	10.80 (10.80)	1312712	3.8890	No
13C_PFBA 1	N_mefosa_d3	718306	2.61 (2.58)	3355149	4.2130	No
13C_PFHXA 1	N_mefosa_d3	718306	6.64 (6.63)	3868562	4.5250	No
13C-PFOA 1	N_mefosa_d3	718306	8.37 (8.35)	2114612	4.4080	No
13C-PFNA 1	N_mefosa_d3	718306	8.96 (8.96)	2468654	4.4700	No
13C-PFOS 1	N_mefosa_d3	718306	8.97 (8.95)	3043452	4.3600	No
13C-PFDA 1	N_mefosa_d3	718306	9.44 (9.45)	1448801	4.2770	No
13C-PFUNA 1	N_mefosa_d3	718306	9.86 (9.85)	323399	3.3740	No
18O-PFHxS 1	N_mefosa_d3	718306	7.72 (7.72)	1203260	4.2200	No
13C-PFDoA 1	N_mefosa_d3	718306	10.20 (10.20)	19427	3.1470	No
PFTrDA 1	13c-pfdoda	19427	10.50 (10.50)	2080	0.0100	No
6_2-FTS 1	13C2-6_2-FTS	118894	8.32 (8.31)	6431	0.0440	No
8_2-FTS 1	13C2-6_2-FTS	118894	0.00 (9.42)	0	N/A	No
13C2-6_2-FTS 1	N_mefosa_d3	718306	8.32 (8.31)	118894	4.5180	No

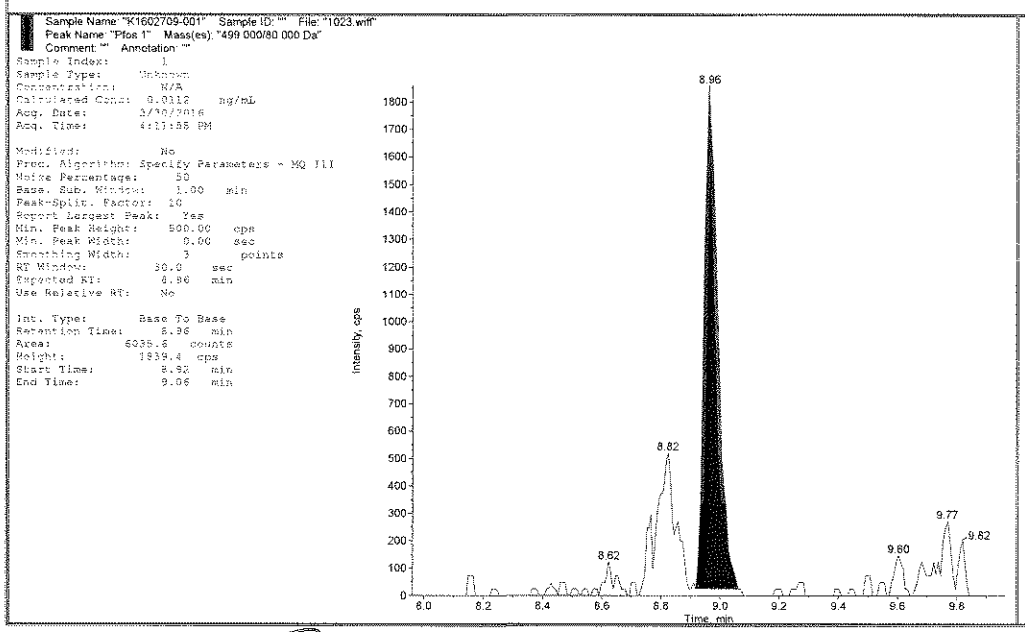
IRC Summary

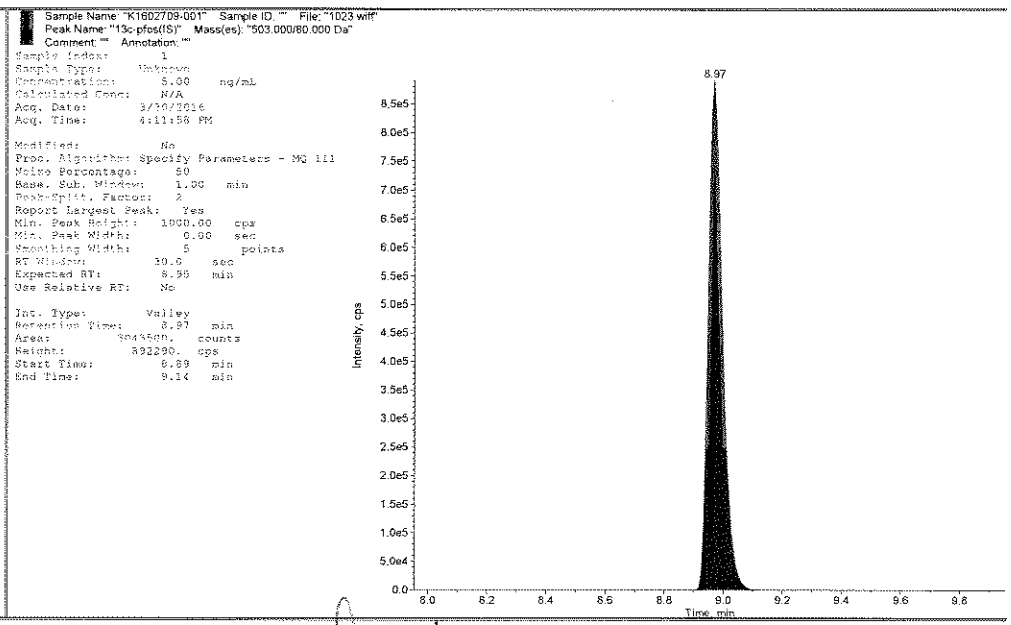
Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfba 2	2.66 (2.58)	8762	No	0.50 (0.98)	No
Pfpea 2	5.09 (5.07)	10458	No	1.05 (1.01)	YES
Pfbs 2	0.00 (5.52)	0	No	0.00 (0.48)	No
Pfhxa 2	6.64 (6.63)	87830	No	0.08 (0.09)	YES
Pfhpa 2	0.00 (7.63)	0	No	0.00 (0.44)	No
Pfhxs 2	7.72 (7.72)	5060	No	0.43 (0.40)	YES
Pfoa 2	8.37 (8.36)	4710	No	1.52 (1.81)	YES
Pfna 2	0.00 (8.95)	0	Yes	0.00 (0.33)	No

Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfos 2	8.97 (8.95)	1879	Yes	0.22 (0.36)	No
Pfda 2	0.00 (9.44)	0	No	0.00 (0.26)	No
Pfuna 2	9.88 (9.85)	1337	No	0.49 (0.50)	YES
Pfds 2	0.00 (9.84)	0	No	0.00 (0.36)	No
Pfdoa 2	0.00 (10.20)	0	No	0.00 (0.37)	No
Fosa 2	0.00 (9.94)	0	No	0.00 (0.03)	No
Pfteda 2	10.80 (10.80)	545	Yes	0.58 (0.42)	No
PFHpS 2	0.00 (8.39)	0	No	0.00 (0.39)	No
NMeFOSE 2	0.00 (10.80)	0	No	0.00 (0.00)	No
NMeFOSA 2	0.00 (10.80)	0	No	0.00 (0.93)	No
NEtFOSE 2	0.00 (11.00)	0	No	0.00 (0.00)	No
NEtFOSA 2	0.00 (11.00)	0	No	0.00 (0.70)	No
PFTrDA 2	0.00 (10.50)	0	No	0.00 (0.32)	No
6_2-FTS 2	8.32 (8.30)	8853	No	1.38 (1.35)	YES
8_2-FTS 2	0.00 (9.41)	0	No	0.00 (0.12)	No

Quantitative Peak Review **K1602709-001** *No data for Sample ID*

	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
946	033016\1023.wiff	K1602709-001	Unknown	Pfba 2	8762.5	N/A	3355100.	0.0152
947	033016\1023.wiff	K1602709-001	Unknown	Pfpea 1	9913.1	N/A	3868600.	0.0202
948	033016\1023.wiff	K1602709-001	Unknown	Pfpea 2	10458.	N/A	3868600.	0.0211
949	033016\1023.wiff	K1602709-001	Unknown	Pfbs 1	0.0000	N/A	1203300.	No Peak
950	033016\1023.wiff	K1602709-001	Unknown	Pfbs 2	0.0000	N/A	1203300.	No Peak
951	033016\1023.wiff	K1602709-001	Unknown	Pfhxa 1	1043000.	N/A	3868600.	1.40
952	033016\1023.wiff	K1602709-001	Unknown	Pfhxa 2	87830.	N/A	3868600.	1.27
953	033016\1023.wiff	K1602709-001	Unknown	Pfhpa 1	0.0000	N/A	3868600.	No Peak
954	033016\1023.wiff	K1602709-001	Unknown	Pfhpa 2	0.0000	N/A	3868600.	No Peak
955	033016\1023.wiff	K1602709-001	Unknown	Pfhxs 1	11701.	N/A	1203300.	0.0179
956	033016\1023.wiff	K1602709-001	Unknown	Pfhxs 2	5059.9	N/A	1203300.	0.0171
957	033016\1023.wiff	K1602709-001	Unknown	Pfoa 1	3097.0	N/A	2114600.	0.0136
958	033016\1023.wiff	K1602709-001	Unknown	Pfoa 2	4710.2	N/A	2114600.	0.0105





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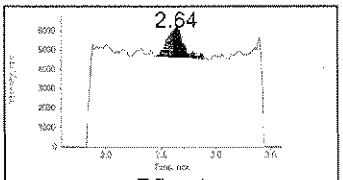
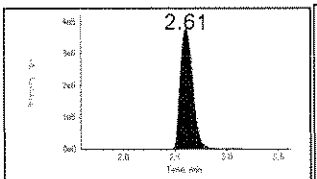
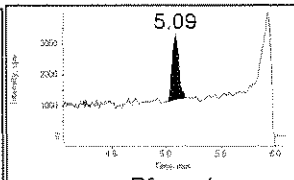


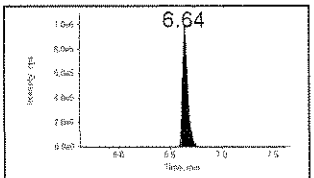
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



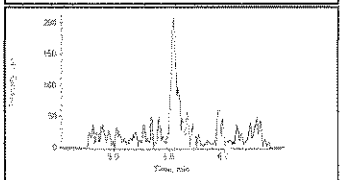
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



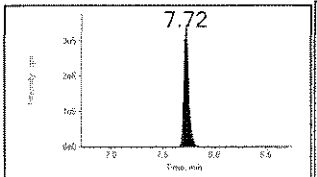
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



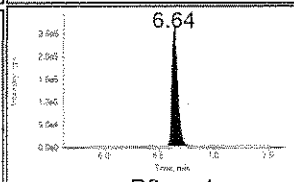
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



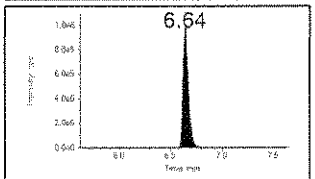
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



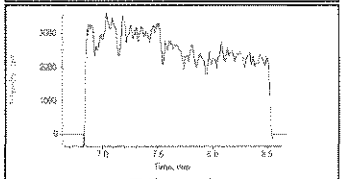
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



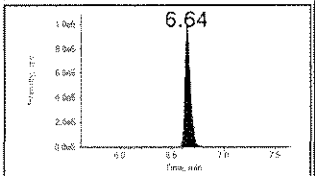
Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak



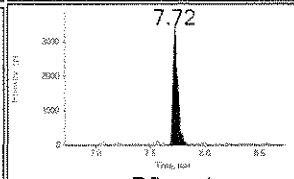
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



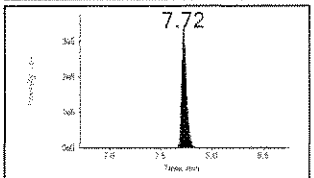
Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



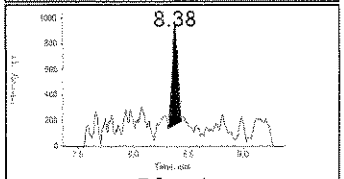
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



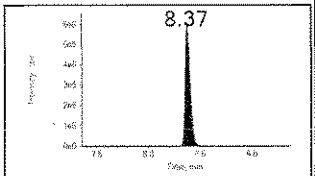
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



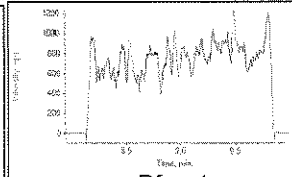
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



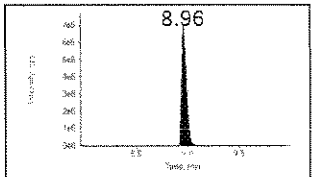
Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



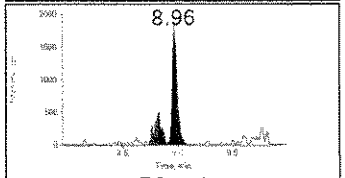
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



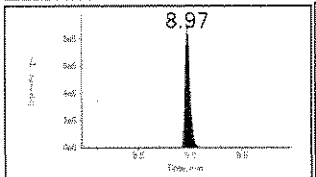
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



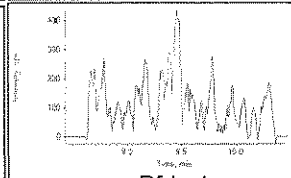
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



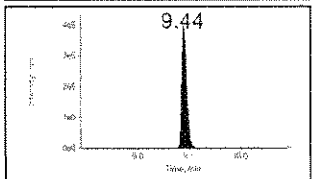
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak

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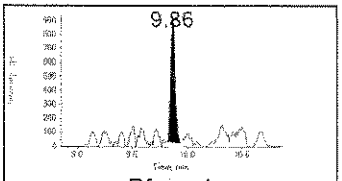
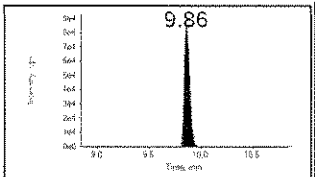
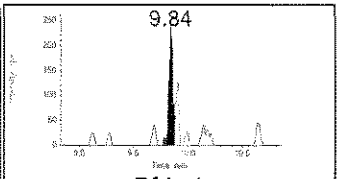


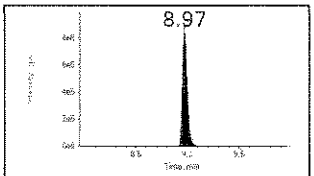
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



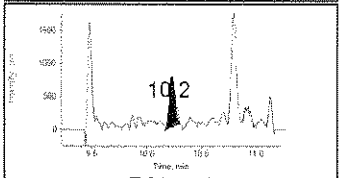
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



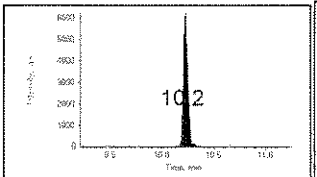
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



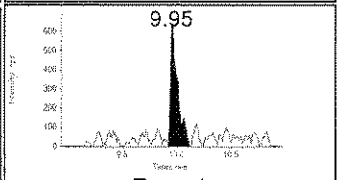
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



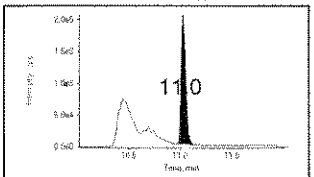
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



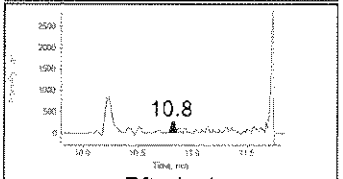
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



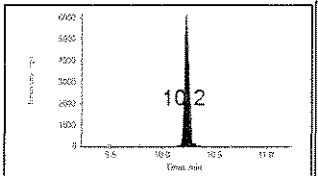
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



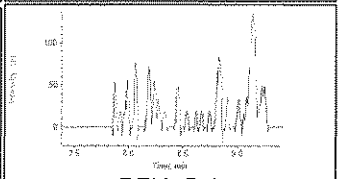
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



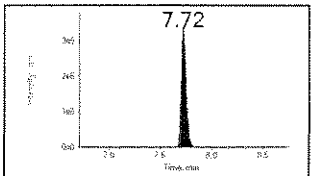
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



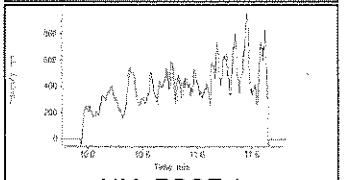
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



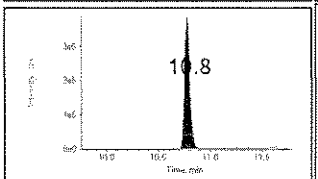
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



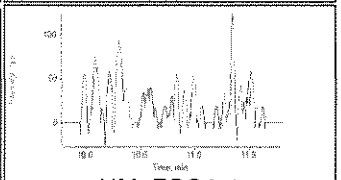
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



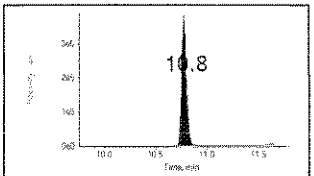
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



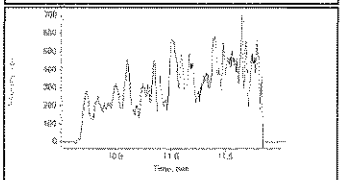
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



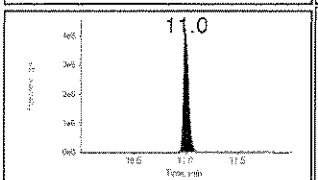
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



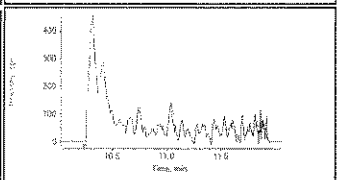
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



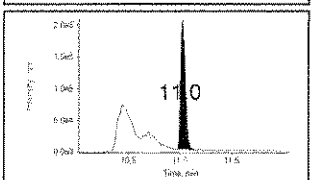
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



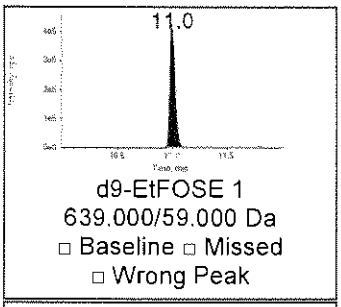
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



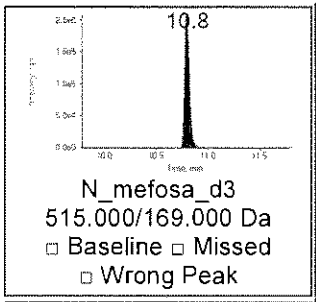
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



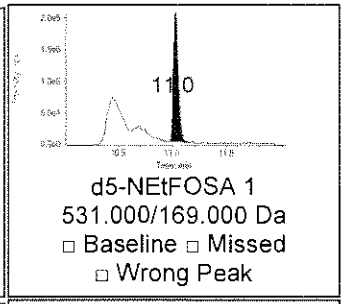
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



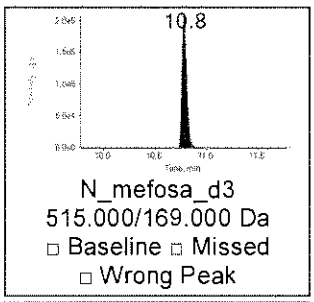
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



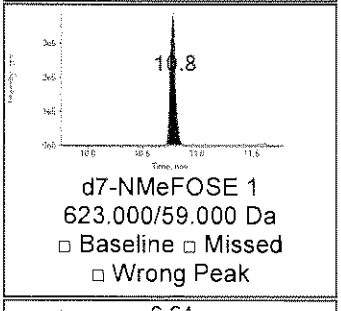
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



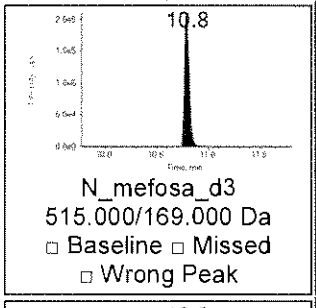
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



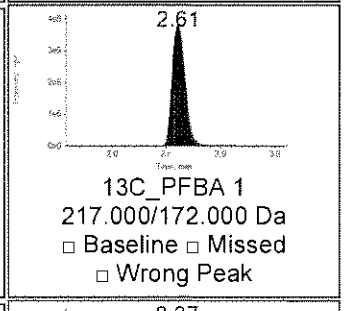
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



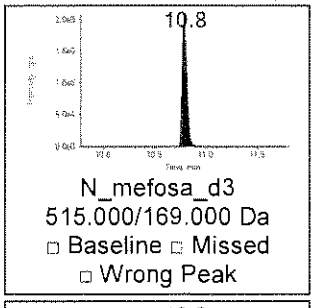
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



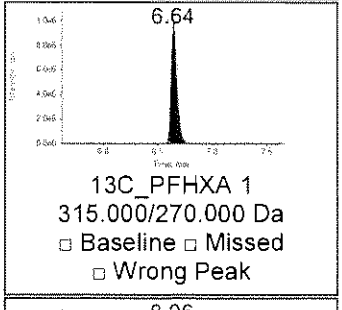
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



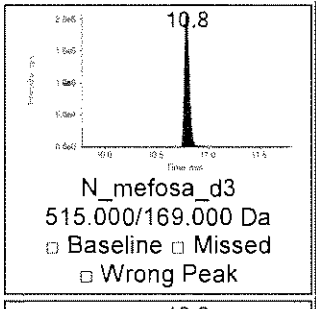
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



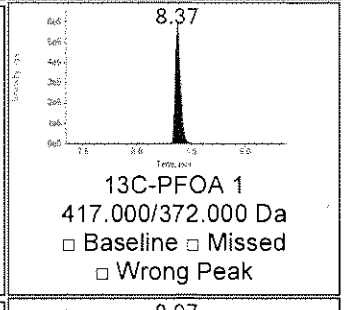
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



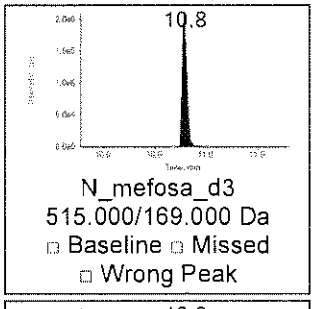
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



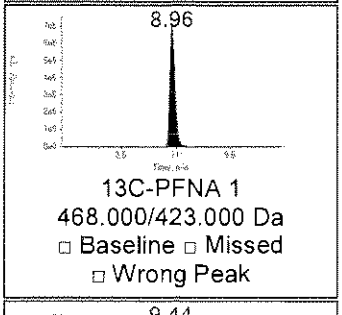
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



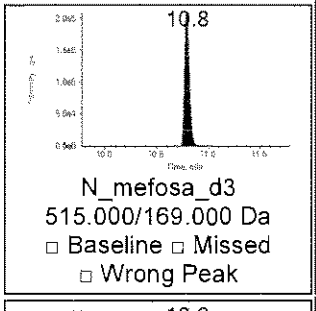
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



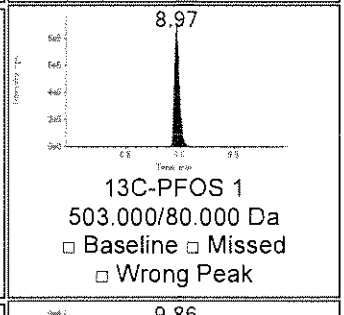
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



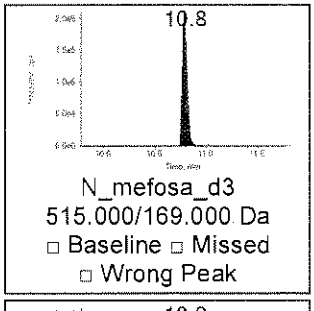
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



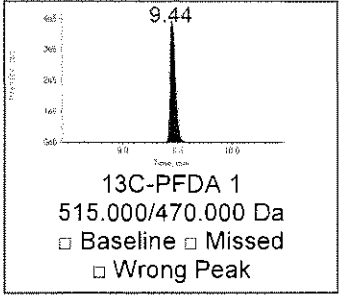
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



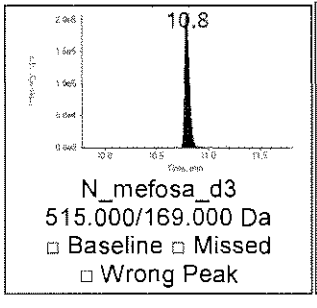
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



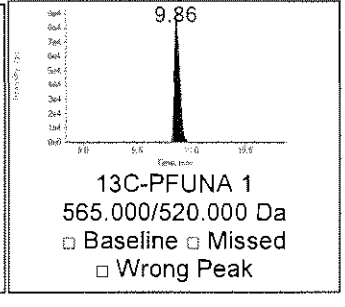
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



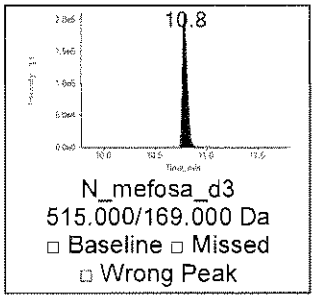
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



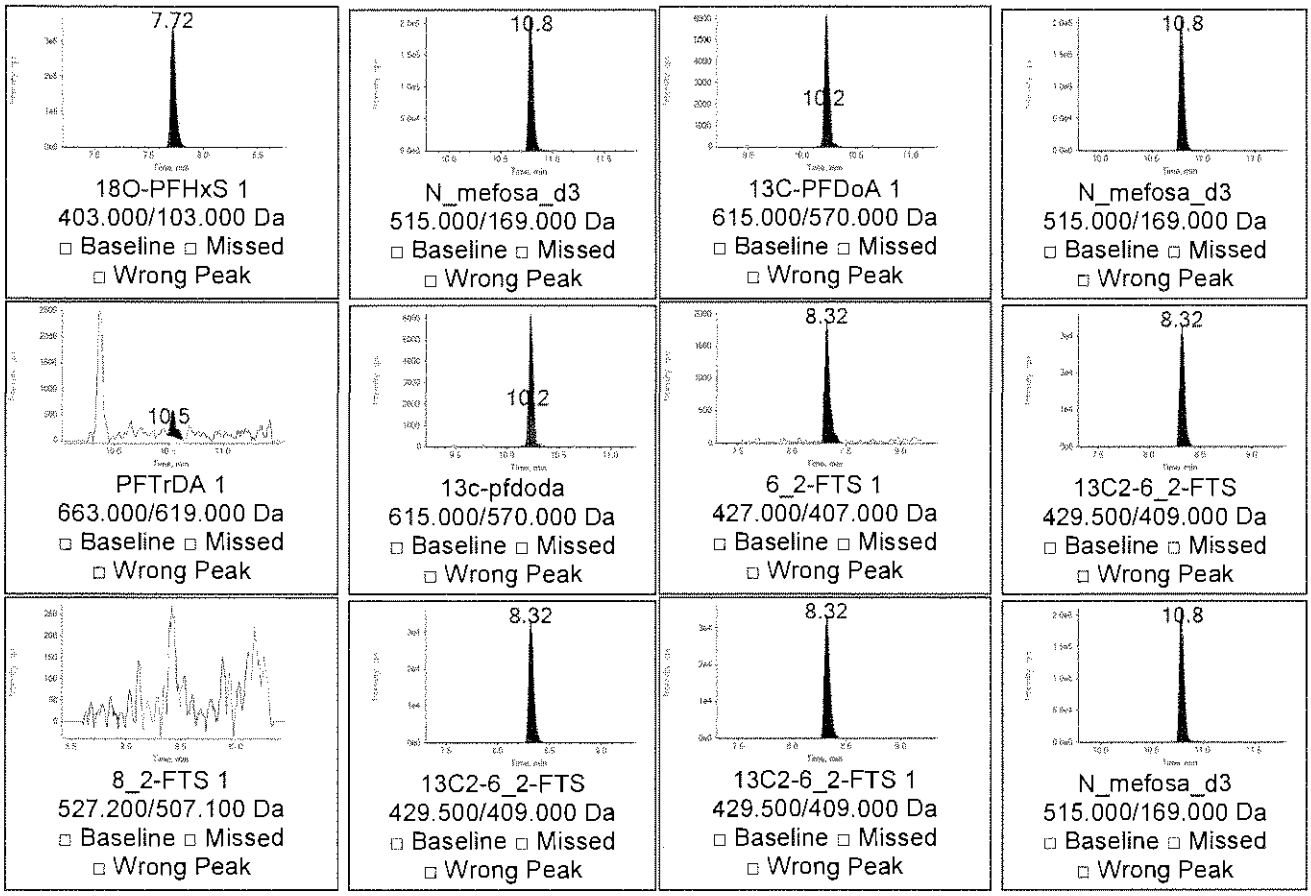
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



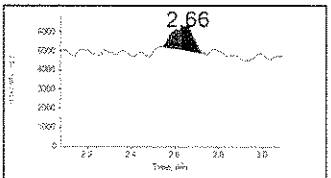
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



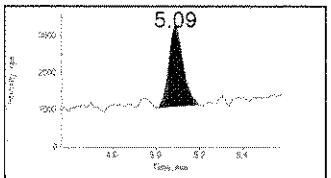
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



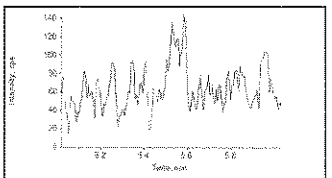
Ion Ratio Confirmation



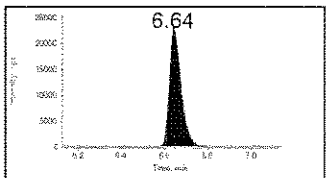
Pfba 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



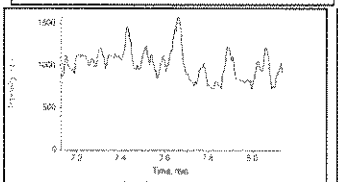
Pfpea 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



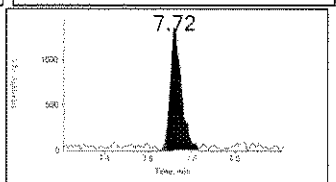
Pfbs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



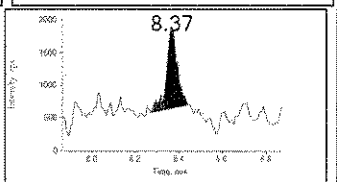
Pfhxa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



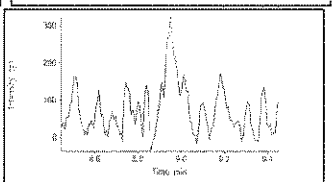
Pfhpa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



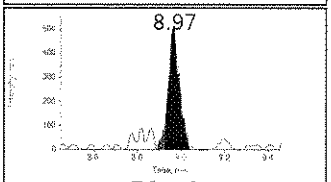
Pfhxs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



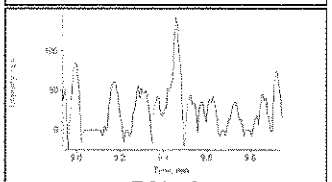
Pfoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



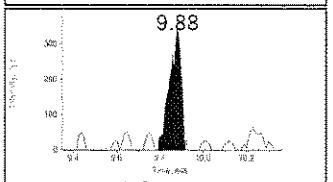
Pfna 2
Mod? Yes
□ Baseline □ Missed
□ Wrong Peak



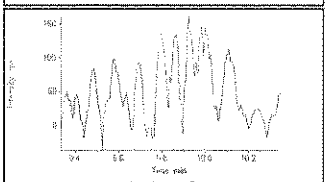
Pfos 2
Mod? Yes
□ Baseline □ Missed
□ Wrong Peak



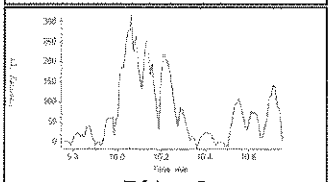
Pfda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



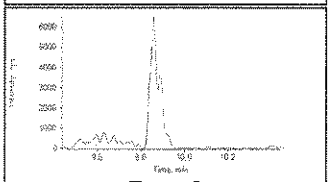
Pfuna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



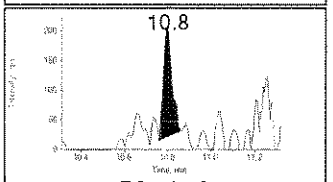
Pfds 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



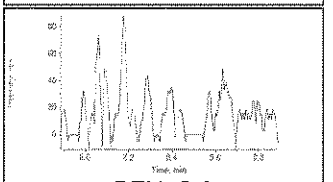
Pfdoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



Fosa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

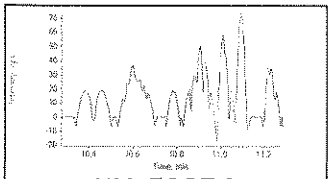


Pfteda 2
Mod? Yes
□ Baseline □ Missed
□ Wrong Peak

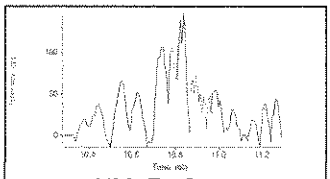


PFHpS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

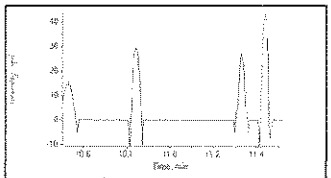
APR 0 1 2016



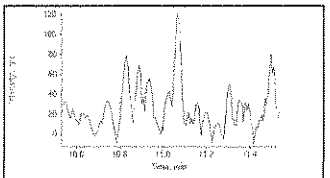
NMeFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



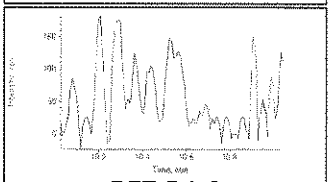
NMeFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



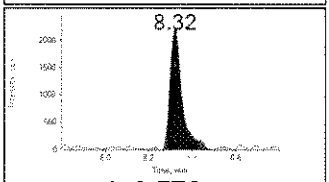
NEtFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



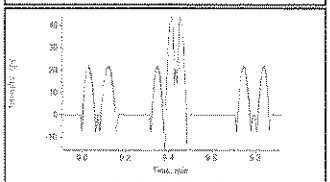
NEtFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

Quantitation Report

Data File:	033016\1021.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/30/16 15:33:18	**Vial:**	2
Run Type:	MB	**Dilution:**	1
Lab ID:	KQ1602838-04	**Raw Units:**	ng/mL

Bottle ID:		**Tier:**	I	**Matrix:**	Water
Prod Code:	PFOA	**Collect Date:**	3/17/16	**Receive Date:**	3/18/16

Analysis Lot:	490080	**Prep Lot:**	258211	**Report Group:**	KQ1602838
Analysis Method:	PFC/537M	**Prep Method:**	EPA 3535A		
		Prep Date:	3/28/16		

Title:	Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS	**Calibration ID:**	KC1600038
		Report List ID:	14664

Internal Standard Compounds

Parameter Name	RT	Response	Solution Conc	Area Criteria
N-methyl-d3-perfluoro-1-octanesulfonamide	10.8	784449.00	5.00	OK

Surrogate Compounds

Parameter Name	RT	Response	Solution Conc	% Rec	% Rec Criteria
Perfluoro-n-[1,2,3,4-13C4] butanoic acid	2.61	2896188.81	3.330	67	19 - 126
Perfluoro-n-[1,2-13C2] hexanoic acid	6.63	3372320.56	3.612	72	10 - 151
Sodium perfluoro-1-hexane[18O2]sulfonate	7.70	867307.63	2.785	56	20 - 128
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	8.35	1891139.85	3.610	72	13 - 142
Perfluoro-n-[1,2,3,4,5-13C5] nonanoic acid	8.94	2252769.91	3.735	75	15 - 143
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulf	8.95	2375655.14	3.116	62	11 - 131
Perfluoro-n-[1,2-13C2] decanoic acid	9.43	1387813.11	3.751	75	25 - 129
Perfluoro-n-[1,2-13C2]undecanoic Acid	9.85	336412.31	3.214	64	16 - 129
Perfluoro-n-[1,2-13C2]dodecanoic Acid	10.2	20863.28	3.094	62	17 - 114
S_N-ethyl-d5-perfluoro-1-octanesulfonamide	11.0	531670.58	2.561	51	19 - 103
d9-NEtFOSE (Surr)	11.0	1205716.25	3.102	62	20 - 113
d7-N-MeFOSE (Surr)	10.8	1045045.06	2.835	57	32 - 113
S_6:2 Fluorotelomer sulfonate-13C2	8.30	103776.26	3.611	72	10 - 187

Target Compounds

Final Conc.Units: ng/L

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorobutanoic Acid	0.00	0.00	0	0	U
Perfluoropentanoic Acid	0.00	0.00	0	0	U
Perfluorobutane Sulfonate	5.53	633.16	0.001	0.032	U
Perfluorohexanoic Acid	6.63	71514.93	0.110	3.5	J
Perfluoroheptanoic Acid	0.00	0.00	0	0	U
Perfluorohexane Sulfonate	7.71	7928.02	0.017	0.54	J
Perfluorooctanoic Acid	8.34	2298.98	0.011	0.35	J
Perfluorononanoic Acid	0.00	0.00	0	0	U

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Printed: 3/31/16 14:48

\\alprews001\starlims$\LIMSReps\QuantValidation.rpt

Data File:	033016\1021.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/30/16 15:33:18	**Vial:**	2
Run Type:	MB	**Dilution:**	1
Lab ID:	KQ1602838-04	**Raw Units:**	ng/mL

Target Compounds

Final Conc.Units: ng/L

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorooctane Sulfonate	0.00	0.00	0	0	U
Perfluorodecanoic Acid	0.00	0.00	0	0	U
Perfluoroundecanoic Acid	9.85	2612.42	0.016	0.51	U
Perfluorodecane Sulfonate	9.85	435.87	0.001	0.032	U
Perfluorododecanoic Acid	0.00	0.00	0	0	U
Perfluorooctylsulfonamide	9.96	3090.68	0.007	0.22	U
Perfluoro-n-tridecanoic acid	0.00	0.00	0	0	U
Perfluoro-n-tetradecanoic acid	0.00	0.00	0	0	U
Perfluoroheptane sulfonate	0.00	0.00	0	0	U
N-ethylperfluoro-1-octanesulfonamide	0.00	0.00	0	0	U
N-methylperfluoro-1-octanesulfonamide	0.00	0.00	0	0	U
2-(N-ethylperfluoro-1-octanesulfonamido)-eth	0.00	0.00	0	0	U
2-(N-methylperfluoro-1-octanesulfonamido)-e	0.00	0.00	0	0	U
6:2 Fluorotelomer sulfonate	0.00	0.00	0	0	U
8:2 Fluorotelomer sulfonate	0.00	0.00	0	0	U

Prep Amount:	250.0000 mL	**Dilution:**	1
Prep Final Amount:	8.00 mL	**Basis Factor:**	100.00

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

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Project	Ewan's Projects\PFCs
Data File	033016\1021.wiff
Result Table	033016.rdb
Instrument Name	LCMS02

Sample Name	KQ1602838-04	Injection Volume	10
Acquisition Date	3/30/2016 3:33:18 PM	Sample Type	Unknown
Acquisition Method	PFC_090315 schedule mrm.dam	Dilution Factor	1.00
Injection Vial	15	Weight to Volume	0.00

Results Summary

Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
Pfba 1	13c_pfba	2896189	0.00 (2.60)	0	N/A	Yes
Pfpea 1	13c_pfhxa	3372321	0.00 (5.06)	0	N/A	No
Pfbs 1	18o-pfhs	867308	5.53 (5.53)	633	0.0010	No
Pfhxa 1	13c_pfhxa	3372321	6.63 (6.63)	71515	0.1100	No
Pfhpa 1	13c_pfhxa	3372321	0.00 (7.64)	0	N/A	No
Pfhxs 1	18o-pfhs	867308	7.71 (7.72)	7928	0.0170	No
Pfoa 1	13c-pfoa	1891140	8.34 (8.36)	2299	0.0110	No
Pfna 1	13c-pfna	2252770	0.00 (8.95)	0	N/A	No
Pfos 1	13c-pfos	2375655	0.00 (8.96)	0	N/A	No
Pfda 1	13c-pfda	1387813	0.00 (9.44)	0	N/A	No
Pfuna 1	13c-pfuna	336412	9.85 (9.86)	2612	0.0160	No
Pfds 1	13c-pfos	2375655	9.85 (9.84)	436	0.0010	No
Pfdoa 1	13c-pfdoda	20863	0.00 (10.20)	0	N/A	No
Fosa 1	d5-NEtFOSA	531671	9.96 (9.94)	3091	0.0070	No
Pfteda 1	13c-pfdoda	20863	0.00 (10.80)	0	N/A	No
PFHpS 1	18o-pfhs	867308	0.00 (8.39)	0	N/A	No
NMeFOSE 1	d7-NMeFOSE	1045045	0.00 (10.80)	0	N/A	No
NMeFOSA 1	d7-NMeFOSE	1045045	0.00 (10.80)	0	N/A	No
NEtFOSE 1	d9-EtFOSE	1205716	0.00 (11.00)	0	N/A	No
NEtFOSA 1	d5-NEtFOSA	531671	0.00 (11.00)	0	N/A	No

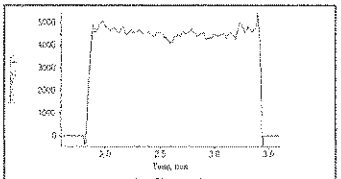
Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
d9-EtFOSE 1	N_mefosa_d3	784449	11.00 (11.00)	1205716	3.1020	No
d5-NEtFOSA 1	N_mefosa_d3	784449	11.00 (11.00)	531671	2.5610	No
d7-NMeFOSE 1	N_mefosa_d3	784449	10.80 (10.80)	1045045	2.8350	No
13C_PFBA 1	N_mefosa_d3	784449	2.61 (2.58)	2896189	3.3300	No
13C_PFHXA 1	N_mefosa_d3	784449	6.63 (6.63)	3372321	3.6120	No
13C-PFOA 1	N_mefosa_d3	784449	8.35 (8.35)	1891140	3.6100	No
13C-PFNA 1	N_mefosa_d3	784449	8.94 (8.96)	2252770	3.7350	No
13C-PFOS 1	N_mefosa_d3	784449	8.95 (8.95)	2375655	3.1160	No
13C-PFDA 1	N_mefosa_d3	784449	9.43 (9.45)	1387813	3.7510	No
13C-PFUNA 1	N_mefosa_d3	784449	9.85 (9.85)	336412	3.2140	No
18O-PFHxS 1	N_mefosa_d3	784449	7.70 (7.72)	867308	2.7850	No
13C-PFDoA 1	N_mefosa_d3	784449	10.20 (10.20)	20863	3.0940	No
PFTrDA 1	13c-pfdoda	20863	0.00 (10.50)	0	N/A	No
6_2-FTS 1	13C2-6_2-FTS	103776	0.00 (8.31)	0	N/A	No
8_2-FTS 1	13C2-6_2-FTS	103776	0.00 (9.42)	0	N/A	No
13C2-6_2-FTS 1	N_mefosa_d3	784449	8.30 (8.31)	103776	3.6110	No

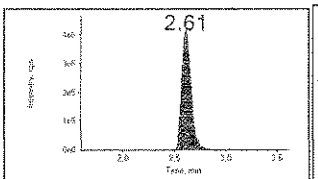
IRC Summary

Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfba 2	0.00 (2.58)	0	No	0.00 (0.98)	No
Pfpea 2	0.00 (5.07)	0	No	0.00 (1.01)	No
Pfbs 2	0.00 (5.52)	0	No	0.00 (0.48)	No
Pfhxa 2	6.64 (6.63)	5658	No	0.08 (0.09)	YES
Pfhpa 2	0.00 (7.63)	0	No	0.00 (0.44)	No
Pfhxs 2	7.70 (7.72)	2373	No	0.30 (0.40)	No
Pfoa 2	8.35 (8.36)	3986	No	1.73 (1.81)	YES
Pfna 2	0.00 (8.95)	0	No	0.00 (0.33)	No

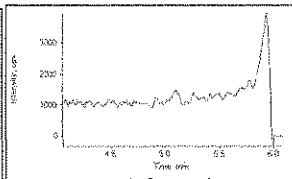
Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfos 2	0.00 (8.95)	0	No	0.00 (0.36)	No
Pfda 2	0.00 (9.44)	0	No	0.00 (0.26)	No
Pfuna 2	9.87 (9.85)	1817	No	0.70 (0.50)	No
Pfds 2	0.00 (9.84)	0	No	0.00 (0.36)	No
Pfdoa 2	0.00 (10.20)	0	No	0.00 (0.37)	No
Fosa 2	0.00 (9.94)	0	No	0.00 (0.03)	No
Pfteda 2	0.00 (10.80)	0	No	0.00 (0.42)	No
PFHpS 2	0.00 (8.39)	0	No	0.00 (0.39)	No
NMeFOSE 2	0.00 (10.80)	0	No	0.00 (0.00)	No
NMeFOSA 2	0.00 (10.80)	0	No	0.00 (0.93)	No
NEtFOSE 2	0.00 (11.00)	0	No	0.00 (0.00)	No
NEtFOSA 2	0.00 (11.00)	0	No	0.00 (0.70)	No
PFTrDA 2	0.00 (10.50)	0	No	0.00 (0.32)	No
6_2-FTS 2	0.00 (8.30)	0	No	0.00 (1.35)	No
8_2-FTS 2	0.00 (9.41)	0	No	0.00 (0.12)	No

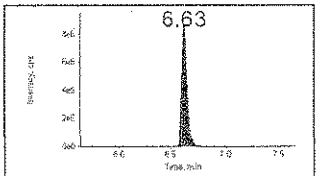
Quantitative Peak Review **KQ1602838-04 MB**


Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

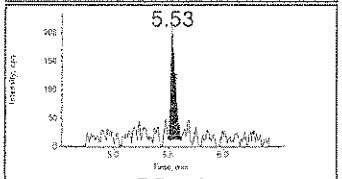


13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak

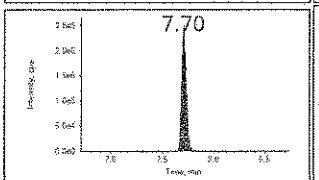

Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



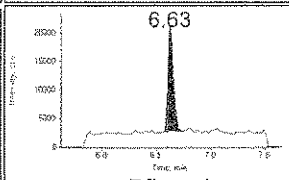
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



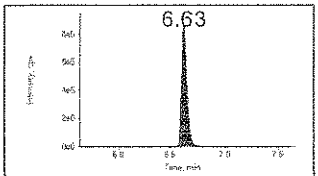
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



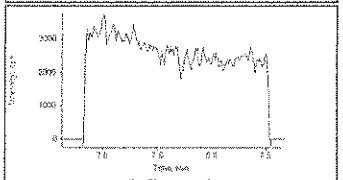
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak

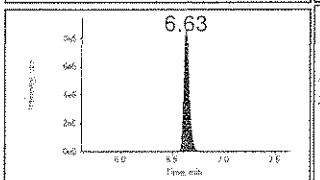


Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak

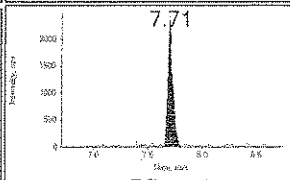


13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak

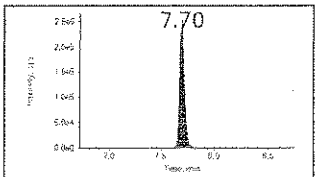

Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



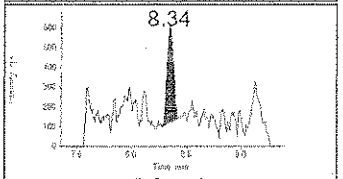
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



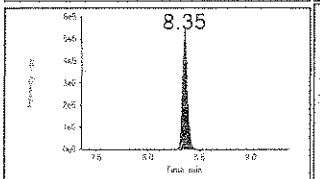
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



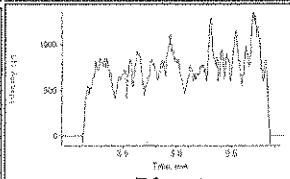
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak

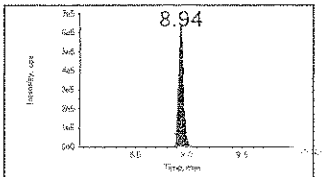


Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

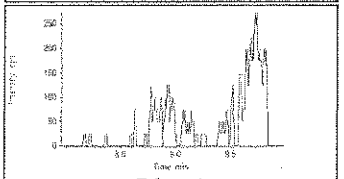


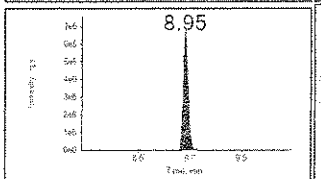
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak

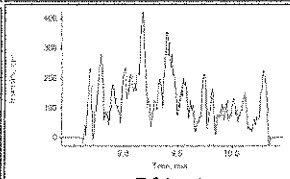


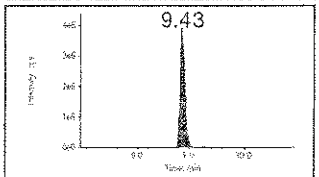
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak

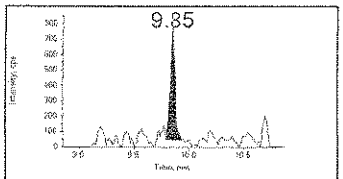


13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak

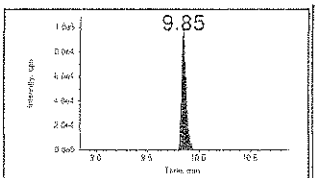

Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



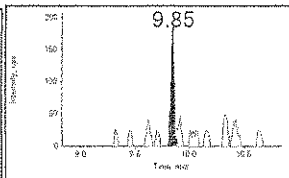
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



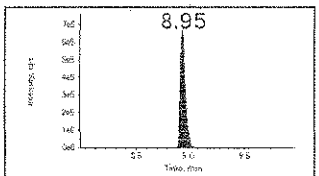
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



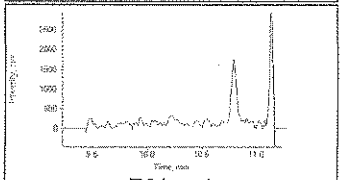
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



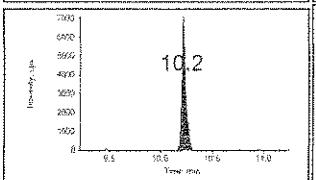
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



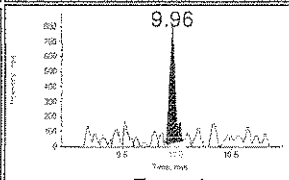
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



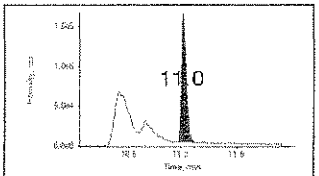
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



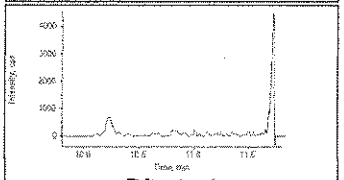
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



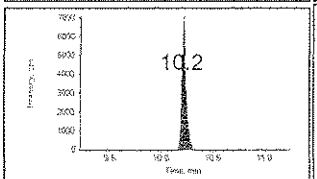
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



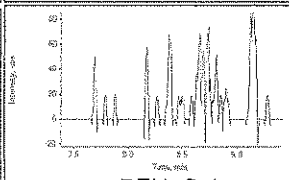
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



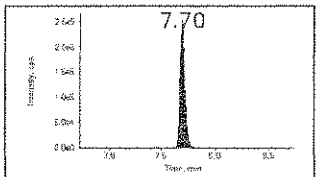
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



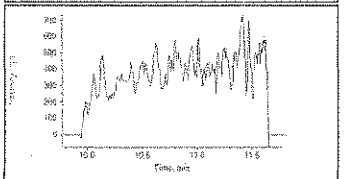
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



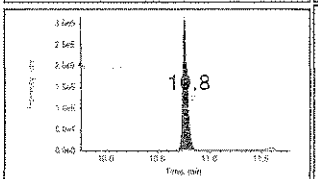
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



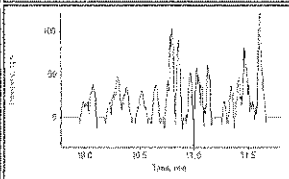
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



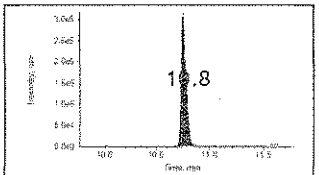
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



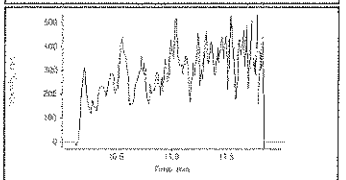
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



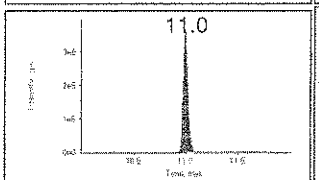
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



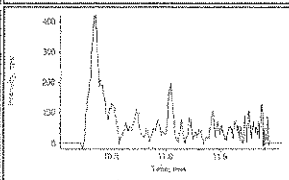
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



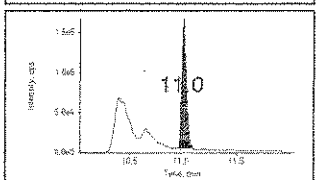
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



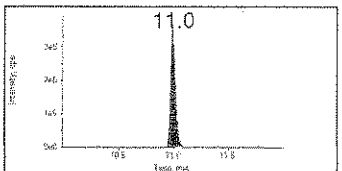
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



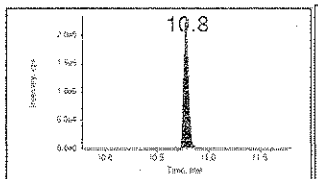
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



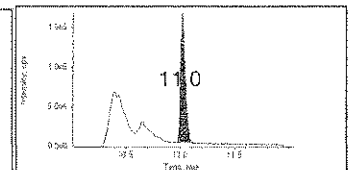
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



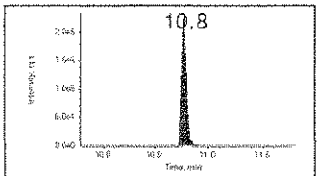
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



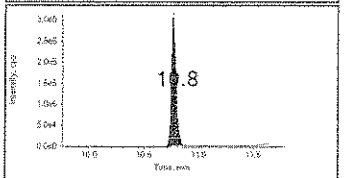
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



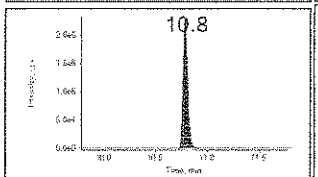
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



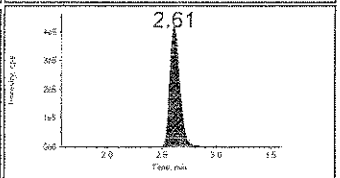
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



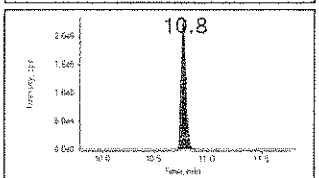
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



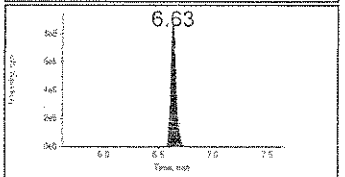
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



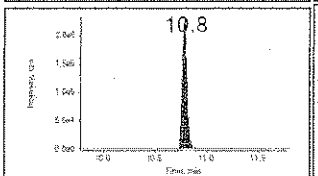
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



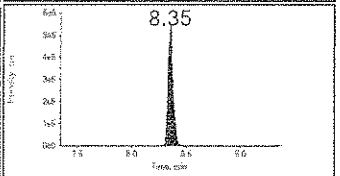
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



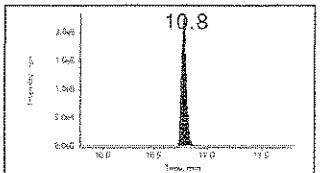
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



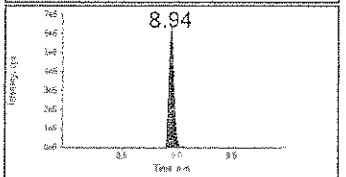
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



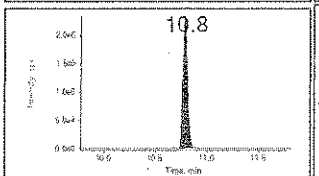
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



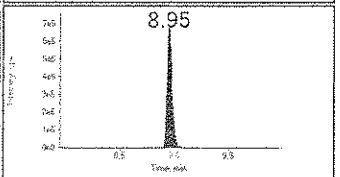
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



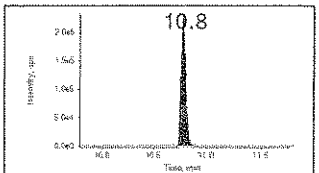
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



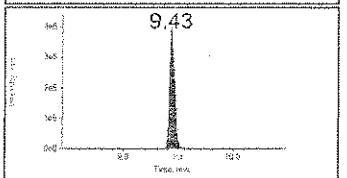
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



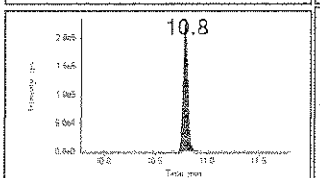
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



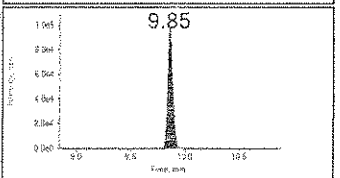
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



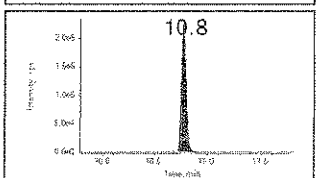
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



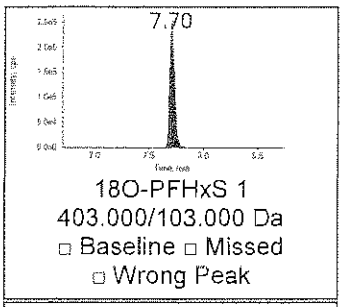
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



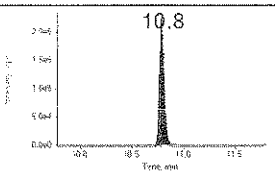
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



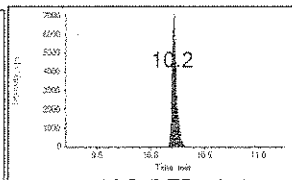
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



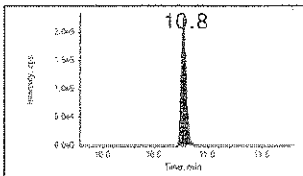
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



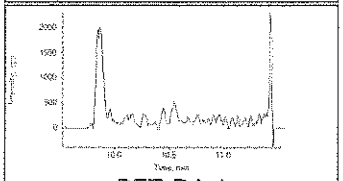
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



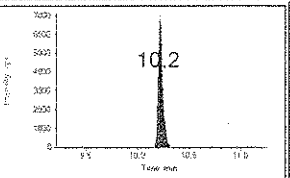
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



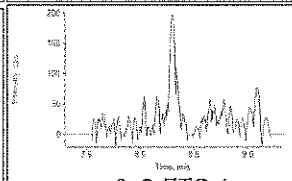
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



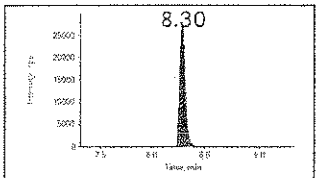
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



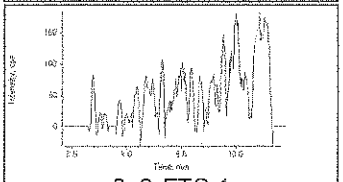
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



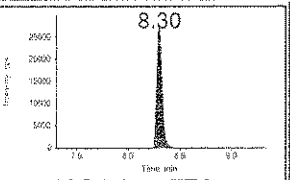
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



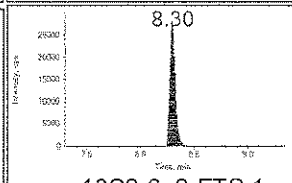
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



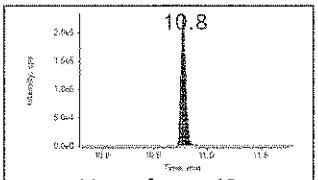
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

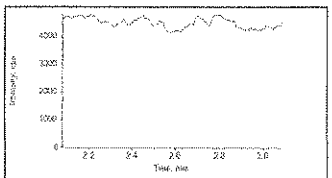


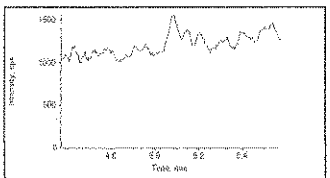
13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

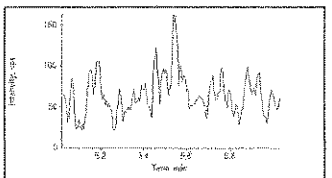


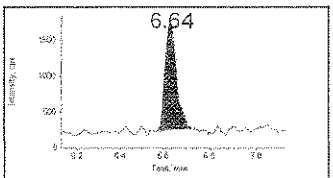
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

Ion Ratio Confirmation

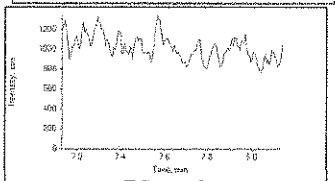

Pfba 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

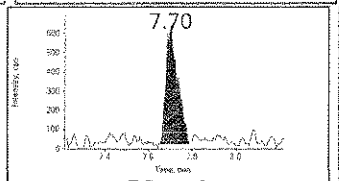

Pfpea 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak


Pfbs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

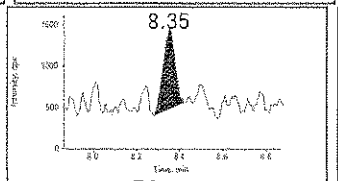


Pfhxa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

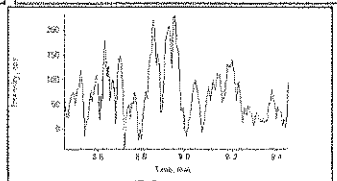

Pfhpa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

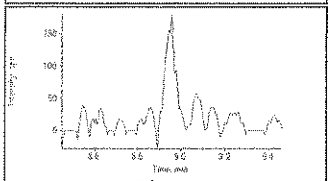


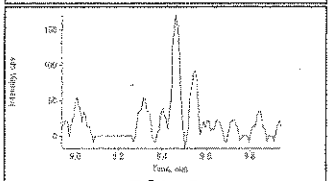
Pfhxs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

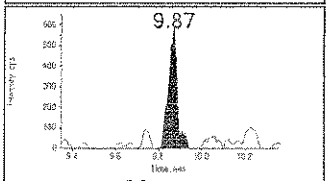


Pfoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

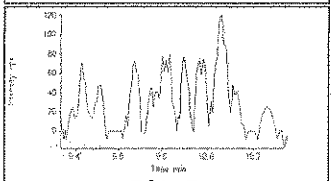

Pfna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

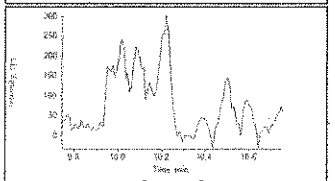

Pfos 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

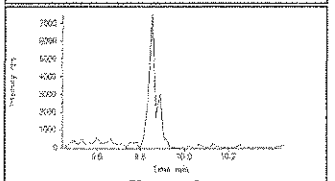

Pfda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

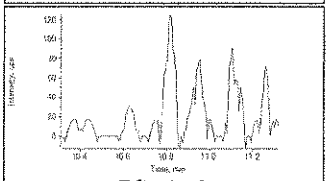


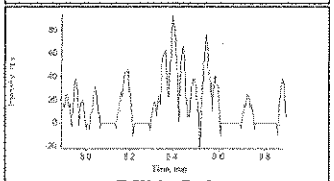
Pfuna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

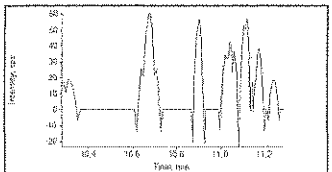

Pfds 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak


Pfdoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

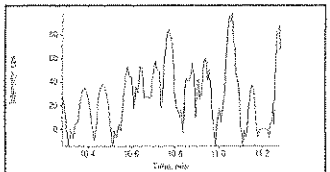

Fosa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak


Pfteda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

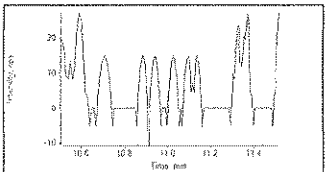

PFHpS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



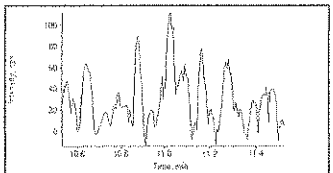
NMeFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



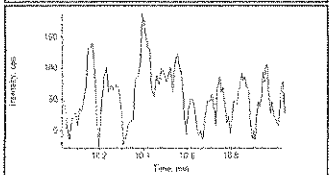
NMeFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



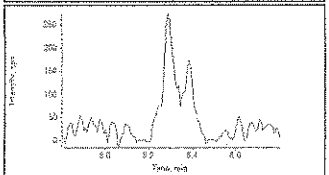
NEtFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



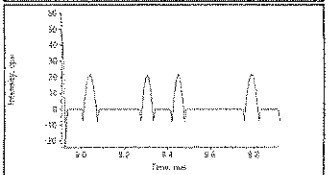
NEtFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

Quantitation Report

Data File:	033016\1035.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/30/16 20:03:52	**Vial:**	15
Run Type:	N/A	**Dilution:**	1
Lab ID:	K1602748-007	**Raw Units:**	ng/mL

Bottle ID:	K1602748-007.01	**Ticr:**	V	**Matrix:**	Water
Prod Code:	PFOA	**Collect Date:**	3/17/16	**Recvie Date:**	3/18/16

Analysis Lot:	490080	**Prep Lot:**	258211	**Report Group:**	K1602748
Analysis Method:	PFC/537M	**Prep Method:**	EPA 3535A		
		Prep Date:	3/28/16		

Title:	Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS	**Calibration ID:**	KC1600038
		Report List ID:	14634

Internal Standard Compounds

Parameter Name	RT	Response	Solution Conc	Area Criteria
N-methyl-d3-perfluoro-1-octanesulfonamide	10.8	872125.85	5.00	OK

Surrogate Compounds

Parameter Name	RT	Response	Solution Conc	% Rec	% Rec Criteria
Perfluoro-n-[1,2-13C2] hexanoic acid	6.62	4037496.31	3.889	78	10 - 151
Sodium perfluoro-1-hexane[18O2]sulfonate	7.71	1252815.63	3.619	72	20 - 128
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	8.36	2248747.13	3.861	77	13 - 142
Perfluoro-n-[1,2,3,4,5-13C5] nonanoic acid	8.95	2500577.94	3.729	75	15 - 143
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulf	8.95	3071479.09	3.624	72	11 - 131
S_6:2 Fluorotelomer sulfonate-13C2	8.31	114203.32	3.574	71	10 - 187

Target Compounds

Final Conc.Units: ng/L

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorobutane Sulfonate	5.51	195211.55	0.207	5.7	J
Perfluoroheptanoic Acid	7.62	44887.52	0.067	1.8	J
Perfluorohexane Sulfonate	7.70	101984.28	0.150	4.1	J
Perfluorooctanoic Acid	8.20	43124.43	0.178	4.9	J
Perfluorononanoic Acid	8.95	38408.53	0.083	2.3	J
Perfluorooctane Sulfonate	8.96	92255.64	0.170	4.7	J
6:2 Fluorotelomer sulfonate	8.32	2672.13	0.019	0.52	U
8:2 Fluorotelomer sulfonate	9.41	27894.26	0.188	5.2	J

Prep Amount:	290.0000 mL	**Dilution:**	1
Prep Final Amount:	8.00 mL	**Basis Factor:**	100.00

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Printed: 3/31/16 14:48

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Project	Ewan's Projects\PFCs
Data File	033016\1035.wiff
Result Table	033016.rdb
Instrument Name	LCMS02

Sample Name	K1602748-007	Injection Volume	10
Acquisition Date	3/30/2016 8:03:52 PM	Sample Type	Unknown
Acquisition Method	PFC_090315 schedule mrm.dam	Dilution Factor	1.00
Injection Vial	27	Weight to Volume	0.00

Results Summary

Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
Pfba 1	13c_pfba	3518282	2.60 (2.60)	257386	0.4600	No
Pfpea 1	13c_pfhxa	4037496	5.07 (5.06)	298579	0.5830	No
Pfbs 1	18o-pfhs	1252816	5.51 (5.53)	195212	0.2070	Yes
Pfhxa 1	13c_pfhxa	4037496	6.62 (6.63)	768987	0.9920	Yes
Pfhpa 1	13c_pfhxa	4037496	7.62 (7.64)	44888	0.0670	Yes
Pfhxs 1	18o-pfhs	1252816	7.70 (7.72)	101984	0.1500	Yes
Pfoa 1	13c-pfoa	2248747	8.20 (8.36)	43124	0.1780	Yes
Pfna 1	13c-pfna	2500578	8.95 (8.95)	38409	0.0830	No
Pfos 1	13c-pfos	3071479	8.96 (8.96)	92256	0.1700	No
Pfda 1	13c-pfda	1489868	9.43 (9.44)	89475	0.2840	No
Pfuna 1	13c-pfuna	356942	9.85 (9.86)	78163	0.4640	No
Pfds 1	13c-pfos	3071479	9.83 (9.84)	264895	0.3900	No
Pfdoa 1	13c-pfdoda	21479	10.20 (10.20)	137336	0.5680	No
Fosa 1	d5-NEtFOSA	714130	9.95 (9.94)	53967	0.0940	No
Pfteda 1	13c-pfdoda	21479	10.80 (10.80)	38994	0.3980	No
PFHpS 1	18o-pfhs	1252816	8.40 (8.39)	4681	0.0220	No
NMeFOSE 1	d7-NMeFOSE	1421115	10.80 (10.80)	31138	0.1150	No
NMeFOSA 1	d7-NMeFOSE	1421115	10.80 (10.80)	934	0.0080	No
NEtFOSE 1	d9-EtFOSE	1410170	11.00 (11.00)	36907	0.1080	No
NEtFOSA 1	d5-NEtFOSA	714130	0.00 (11.00)	0	N/A	No

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Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
d9-EtFOSE 1	N_mefosa_d3	872126	11.00 (11.00)	1410170	3.2630	No
d5-NEtFOSA 1	N_mefosa_d3	872126	11.00 (11.00)	714130	3.0940	No
d7-NMeFOSE 1	N_mefosa_d3	872126	10.80 (10.80)	1421115	3.4670	No
13C_PFBA 1	N_mefosa_d3	872126	2.59 (2.58)	3518282	3.6380	No
13C_PFHXA 1	N_mefosa_d3	872126	6.62 (6.63)	4037496	3.8890	No
13C-PFOA 1	N_mefosa_d3	872126	8.36 (8.35)	2248747	3.8610	No
13C-PFNA 1	N_mefosa_d3	872126	8.95 (8.96)	2500578	3.7290	No
13C-PFOS 1	N_mefosa_d3	872126	8.95 (8.95)	3071479	3.6240	No
13C-PFDA 1	N_mefosa_d3	872126	9.43 (9.45)	1489868	3.6220	No
13C-PFUNA 1	N_mefosa_d3	872126	9.85 (9.85)	356942	3.0670	No
18O-PFHxS 1	N_mefosa_d3	872126	7.71 (7.72)	1252816	3.6190	No
13C-PFDoA 1	N_mefosa_d3	872126	10.20 (10.20)	21479	2.8650	No
PFTrDA 1	13c-pfdoda	21479	10.50 (10.50)	114673	0.4810	No
6_2-FTS 1	13C2-6_2-FTS	114203	8.32 (8.31)	2672	0.0190	No
8_2-FTS 1	13C2-6_2-FTS	114203	9.41 (9.42)	27894	0.1880	No
13C2-6_2-FTS 1	N_mefosa_d3	872126	8.31 (8.31)	114203	3.5740	No

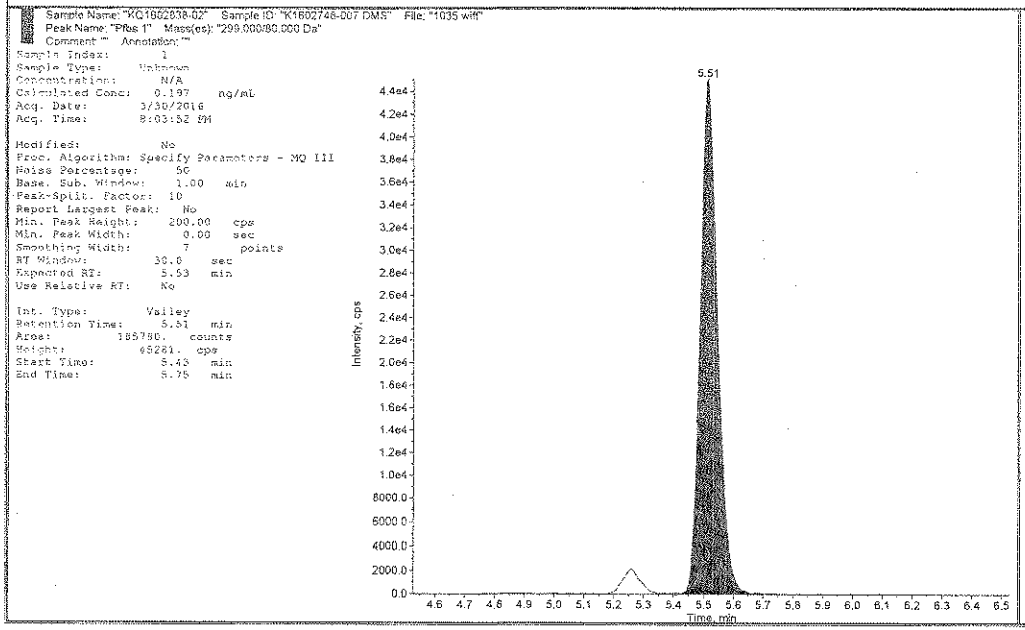
IRC Summary

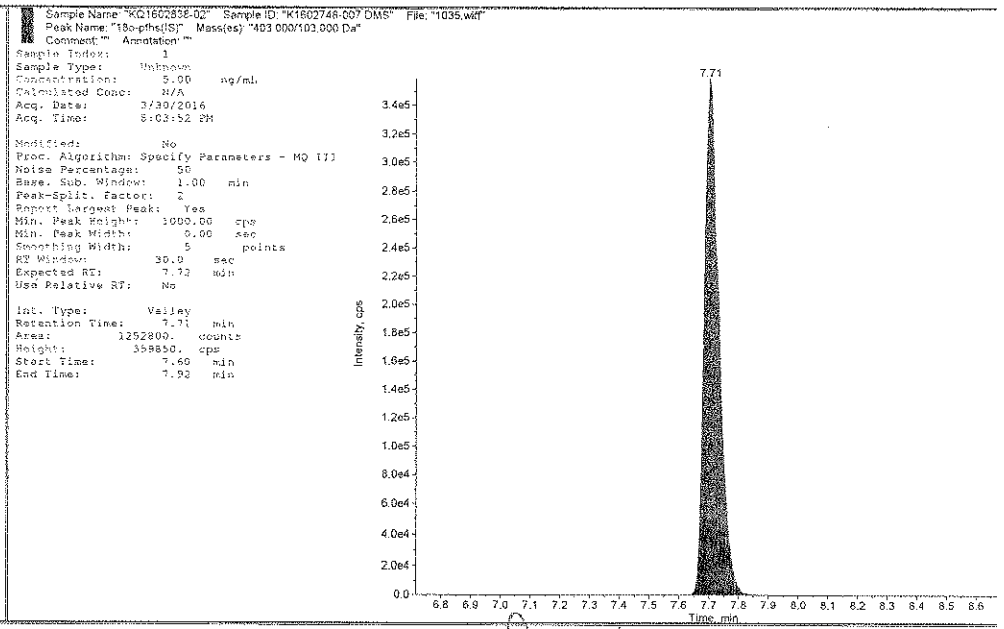
Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfba 2	2.60 (2.58)	256779	No	1.00 (0.98)	YES
Pfpea 2	5.07 (5.07)	305397	No	1.02 (1.01)	YES
Pfbs 2	5.51 (5.52)	94484	Yes	0.48 (0.48)	YES
Pfhxa 2	6.62 (6.63)	50531	No	0.07 (0.09)	No
Pfhpa 2	7.63 (7.63)	19641	Yes	0.44 (0.44)	YES
Pfhxs 2	7.70 (7.72)	35816	No	0.35 (0.40)	YES
Pfoa 2	8.36 (8.36)	68042	Yes	1.58 (1.81)	YES
Pfna 2	8.95 (8.95)	11675	No	0.30 (0.33)	YES

Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfos 2	8.96 (8.95)	35025	No	0.38 (0.36)	YES
Pfda 2	9.43 (9.44)	22819	No	0.26 (0.26)	YES
Pfuna 2	9.85 (9.85)	38904	No	0.50 (0.50)	YES
Pfds 2	9.83 (9.84)	90613	No	0.34 (0.36)	YES
Pfdoa 2	10.20 (10.20)	48147	No	0.35 (0.37)	YES
Fosa 2	9.94 (9.94)	804	No	0.01 (0.03)	No
Pfteda 2	10.80 (10.80)	15416	No	0.40 (0.42)	YES
PFHpS 2	8.40 (8.39)	1953	No	0.42 (0.39)	YES
NMeFOSE 2	0.00 (10.80)	0	No	0.00 (0.00)	No
NMeFOSA 2	0.00 (10.80)	0	No	0.00 (0.93)	No
NEtFOSE 2	0.00 (11.00)	0	No	0.00 (0.00)	No
NEtFOSA 2	0.00 (11.00)	0	No	0.00 (0.70)	No
PFTrDA 2	10.50 (10.50)	43045	No	0.38 (0.32)	YES
6_2-FTS 2	8.30 (8.30)	4733	No	1.77 (1.35)	No
8_2-FTS 2	9.41 (9.41)	3145	No	0.11 (0.12)	YES

Quantitative Peak Review **K1602748-007** *No data for Sample ID*

	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1642	033016\1034.wiff	KQ1602838-01	Unknown	13C-PFDA 1	1463000.	N/A	905090.	3.43
1643	033016\1034.wiff	KQ1602838-01	Unknown	13C-PFUNA 1	349260.	N/A	905090.	2.89
1644	033016\1034.wiff	KQ1602838-01	Unknown	18O-PFHxS 1	1204100.	N/A	905090.	3.35
1645	033016\1034.wiff	KQ1602838-01	Unknown	13C-PFDoA 1	24806.	N/A	905090.	3.19
1646	033016\1034.wiff	KQ1602838-01	Unknown	PFTrDA 1	1166500.	N/A	24806.	4.24
1647	033016\1034.wiff	KQ1602838-01	Unknown	PFTrDA 2	341640.	N/A	24806.	3.75
1648	033016\1034.wiff	KQ1602838-01	Unknown	6_2-FTS 1	708810.	N/A	115470.	4.95
1649	033016\1034.wiff	KQ1602838-01	Unknown	6_2-FTS 2	959460.	N/A	115470.	4.97
1650	033016\1034.wiff	KQ1602838-01	Unknown	8_2-FTS 1	662690.	N/A	115470.	4.42
1651	033016\1034.wiff	KQ1602838-01	Unknown	8_2-FTS 2	68555.	N/A	115470.	4.07
1652	033016\1034.wiff	KQ1602838-01	Unknown	13C2-6_2-FTS 1	115470.	N/A	905090.	3.48
1653	033016\1035.wiff	KQ1602838-02	Unknown	Pfba 1	257390.	N/A	3518300.	0.460
1654	033016\1035.wiff	KQ1602838-02	Unknown	Pfba 2	256780.	N/A	3518300.	0.425





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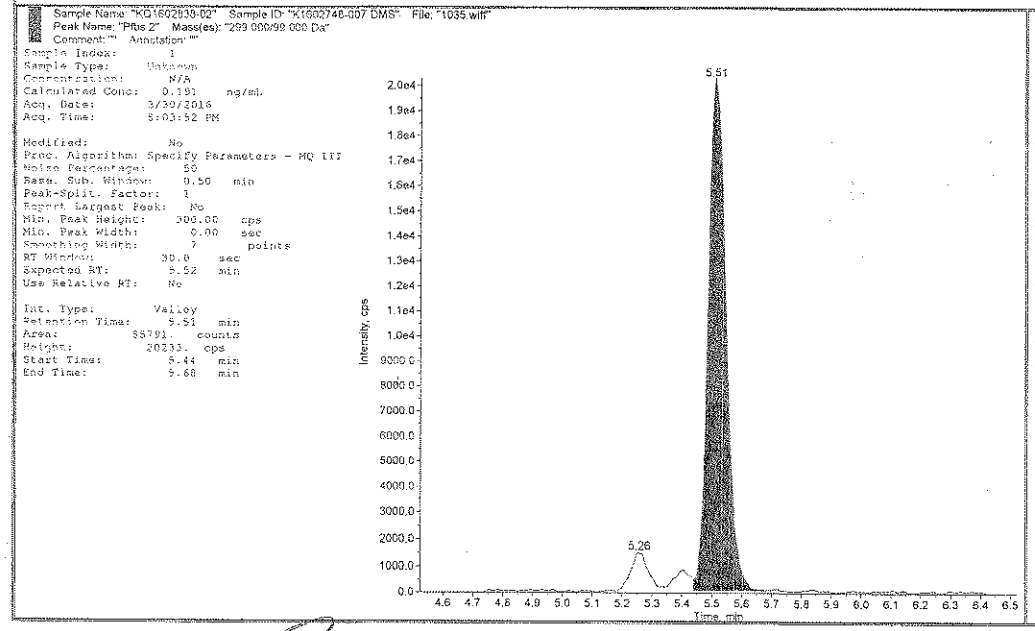
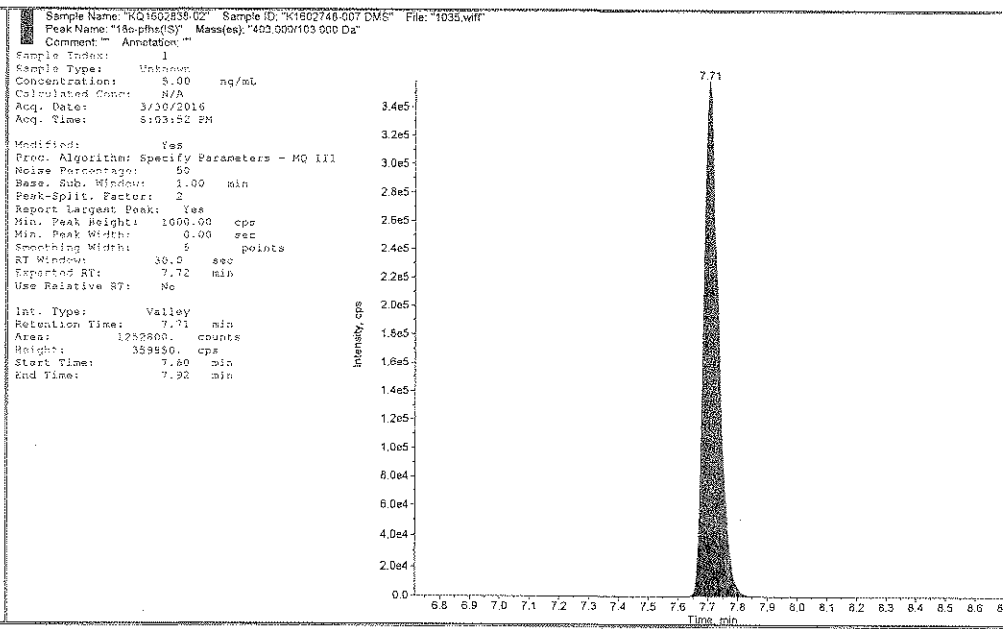
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1644	033016\1034.wiff	KQ1602838-01	Unknown	18O-PFHxS 1	1204100.	N/A	905090.	3.35
1645	033016\1034.wiff	KQ1602838-01	Unknown	13C-PFDoA 1	24806.	N/A	905090.	3.19
1646	033016\1034.wiff	KQ1602838-01	Unknown	PFTrDA 1	1166500.	N/A	24806.	4.24
1647	033016\1034.wiff	KQ1602838-01	Unknown	PFTrDA 2	341640.	N/A	24806.	3.75
1648	033016\1034.wiff	KQ1602838-01	Unknown	6_2-FTS 1	708810.	N/A	115470.	4.95
1649	033016\1034.wiff	KQ1602838-01	Unknown	6_2-FTS 2	959460.	N/A	115470.	4.97
1650	033016\1034.wiff	KQ1602838-01	Unknown	8_2-FTS 1	662690.	N/A	115470.	4.42
1651	033016\1034.wiff	KQ1602838-01	Unknown	8_2-FTS 2	68555.	N/A	115470.	4.07
1652	033016\1034.wiff	KQ1602838-01	Unknown	13C2-6_2-FTS 1	115470.	N/A	905090.	3.48
1653	033016\1035.wiff	KQ1602838-02	Unknown	Pfba 1	257390.	N/A	3518300.	0.460
1654	033016\1035.wiff	KQ1602838-02	Unknown	Pfba 2	256780.	N/A	3518300.	0.425
1655	033016\1035.wiff	KQ1602838-02	Unknown	Pfpea 1	298580.	N/A	4037500.	0.583
1656	033016\1035.wiff	KQ1602838-02	Unknown	Pfpea 2	305400.	N/A	4037500.	0.592





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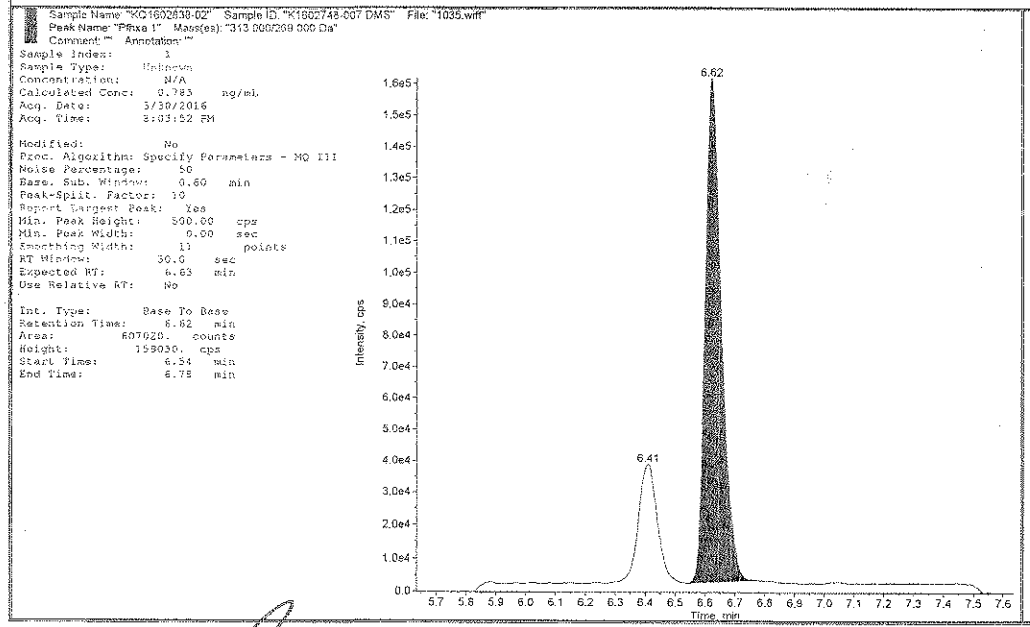
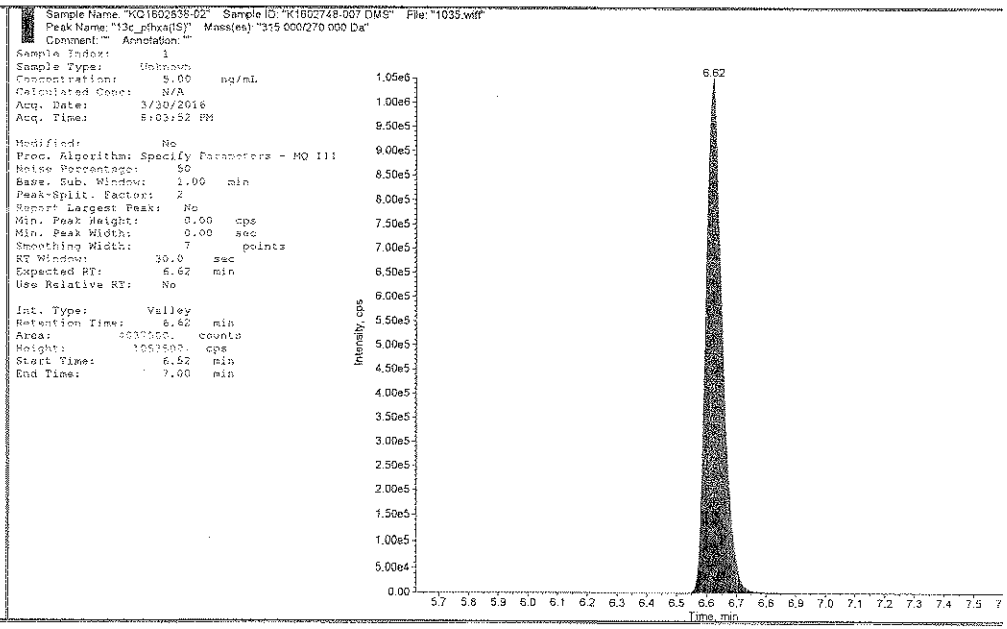
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1644	033016\1034.wiff	KQ1602838-01	Unknown	18O-PFHxS 1	1204100.	N/A	905090.	3.35
1645	033016\1034.wiff	KQ1602838-01	Unknown	13C-PFDoA 1	24806.	N/A	905090.	3.19
1646	033016\1034.wiff	KQ1602838-01	Unknown	PFTrDA 1	1166500.	N/A	24806.	4.24
1647	033016\1034.wiff	KQ1602838-01	Unknown	PFTrDA 2	341640.	N/A	24806.	3.75
1648	033016\1034.wiff	KQ1602838-01	Unknown	6_2-FTS 1	708810.	N/A	115470.	4.95
1649	033016\1034.wiff	KQ1602838-01	Unknown	6_2-FTS 2	959460.	N/A	115470.	4.97
1650	033016\1034.wiff	KQ1602838-01	Unknown	8_2-FTS 1	662690.	N/A	115470.	4.42
1651	033016\1034.wiff	KQ1602838-01	Unknown	8_2-FTS 2	68555.	N/A	115470.	4.07
1652	033016\1034.wiff	KQ1602838-01	Unknown	13C2-6_2-FTS 1	115470.	N/A	905090.	3.48
1653	033016\1035.wiff	KQ1602838-02	Unknown	Pfba 1	257390.	N/A	3518300.	0.460
1654	033016\1035.wiff	KQ1602838-02	Unknown	Pfba 2	256780.	N/A	3518300.	0.425
1655	033016\1035.wiff	KQ1602838-02	Unknown	Pfpea 1	298580.	N/A	4037500.	0.583
1656	033016\1035.wiff	KQ1602838-02	Unknown	Pfpea 2	305400.	N/A	4037500.	0.592





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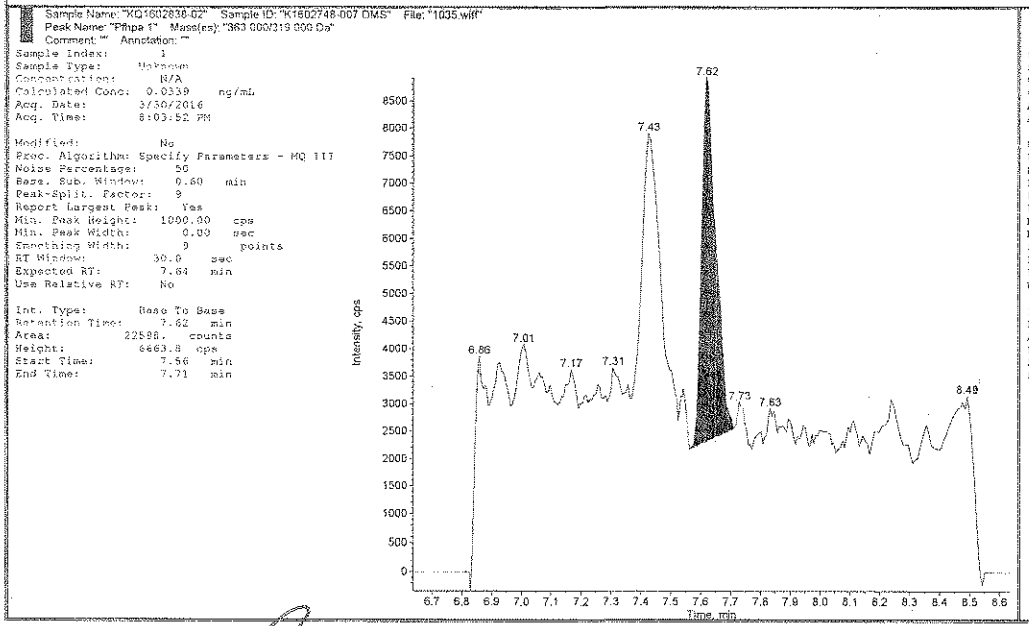
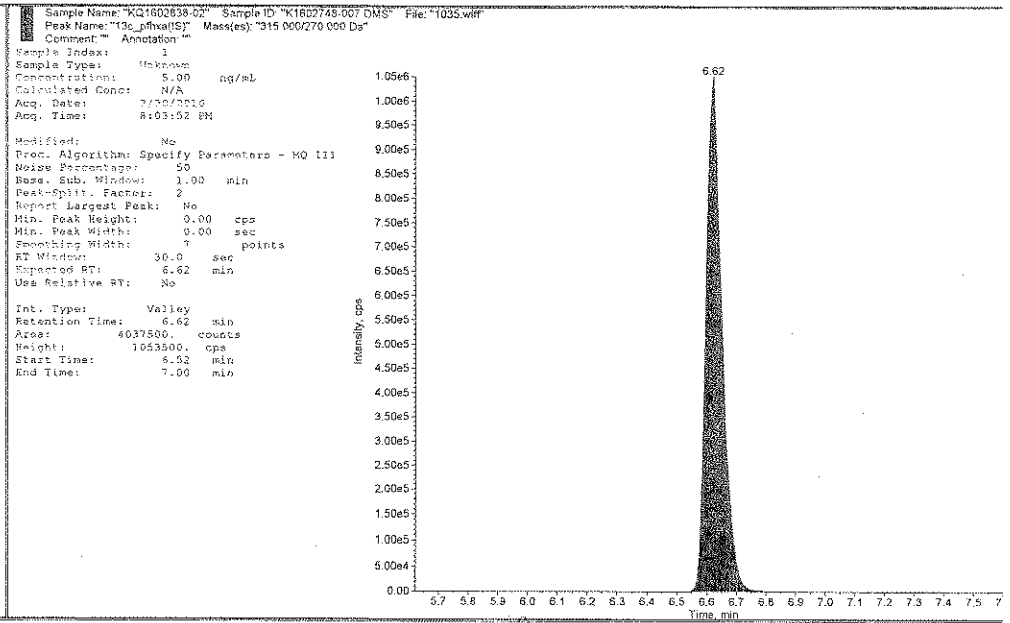
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1646	033016\1034.wiff	KQ1602838-01	Unknown	PFTrDA 1	1166500.	N/A	24806.	4.24
1647	033016\1034.wiff	KQ1602838-01	Unknown	PFTrDA 2	341640.	N/A	24806.	3.75
1648	033016\1034.wiff	KQ1602838-01	Unknown	6_2-FTS 1	708810.	N/A	115470.	4.95
1649	033016\1034.wiff	KQ1602838-01	Unknown	6_2-FTS 2	959460.	N/A	115470.	4.97
1650	033016\1034.wiff	KQ1602838-01	Unknown	8_2-FTS 1	662690.	N/A	115470.	4.42
1651	033016\1034.wiff	KQ1602838-01	Unknown	8_2-FTS 2	68555.	N/A	115470.	4.07
1652	033016\1034.wiff	KQ1602838-01	Unknown	13C2-6_2-FTS 1	115470.	N/A	905090.	3.48
1653	033016\1035.wiff	KQ1602838-02	Unknown	Pfba 1	257390.	N/A	3518300.	0.460
1654	033016\1035.wiff	KQ1602838-02	Unknown	Pfba 2	256780.	N/A	3518300.	0.425
1655	033016\1035.wiff	KQ1602838-02	Unknown	Pfpea 1	298580.	N/A	4037500.	0.583
1656	033016\1035.wiff	KQ1602838-02	Unknown	Pfpea 2	305400.	N/A	4037500.	0.592
1657	033016\1035.wiff	KQ1602838-02	Unknown	Pfbs 1	195210.	N/A	1252800.	0.207
1658	033016\1035.wiff	KQ1602838-02	Unknown	Pfbs 2	94484.	N/A	1252800.	0.210





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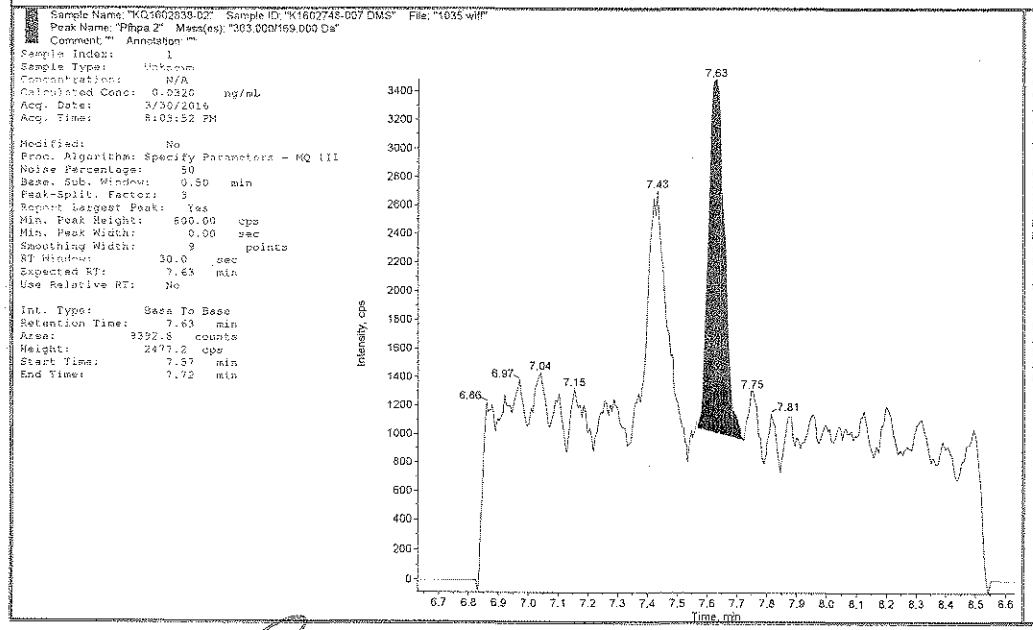
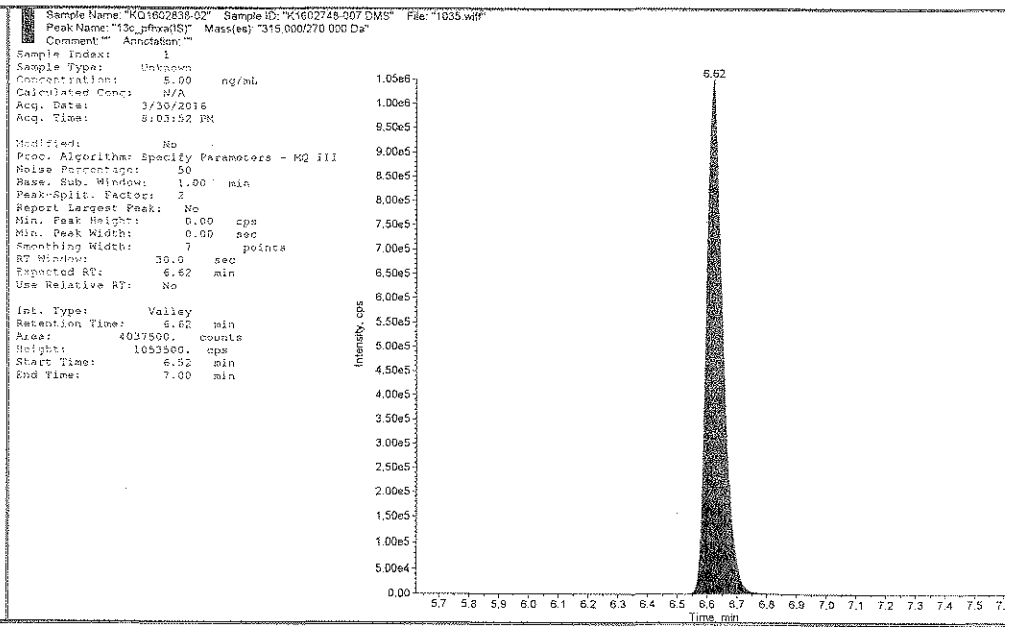
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1648	033016\1034.wiff	KQ1602838-01	Unknown	6_2-FTS 1	708810.	N/A	115470.	4.95
1649	033016\1034.wiff	KQ1602838-01	Unknown	6_2-FTS 2	959460.	N/A	115470.	4.97
1650	033016\1034.wiff	KQ1602838-01	Unknown	8_2-FTS 1	662690.	N/A	115470.	4.42
1651	033016\1034.wiff	KQ1602838-01	Unknown	8_2-FTS 2	68555.	N/A	115470.	4.07
1652	033016\1034.wiff	KQ1602838-01	Unknown	13C2-6_2-FTS 1	115470.	N/A	905090.	3.48
1653	033016\1035.wiff	KQ1602838-02	Unknown	Pfba 1	257390.	N/A	3518300.	0.460
1654	033016\1035.wiff	KQ1602838-02	Unknown	Pfba 2	256780.	N/A	3518300.	0.425
1655	033016\1035.wiff	KQ1602838-02	Unknown	Pfpea 1	298580.	N/A	4037500.	0.583
1656	033016\1035.wiff	KQ1602838-02	Unknown	Pfpea 2	305400.	N/A	4037500.	0.592
1657	033016\1035.wiff	KQ1602838-02	Unknown	Pfbs 1	195210.	N/A	1252800.	0.207
1658	033016\1035.wiff	KQ1602838-02	Unknown	Pfbs 2	94484.	N/A	1252800.	0.210
1659	033016\1035.wiff	KQ1602838-02	Unknown	Pfhxa 1	768990.	N/A	4037500.	0.992
1660	033016\1035.wiff	KQ1602838-02	Unknown	Pfhxa 2	50531.	N/A	4037500.	0.702





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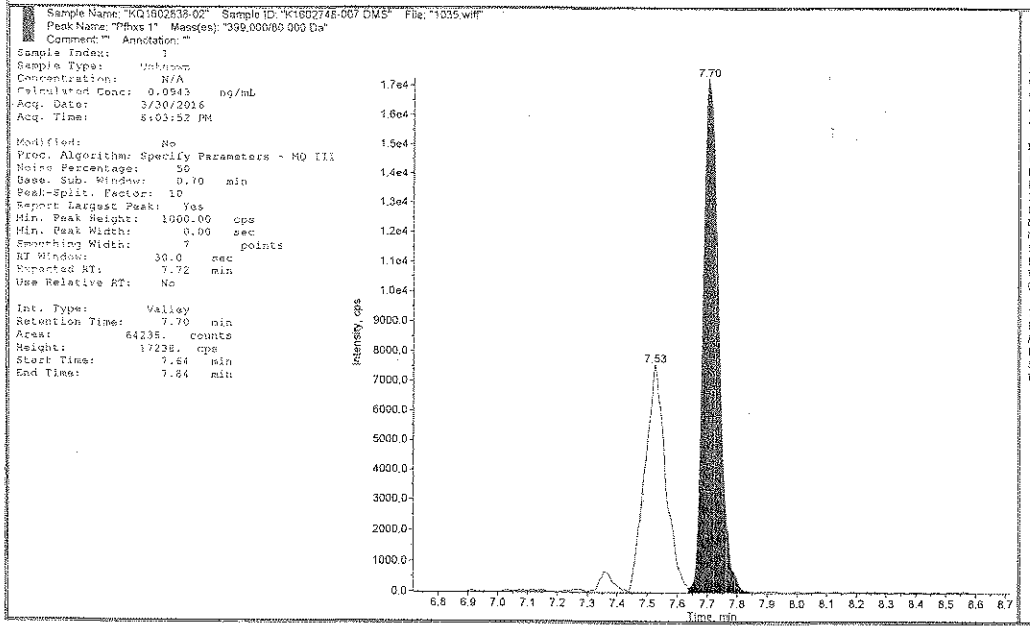
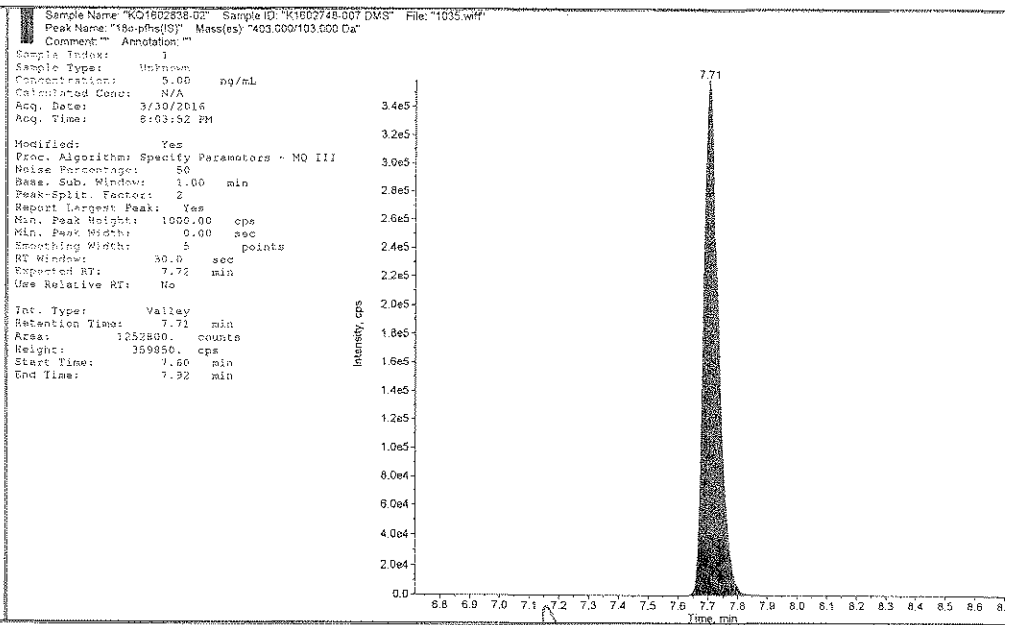
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1648	033016\1034.wiff	KQ1602838-01	Unknown	6_2-FTS 1	708810.	N/A	115470.	4.95
1649	033016\1034.wiff	KQ1602838-01	Unknown	6_2-FTS 2	959460.	N/A	115470.	4.97
1650	033016\1034.wiff	KQ1602838-01	Unknown	8_2-FTS 1	662690.	N/A	115470.	4.42
1651	033016\1034.wiff	KQ1602838-01	Unknown	8_2-FTS 2	68555.	N/A	115470.	4.07
1652	033016\1034.wiff	KQ1602838-01	Unknown	13C2-6_2-FTS 1	115470.	N/A	905090.	3.48
1653	033016\1035.wiff	KQ1602838-02	Unknown	Pfba 1	257390.	N/A	3518300.	0.460
1654	033016\1035.wiff	KQ1602838-02	Unknown	Pfba 2	256780.	N/A	3518300.	0.425
1655	033016\1035.wiff	KQ1602838-02	Unknown	Pfpea 1	298580.	N/A	4037500.	0.583
1656	033016\1035.wiff	KQ1602838-02	Unknown	Pfpea 2	305400.	N/A	4037500.	0.592
1657	033016\1035.wiff	KQ1602838-02	Unknown	Pfbs 1	195210.	N/A	1252800.	0.207
1658	033016\1035.wiff	KQ1602838-02	Unknown	Pfbs 2	94484.	N/A	1252800.	0.210
1659	033016\1035.wiff	KQ1602838-02	Unknown	Pfhxa 1	768990.	N/A	4037500.	0.992
1660	033016\1035.wiff	KQ1602838-02	Unknown	Pfhxa 2	50531.	N/A	4037500.	0.702





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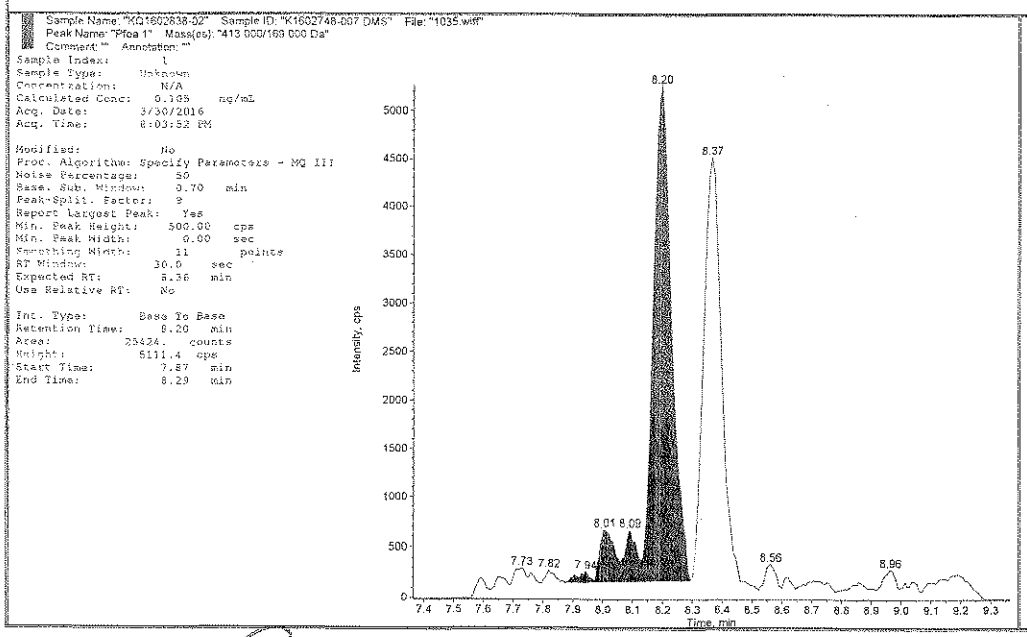
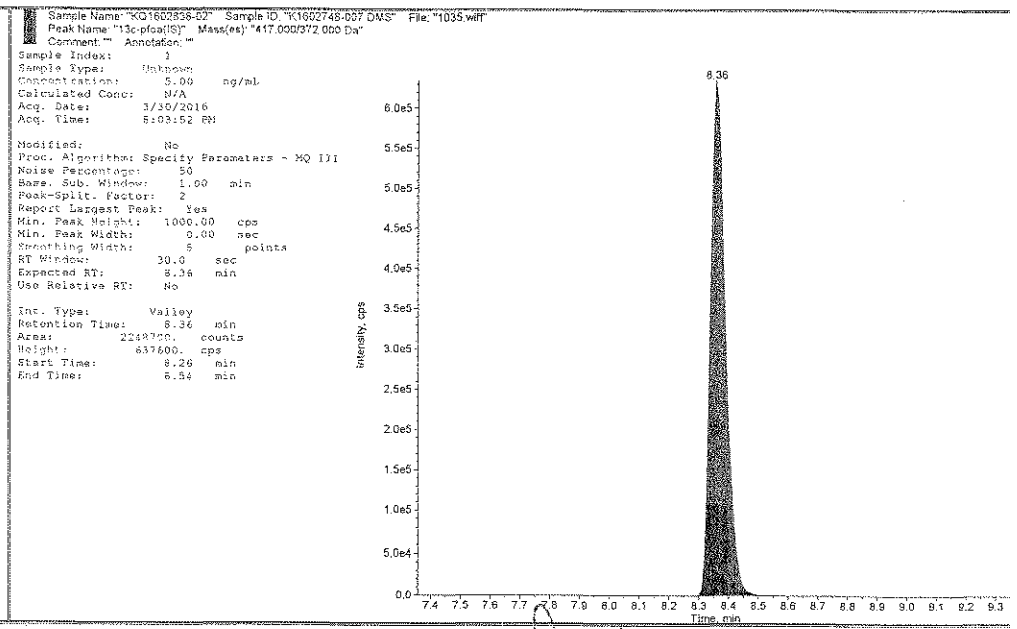
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1650	033016\1034.wiff	KQ1602838-01	Unknown	8_2-FTS 1	662690.	N/A	115470.	4.42
1651	033016\1034.wiff	KQ1602838-01	Unknown	8_2-FTS 2	68555.	N/A	115470.	4.07
1652	033016\1034.wiff	KQ1602838-01	Unknown	13C2-6_2-FTS 1	115470.	N/A	905090.	3.48
1653	033016\1035.wiff	KQ1602838-02	Unknown	Pfba 1	257390.	N/A	3518300.	0.460
1654	033016\1035.wiff	KQ1602838-02	Unknown	Pfba 2	256780.	N/A	3518300.	0.425
1655	033016\1035.wiff	KQ1602838-02	Unknown	Pfpea 1	298580.	N/A	4037500.	0.583
1656	033016\1035.wiff	KQ1602838-02	Unknown	Pfpea 2	305400.	N/A	4037500.	0.592
1657	033016\1035.wiff	KQ1602838-02	Unknown	Pfbs 1	195210.	N/A	1252800.	0.207
1658	033016\1035.wiff	KQ1602838-02	Unknown	Pfbs 2	94484.	N/A	1252800.	0.210
1659	033016\1035.wiff	KQ1602838-02	Unknown	Pfhxa 1	768990.	N/A	4037500.	0.992
1660	033016\1035.wiff	KQ1602838-02	Unknown	Pfhxa 2	50531.	N/A	4037500.	0.702
1661	033016\1035.wiff	KQ1602838-02	Unknown	Pfhpa 1	44888.	N/A	4037500.	0.0674
1662	033016\1035.wiff	KQ1602838-02	Unknown	Pfhpa 2	19641.	N/A	4037500.	0.0669





APR 0 1 2016

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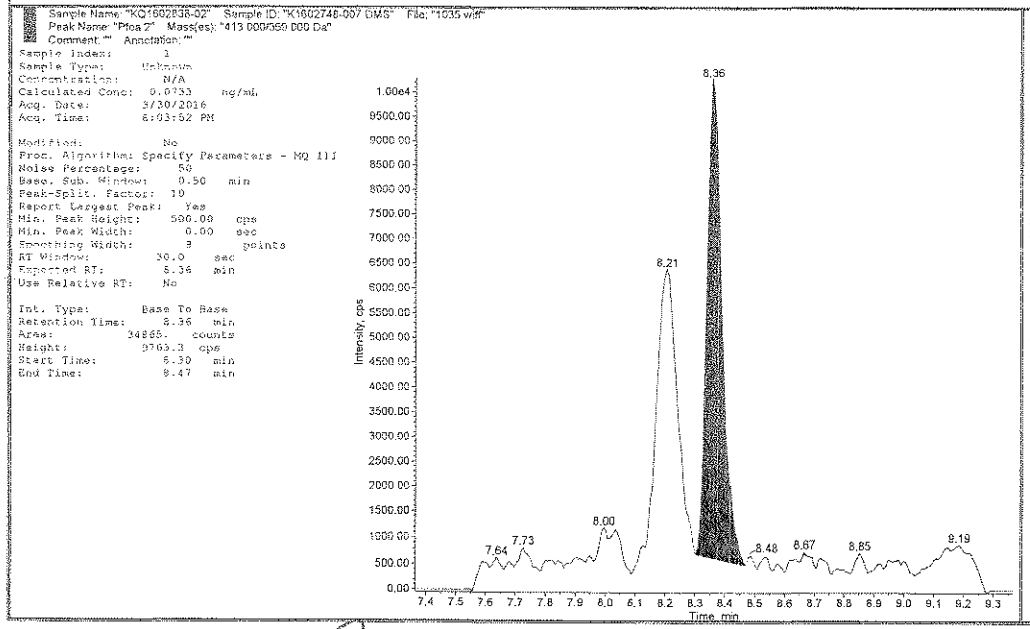
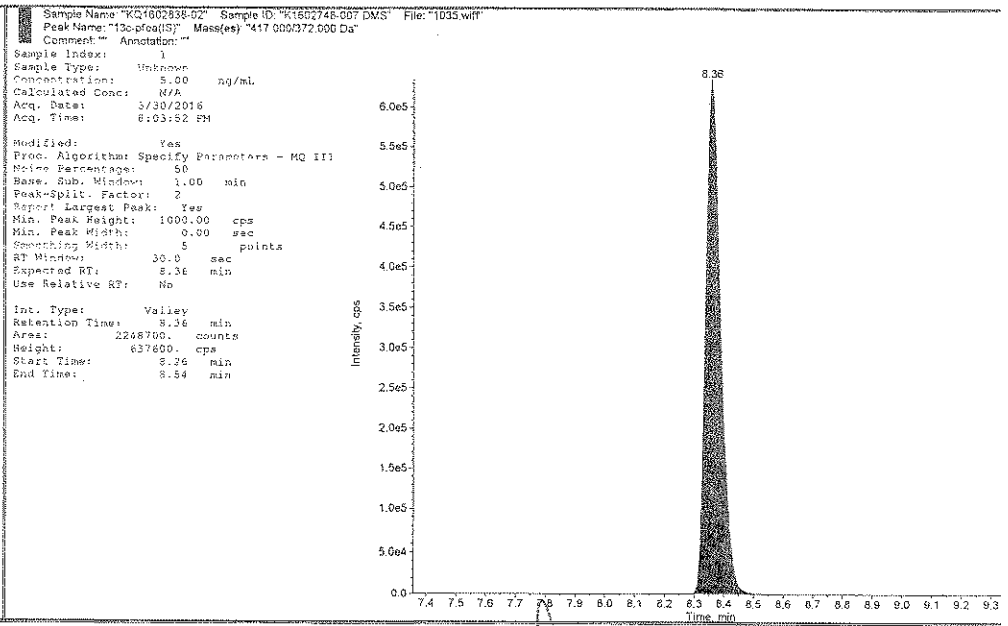
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1652	033016\1034.wiff	KQ1602838-01	Unknown	13C2-6_2-FTS 1	115470.	N/A	905090.	3.48
1653	033016\1035.wiff	KQ1602838-02	Unknown	Pfba 1	257390.	N/A	3518300.	0.460
1654	033016\1035.wiff	KQ1602838-02	Unknown	Pfba 2	256780.	N/A	3518300.	0.425
1655	033016\1035.wiff	KQ1602838-02	Unknown	Pfpea 1	298580.	N/A	4037500.	0.583
1656	033016\1035.wiff	KQ1602838-02	Unknown	Pfpea 2	305400.	N/A	4037500.	0.592
1657	033016\1035.wiff	KQ1602838-02	Unknown	Pfbs 1	195210.	N/A	1252800.	0.207
1658	033016\1035.wiff	KQ1602838-02	Unknown	Pfbs 2	94484.	N/A	1252800.	0.210
1659	033016\1035.wiff	KQ1602838-02	Unknown	Pfhxa 1	768990.	N/A	4037500.	0.992
1660	033016\1035.wiff	KQ1602838-02	Unknown	Pfhxa 2	50531.	N/A	4037500.	0.702
1661	033016\1035.wiff	KQ1602838-02	Unknown	Pfhpa 1	44888.	N/A	4037500.	0.0674
1662	033016\1035.wiff	KQ1602838-02	Unknown	Pfhpa 2	19641.	N/A	4037500.	0.0669
1663	033016\1035.wiff	KQ1602838-02	Unknown	Pfhxs 1	101980.	N/A	1252800.	0.150
1664	033016\1035.wiff	KQ1602838-02	Unknown	Pfhxs 2	35816.	N/A	1252800.	0.116





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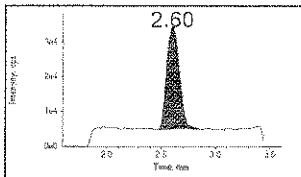
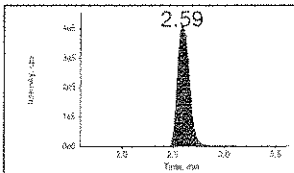
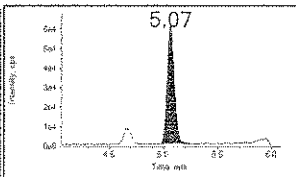


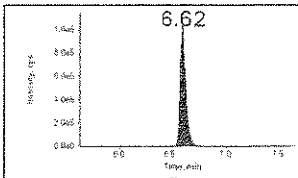
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



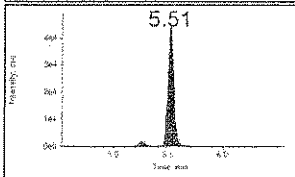
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



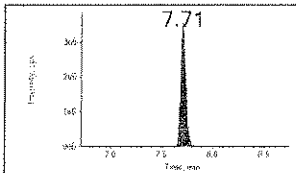
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



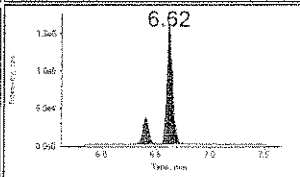
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



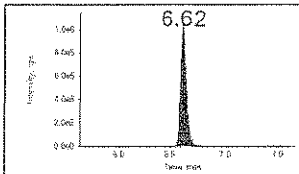
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



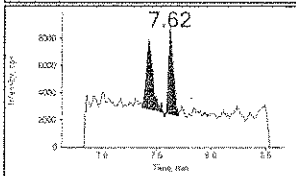
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



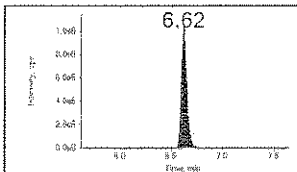
Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak



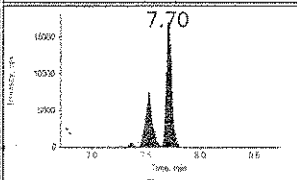
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



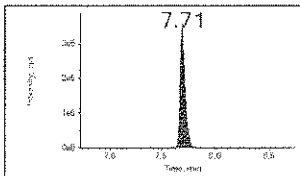
Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



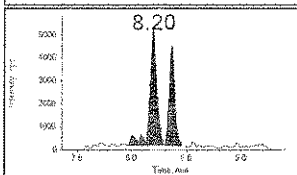
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



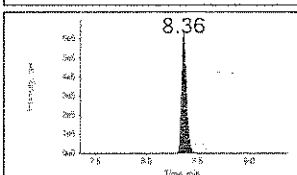
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



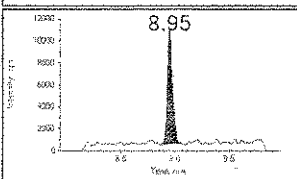
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



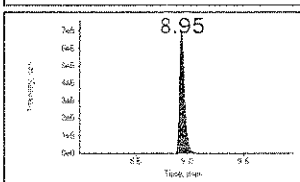
Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



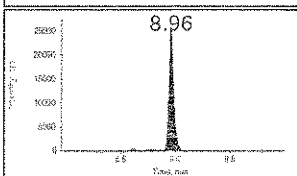
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



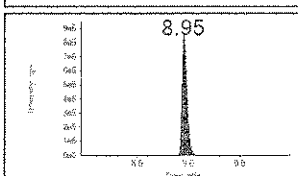
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



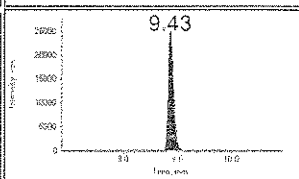
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



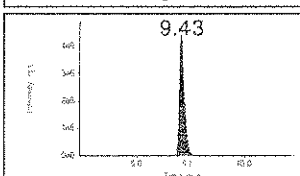
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak

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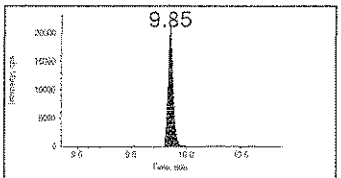
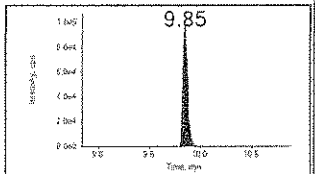
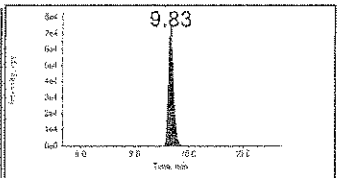


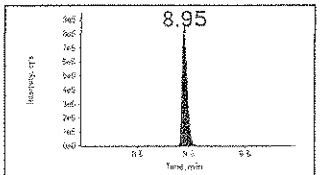
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



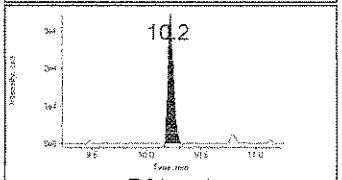
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



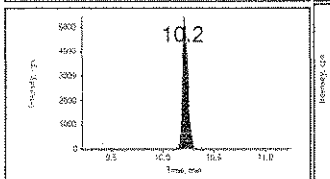
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



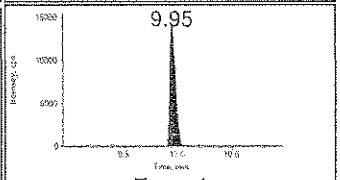
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



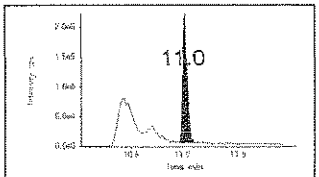
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



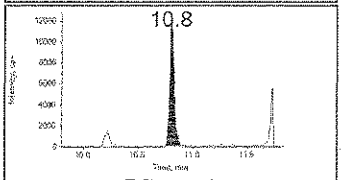
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



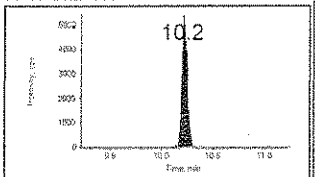
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



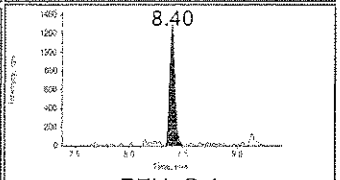
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



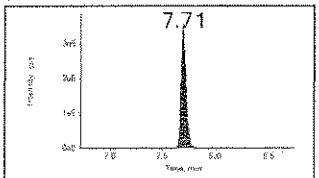
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



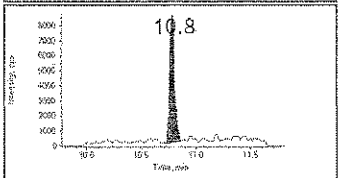
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



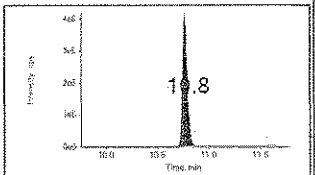
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



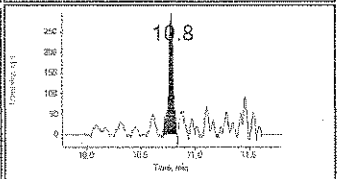
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



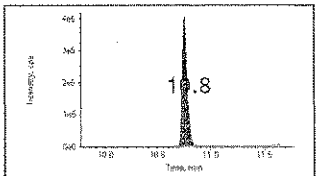
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



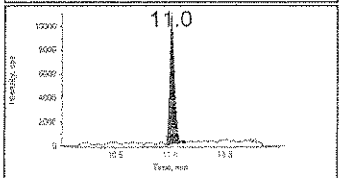
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



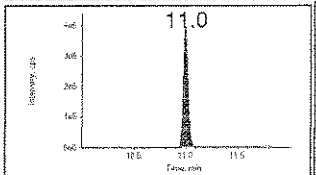
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



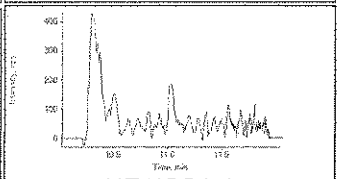
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



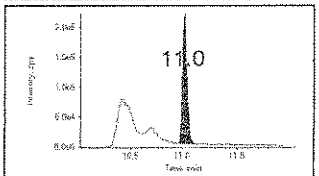
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



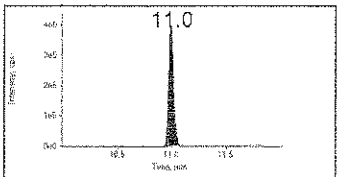
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



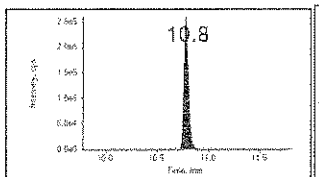
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



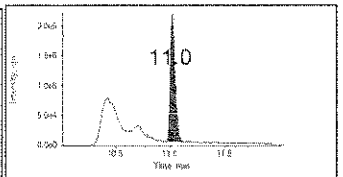
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



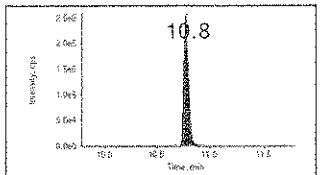
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



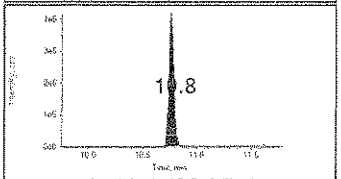
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



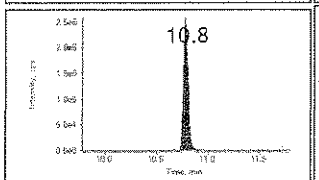
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



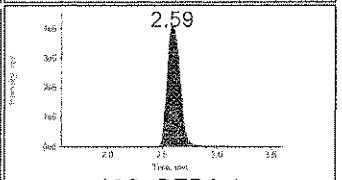
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



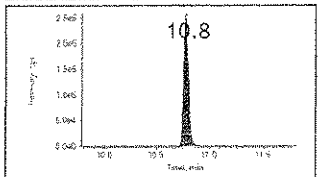
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



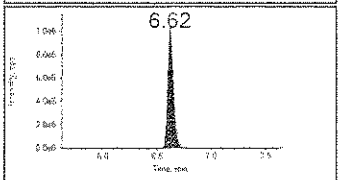
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



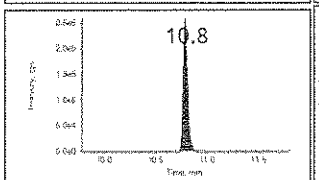
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



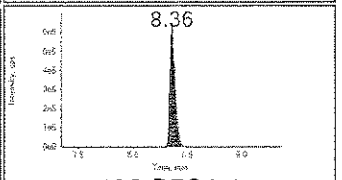
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



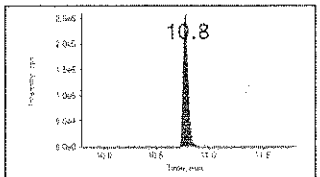
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



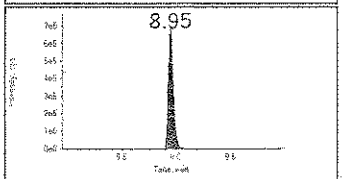
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



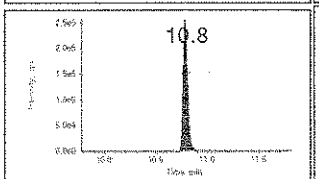
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



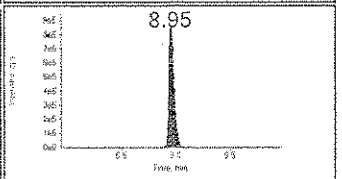
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



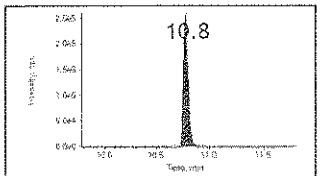
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



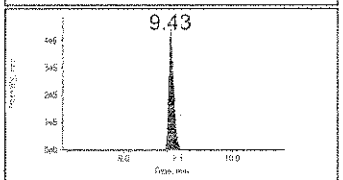
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



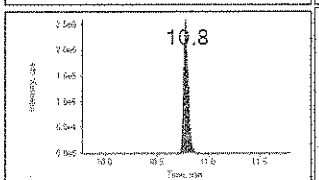
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



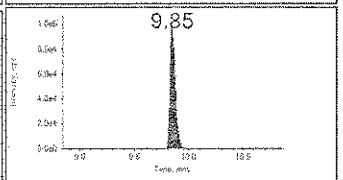
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



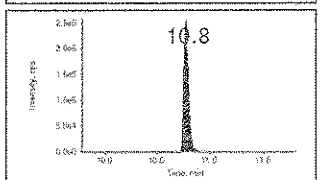
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



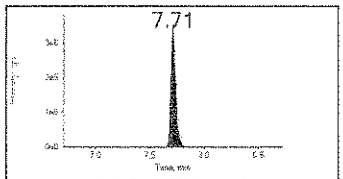
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



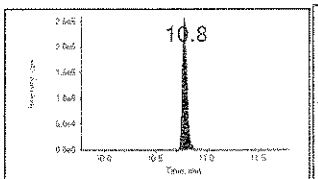
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



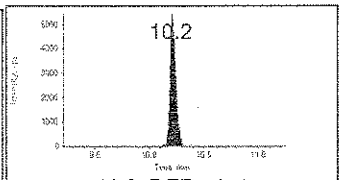
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



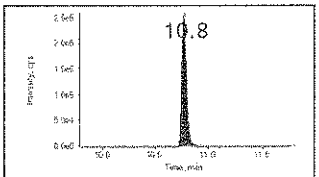
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



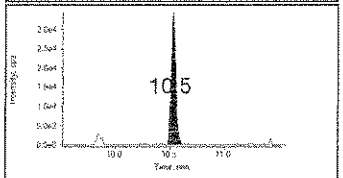
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



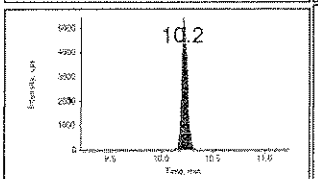
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



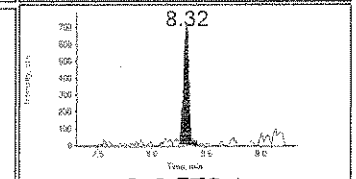
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



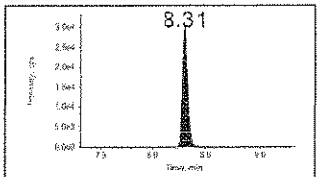
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



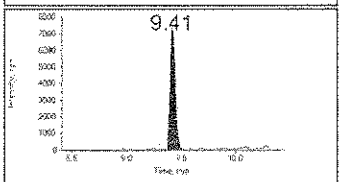
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



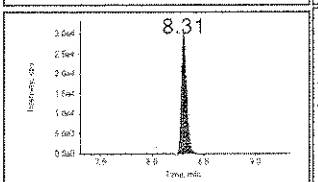
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



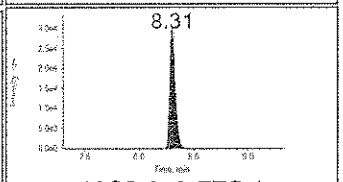
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



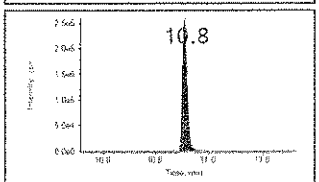
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

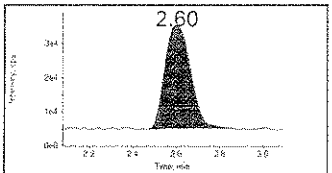


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

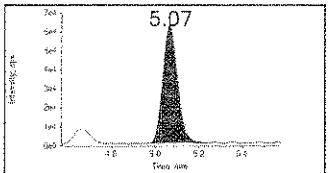


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

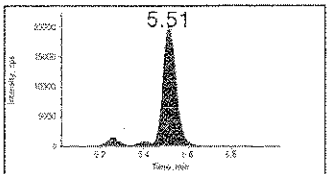
Ion Ratio Confirmation



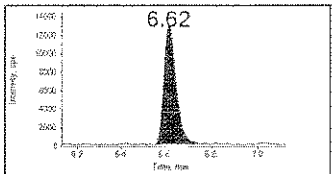
Pfba 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



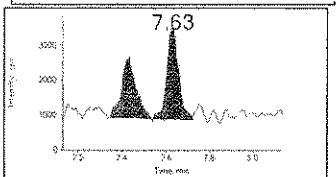
Pfpea 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



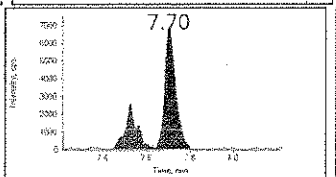
Pfbs 2
Mod? Yes
☑ Baseline □ Missed
□ Wrong Peak



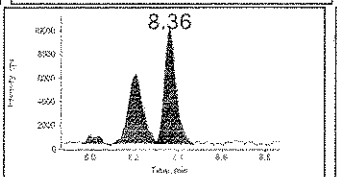
Pfhxa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



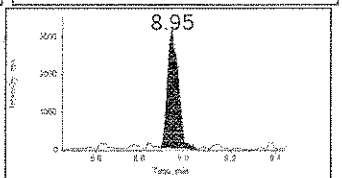
Pfhpa 2
Mod? Yes
☑ Baseline □ Missed
□ Wrong Peak



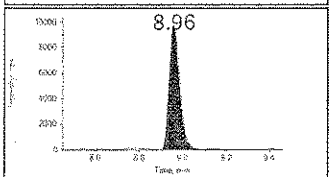
Pfhxs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



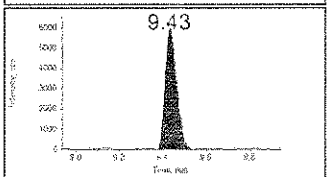
Pfoa 2
Mod? Yes
☑ Baseline □ Missed
□ Wrong Peak



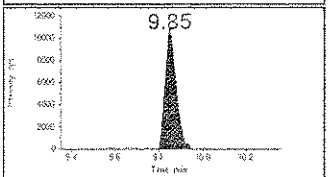
Pfna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



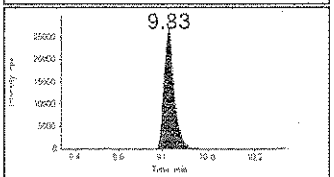
Pfos 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



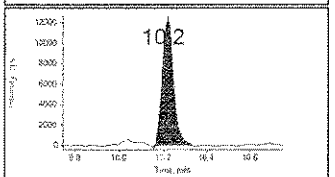
Pfda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



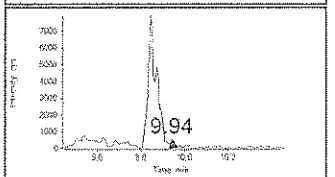
Pfuna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



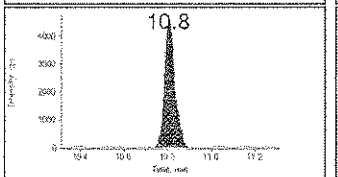
Pfds 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



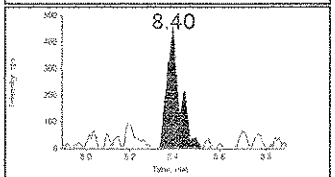
Pfdoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



Fosa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



Pfteda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



PFHpS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

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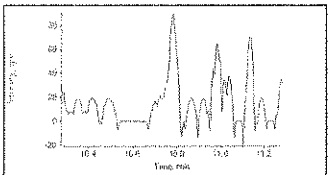
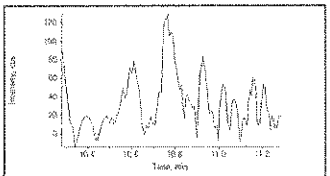
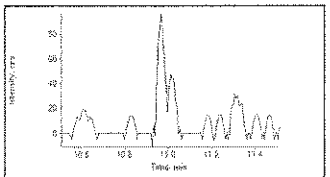


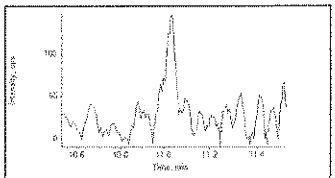
NMeFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



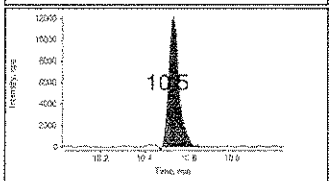
NMeFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



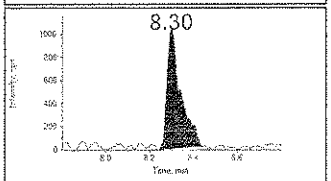
NEtFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



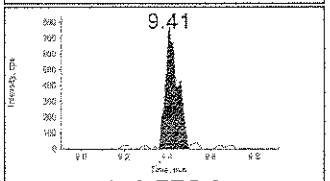
NEtFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

Quantitation Report

Data File:	033016\1034.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/30/16 19:44:30	**Vial:**	14
Run Type:	MS	**Dilution:**	1
Lab ID:	KQ1602838-01	**Raw Units:**	ng/mL

Bottle ID:	K1602748-007.09	**Tier:**	I	**Matrix:**	Water
Prod Code:	PFOA	**Collect Date:**	3/17/16	**Receive Date:**	3/18/16

Analysis Lot:	490080	**Prep Lot:**	258211	**Report Group:**	KQ1602838
Analysis Method:	PFC/537M	**Prep Method:**	EPA 3535A		
		Prep Date:	3/28/16		

Title:	Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS	**Calibration ID:**	KC1600038
		Report List ID:	14664

Internal Standard Compounds

Parameter Name	RT	Response	Solution Conc	Area Criteria
N-methyl-d3-perfluoro-1-octanesulfonamide	10.8	905086.46	5.00	OK

Surrogate Compounds

Parameter Name	RT	Response	Solution Conc	% Rec	% Rec Criteria
Perfluoro-n-[1,2,3,4-13C4] butanoic acid	2.58	3392988.08	3.381	68	19 - 126
Perfluoro-n-[1,2-13C2] hexanoic acid	6.61	3842913.03	3.567	71	10 - 151
Sodium perfluoro-1-hexane[18O2]sulfonate	7.69	1204099.13	3.352	67	20 - 128
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	8.35	2127783.93	3.520	70	13 - 142
Perfluoro-n-[1,2,3,4,5-13C5] nonanoic acid	8.94	2445544.47	3.514	70	15 - 143
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulf	8.95	3007712.39	3.420	68	11 - 131
Perfluoro-n-[1,2-13C2] decanoic acid	9.43	1462993.99	3.428	69	25 - 129
Perfluoro-n-[1,2-13C2]undecanoic Acid	9.84	349264.96	2.892	58	16 - 129
Perfluoro-n-[1,2-13C2]dodecanoic Acid	10.2	24805.79	3.189	64	17 - 114
S_N-ethyl-d5-perfluoro-1-octanesulfonamide	11.0	714735.39	2.984	60	19 - 103
d9-NEtFOSE (Surr)	11.0	1444137.17	3.220	64	20 - 113
d7-N-MeFOSE (Surr)	10.8	1354944.76	3.185	64	32 - 113
S_6:2 Fluorotelomer sulfonate-13C2	8.29	115465.65	3.482	70	10 - 187

Target Compounds

Final Conc.Units: ng/L

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorobutanoic Acid	2.58	3154497.26	5.852	161	
Perfluoropentanoic Acid	5.06	2803316.09	5.748	159	
Perfluorobutane Sulfonate	5.51	4813345.70	5.317	147	
Perfluorohexanoic Acid	6.61	4323849.00	5.863	162	
Perfluoroheptanoic Acid	7.61	3136122.46	4.945	136	
Perfluorohexane Sulfonate	7.70	3219776.78	4.917	136	
Perfluorooctanoic Acid	8.35	1160456.55	5.051	139	
Perfluorononanoic Acid	8.94	2329210.53	5.149	142	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Printed: 3/31/16 14:48

\\alprews001\starlims$\LIMSReps\QuantValidation.rpt

Data File:	033016\1034.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/30/16 19:44:30	**Vial:**	14
Run Type:	MS	**Dilution:**	1
Lab ID:	KQ1602838-01	**Raw Units:**	ng/mL

Target Compounds

Final Conc.Units: ng/L

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorooctane Sulfonate	8.95	2575148.78	4.852	134	
Perfluorodecanoic Acid	9.43	1487591.49	4.815	133	
Perfluoroundecanoic Acid	9.85	848792.97	5.147	142	
Perfluorodecane Sulfonate	9.83	2791681.93	4.199	116	
Perfluorododecanoic Acid	10.2	1343182.51	4.814	133	
Perfluorooctylsulfonamide	9.94	2775049.41	4.825	133	
Perfluoro-n-tridecanoic acid	10.5	1166503.05	4.240	117	
Perfluoro-n-tetradecanoic acid	10.8	436854.21	4.023	111	
Perfluoroheptane sulfonate	8.38	911555.08	4.402	121	
N-ethylperfluoro-1-octanesulfonamide	11.0	726167.42	5.588	154	
N-methylperfluoro-1-octanesulfonamide	10.8	483959.40	4.576	126	
2-(N-ethylperfluoro-1-octanesulfonamido)-eth	11.0	1595077.53	4.570	126	
2-(N-methylperfluoro-1-octanesulfonamido)-e	10.8	1279154.33	4.949	137	
6:2 Fluorotelomer sulfonate	8.29	708808.35	4.948	136	
8:2 Fluorotelomer sulfonate	9.41	662689.28	4.417	122	

Prep Amount:	290.0000 mL	**Dilution:**	1
Prep Final Amount:	8.00 mL	**Basis Factor:**	100.00

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Printed: 3/31/16 14:48

\\alprews001\starlims$\LIMSReps\QuantValidation.rpt

Project	Ewan's Projects\PFCs
Data File	033016\1034.wiff
Result Table	033016.rdb
Instrument Name	LCMS02

Sample Name	KQ1602838-01	Injection Volume	10
Acquisition Date	3/30/2016 7:44:30 PM	Sample Type	Unknown
Acquisition Method	PFC_090315 schedule mrm.dam	Dilution Factor	1.00
Injection Vial	26	Weight to Volume	0.00

Results Summary

Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
Pfba 1	13c_pfba	3392988	2.58 (2.60)	3154497	5.8520	No
Pfpea 1	13c_pfhxa	3842913	5.06 (5.06)	2803316	5.7480	No
Pfbs 1	18o-pfhs	1204099	5.51 (5.53)	4813346	5.3170	Yes
Pfhxa 1	13c_pfhxa	3842913	6.61 (6.63)	4323849	5.8630	Yes
Pfhpa 1	13c_pfhxa	3842913	7.61 (7.64)	3136122	4.9450	Yes
Pfhxs 1	18o-pfhs	1204099	7.70 (7.72)	3219777	4.9170	Yes
Pfoa 1	13c-pfoa	2127784	8.35 (8.36)	1160457	5.0510	Yes
Pfna 1	13c-pfna	2445544	8.94 (8.95)	2329211	5.1490	No
Pfos 1	13c-pfos	3007712	8.95 (8.96)	2575149	4.8520	No
Pfda 1	13c-pfda	1462994	9.43 (9.44)	1487591	4.8150	No
Pfuna 1	13c-pfuna	349265	9.85 (9.86)	848793	5.1470	No
Pfds 1	13c-pfos	3007712	9.83 (9.84)	2791682	4.1990	No
Pfdoa 1	13c-pfdoda	24806	10.20 (10.20)	1343183	4.8140	No
Fosa 1	d5-NEtFOSA	714735	9.94 (9.94)	2775049	4.8250	No
Pfteda 1	13c-pfdoda	24806	10.80 (10.80)	436854	4.0230	No
PFHpS 1	18o-pfhs	1204099	8.38 (8.39)	911555	4.4020	No
NMeFOSE 1	d7-NMeFOSE	1354945	10.80 (10.80)	1279154	4.9490	No
NMeFOSA 1	d7-NMeFOSE	1354945	10.80 (10.80)	483959	4.5760	No
NEtFOSE 1	d9-EtFOSE	1444137	11.00 (11.00)	1595078	4.5700	No
NEtFOSA 1	d5-NEtFOSA	714735	11.00 (11.00)	726167	5.5880	No

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Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
d9-EtFOSE 1	N_mefosa_d3	905086	11.00 (11.00)	1444137	3.2200	No
d5-NEtFOSA 1	N_mefosa_d3	905086	11.00 (11.00)	714735	2.9840	No
d7-NMeFOSE 1	N_mefosa_d3	905086	10.80 (10.80)	1354945	3.1850	No
13C_PFBA 1	N_mefosa_d3	905086	2.58 (2.58)	3392988	3.3810	No
13C_PFHXA 1	N_mefosa_d3	905086	6.61 (6.63)	3842913	3.5670	No
13C-PFOA 1	N_mefosa_d3	905086	8.35 (8.35)	2127784	3.5200	No
13C-PFNA 1	N_mefosa_d3	905086	8.94 (8.96)	2445544	3.5140	No
13C-PFOS 1	N_mefosa_d3	905086	8.95 (8.95)	3007712	3.4200	No
13C-PFDA 1	N_mefosa_d3	905086	9.43 (9.45)	1462994	3.4280	No
13C-PFUNA 1	N_mefosa_d3	905086	9.84 (9.85)	349265	2.8920	No
18O-PFHxS 1	N_mefosa_d3	905086	7.69 (7.72)	1204099	3.3520	No
13C-PFDoA 1	N_mefosa_d3	905086	10.20 (10.20)	24806	3.1890	No
PFTrDA 1	13c-pfdoda	24806	10.50 (10.50)	1166503	4.2400	No
6_2-FTS 1	13C2-6_2-FTS	115466	8.29 (8.31)	708808	4.9480	No
8_2-FTS 1	13C2-6_2-FTS	115466	9.41 (9.42)	662689	4.4170	No
13C2-6_2-FTS 1	N_mefosa_d3	905086	8.29 (8.31)	115466	3.4820	No

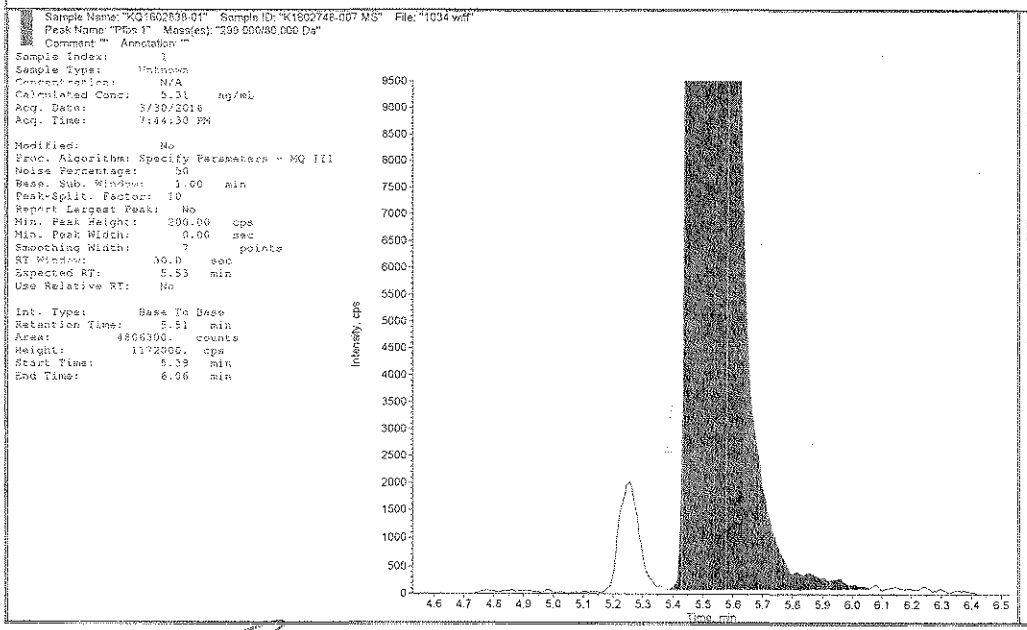
IRC Summary

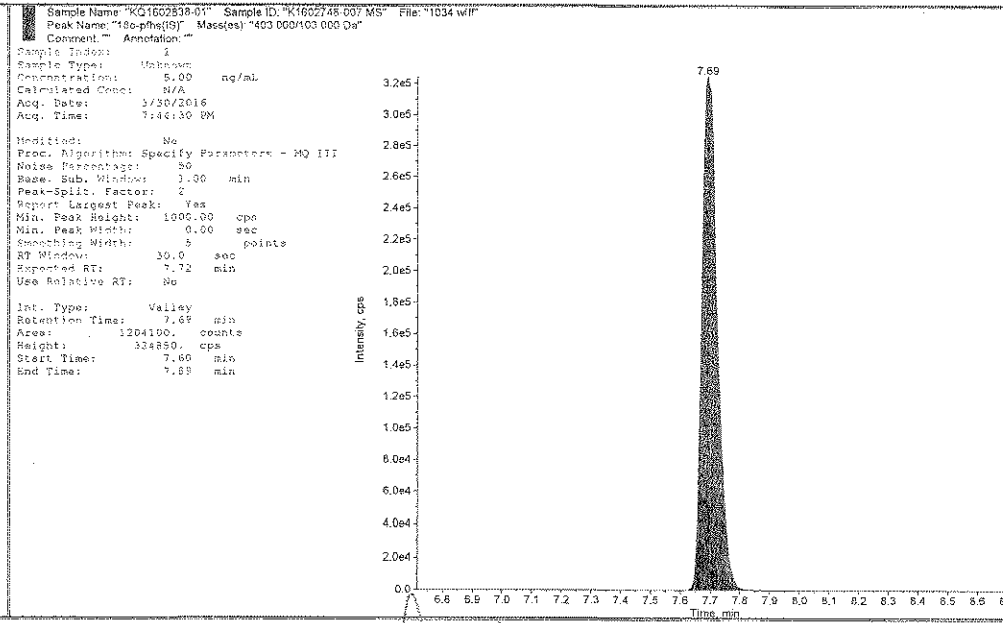
Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfba 2	2.59 (2.58)	3136798	No	0.99 (0.98)	YES
Pfpea 2	5.06 (5.07)	2820803	No	1.01 (1.01)	YES
Pfbs 2	5.51 (5.52)	2236154	Yes	0.46 (0.48)	YES
Pfhxa 2	6.61 (6.63)	344876	No	0.08 (0.09)	YES
Pfhpa 2	7.61 (7.63)	1373994	Yes	0.44 (0.44)	YES
Pfhxs 2	7.70 (7.72)	1281572	Yes	0.40 (0.40)	YES
Pfoa 2	8.35 (8.36)	2066560	Yes	1.78 (1.81)	YES
Pfna 2	8.94 (8.95)	739724	No	0.32 (0.33)	YES

Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfos 2	8.95 (8.95)	947569	No	0.37 (0.36)	YES
Pfda 2	9.43 (9.44)	396940	No	0.27 (0.26)	YES
Pfuna 2	9.84 (9.85)	405610	No	0.48 (0.50)	YES
Pfds 2	9.83 (9.84)	961390	No	0.34 (0.36)	YES
Pfdoa 2	10.20 (10.20)	444603	No	0.33 (0.37)	YES
Fosa 2	9.94 (9.94)	68421	No	0.02 (0.03)	No
Pfteda 2	10.80 (10.80)	170281	No	0.39 (0.42)	YES
PFHpS 2	8.38 (8.39)	376178	No	0.41 (0.39)	YES
NMeFOSE 2	10.80 (10.80)	8009	No	0.01 (0.00)	No
NMeFOSA 2	10.80 (10.80)	470198	No	0.97 (0.93)	YES
NEtFOSE 2	11.00 (11.00)	5160	No	0.00 (0.00)	YES
NEtFOSA 2	11.00 (11.00)	505594	No	0.70 (0.70)	YES
PFTrDA 2	10.50 (10.50)	341636	No	0.29 (0.32)	YES
6_2-FTS 2	8.29 (8.30)	959457	No	1.35 (1.35)	YES
8_2-FTS 2	9.41 (9.41)	68555	No	0.10 (0.12)	YES

Quantitative Peak Review KQ1602838-01 K1602748-007 MS

	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1583	033016\1033.wiff	K1602748-007	Unknown	13C-PFDA 1	1462600.	N/A	787790.	3.94
1584	033016\1033.wiff	K1602748-007	Unknown	13C-PFUNA 1	367760.	N/A	787790.	3.50
1585	033016\1033.wiff	K1602748-007	Unknown	18O-PFHxS 1	1220200.	N/A	787790.	3.90
1586	033016\1033.wiff	K1602748-007	Unknown	13C-PFDoA 1	23584.	N/A	787790.	3.48
1587	033016\1033.wiff	K1602748-007	Unknown	PFTrDA 1	863130.	N/A	23584.	3.30
1588	033016\1033.wiff	K1602748-007	Unknown	PFTrDA 2	271740.	N/A	23584.	3.14
1589	033016\1033.wiff	K1602748-007	Unknown	6_2-FTS 1	646900.	N/A	97524.	5.35
1590	033016\1033.wiff	K1602748-007	Unknown	6_2-FTS 2	893780.	N/A	97524.	5.49
1591	033016\1033.wiff	K1602748-007	Unknown	8_2-FTS 1	599220.	N/A	97524.	4.73
1592	033016\1033.wiff	K1602748-007	Unknown	8_2-FTS 2	63563.	N/A	97524.	4.47
1593	033016\1033.wiff	K1602748-007	Unknown	13C2-6_2-FTS 1	97524.	N/A	787790.	3.38
1594	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 1	3154500.	N/A	3393000.	5.85
1595	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 2	3136800.	N/A	3393000.	5.38





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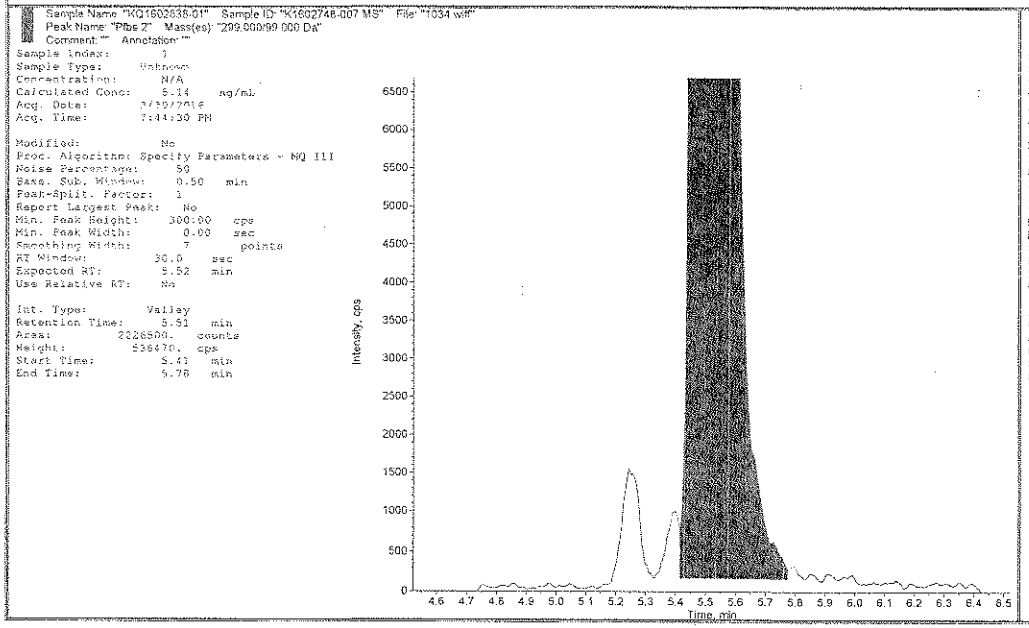
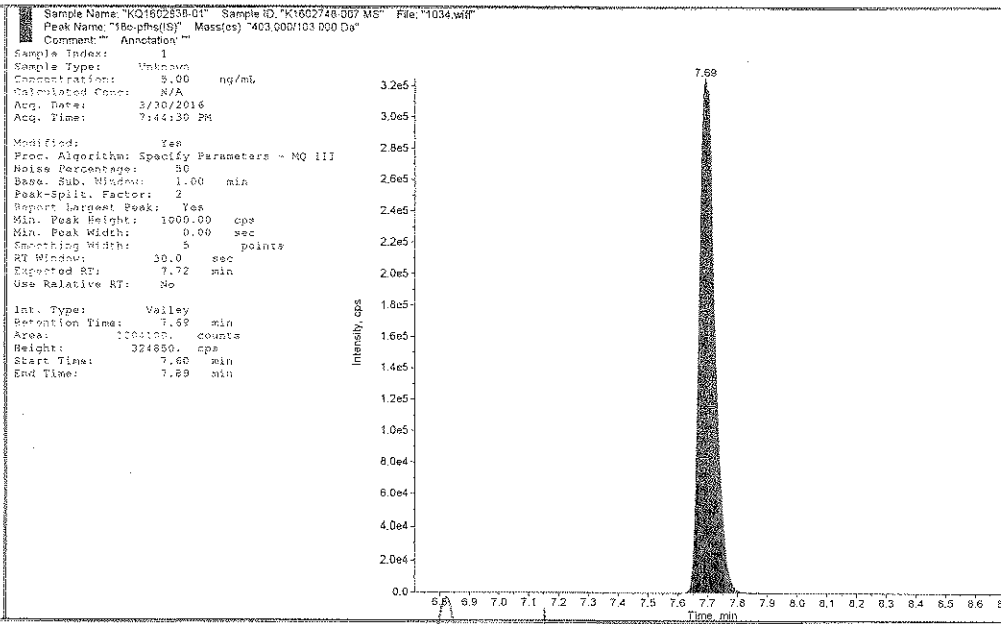
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1585	033016\1033.wiff	K1602748-007	Unknown	18O-PFHxS 1	1220200.	N/A	787790.	3.90
1586	033016\1033.wiff	K1602748-007	Unknown	13C-PFDoA 1	23584.	N/A	787790.	3.48
1587	033016\1033.wiff	K1602748-007	Unknown	PFTrDA 1	863130.	N/A	23584.	3.30
1588	033016\1033.wiff	K1602748-007	Unknown	PFTrDA 2	271740.	N/A	23584.	3.14
1589	033016\1033.wiff	K1602748-007	Unknown	6_2-FTS 1	646900.	N/A	97524.	5.35
1590	033016\1033.wiff	K1602748-007	Unknown	6_2-FTS 2	893780.	N/A	97524.	5.49
1591	033016\1033.wiff	K1602748-007	Unknown	8_2-FTS 1	599220.	N/A	97524.	4.73
1592	033016\1033.wiff	K1602748-007	Unknown	8_2-FTS 2	63563.	N/A	97524.	4.47
1593	033016\1033.wiff	K1602748-007	Unknown	13C2-6_2-FTS 1	97524.	N/A	787790.	3.38
1594	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 1	3154500.	N/A	3393000.	5.85
1595	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 2	3136800.	N/A	3393000.	5.38
1596	033016\1034.wiff	KQ1602838-01	Unknown	Pfpea 1	2803300.	N/A	3842900.	5.75
1597	033016\1034.wiff	KQ1602838-01	Unknown	Pfpea 2	2820800.	N/A	3842900.	5.74





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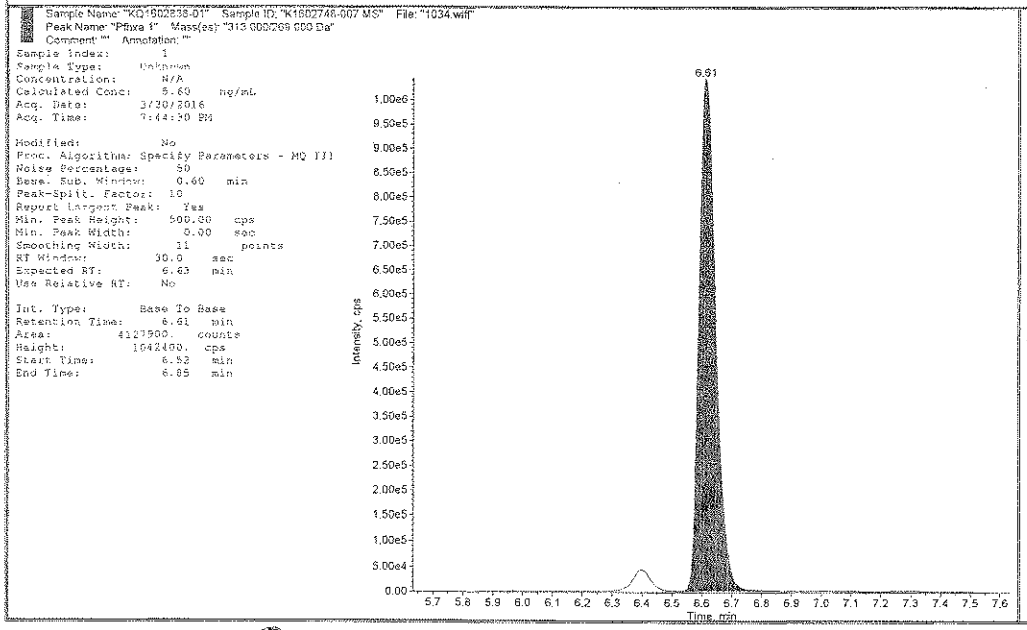
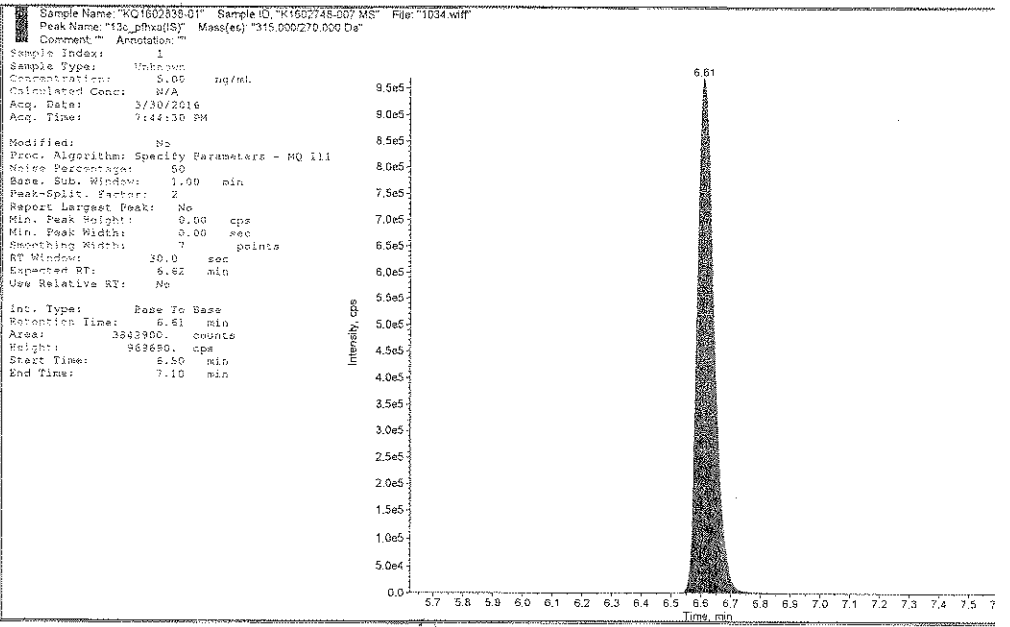
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1585	033016\1033.wiff	K1602748-007	Unknown	18O-PFHxS 1	1220200.	N/A	787790.	3.90
1586	033016\1033.wiff	K1602748-007	Unknown	13C-PFDoA 1	23584.	N/A	787790.	3.48
1587	033016\1033.wiff	K1602748-007	Unknown	PFTrDA 1	863130.	N/A	23584.	3.30
1588	033016\1033.wiff	K1602748-007	Unknown	PFTrDA 2	271740.	N/A	23584.	3.14
1589	033016\1033.wiff	K1602748-007	Unknown	6_2-FTS 1	646900.	N/A	97524.	5.35
1590	033016\1033.wiff	K1602748-007	Unknown	6_2-FTS 2	893780.	N/A	97524.	5.49
1591	033016\1033.wiff	K1602748-007	Unknown	8_2-FTS 1	599220.	N/A	97524.	4.73
1592	033016\1033.wiff	K1602748-007	Unknown	8_2-FTS 2	63563.	N/A	97524.	4.47
1593	033016\1033.wiff	K1602748-007	Unknown	13C2-6_2-FTS 1	97524.	N/A	787790.	3.38
1594	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 1	3154500.	N/A	3393000.	5.85
1595	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 2	3136800.	N/A	3393000.	5.38
1596	033016\1034.wiff	KQ1602838-01	Unknown	Pfpea 1	2803300.	N/A	3842900.	5.75
1597	033016\1034.wiff	KQ1602838-01	Unknown	Pfpea 2	2820800.	N/A	3842900.	5.74





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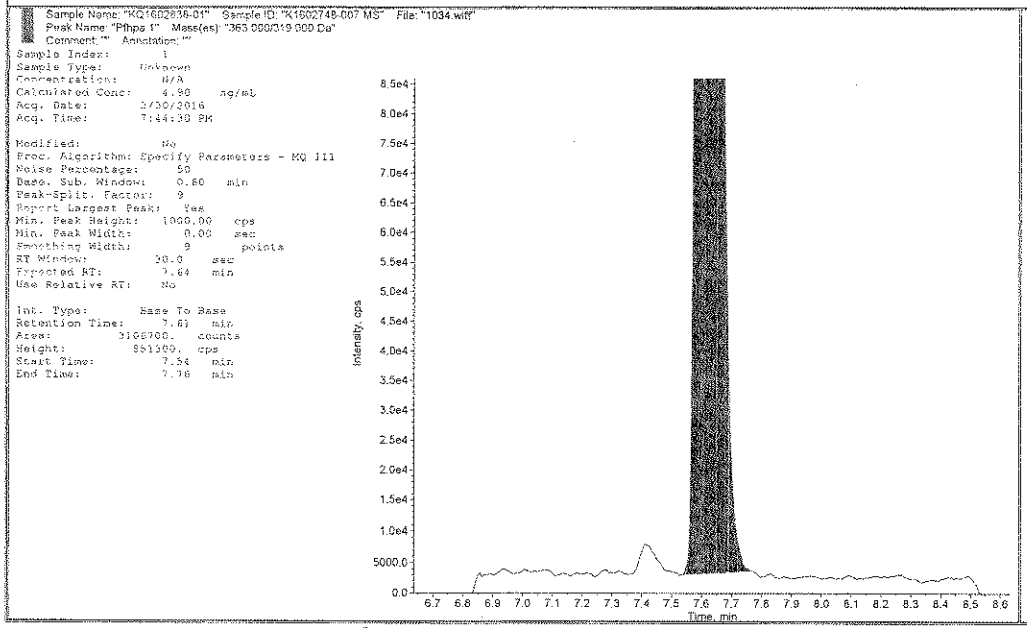
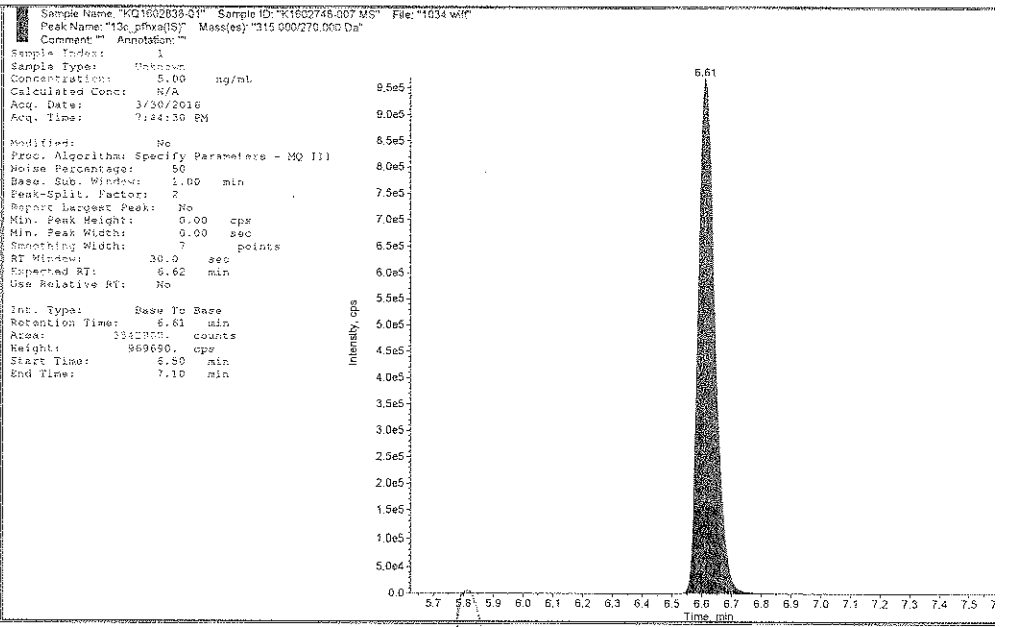
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1589	033016\1033.wiff	K1602748-007	Unknown	6_2-FTS 1	646900.	N/A	97524.	5.35
1590	033016\1033.wiff	K1602748-007	Unknown	6_2-FTS 2	893780.	N/A	97524.	5.49
1591	033016\1033.wiff	K1602748-007	Unknown	8_2-FTS 1	599220.	N/A	97524.	4.73
1592	033016\1033.wiff	K1602748-007	Unknown	8_2-FTS 2	63563.	N/A	97524.	4.47
1593	033016\1033.wiff	K1602748-007	Unknown	13C2-6_2-FTS 1	97524.	N/A	787790.	3.38
1594	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 1	3154500.	N/A	3393000.	5.85
1595	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 2	3136800.	N/A	3393000.	5.38
1596	033016\1034.wiff	KQ1602838-01	Unknown	Pfpea 1	2803300.	N/A	3842900.	5.75
1597	033016\1034.wiff	KQ1602838-01	Unknown	Pfpea 2	2820800.	N/A	3842900.	5.74
1598	033016\1034.wiff	KQ1602838-01	Unknown	Pfbs 1	4813300.	N/A	1204100.	5.32
1599	033016\1034.wiff	KQ1602838-01	Unknown	Pfbs 2	2236200.	N/A	1204100.	5.17
1600	033016\1034.wiff	KQ1602838-01	Unknown	Pfhxa 1	4323800.	N/A	3842900.	5.86
1601	033016\1034.wiff	KQ1602838-01	Unknown	Pfhxa 2	344880.	N/A	3842900.	5.03





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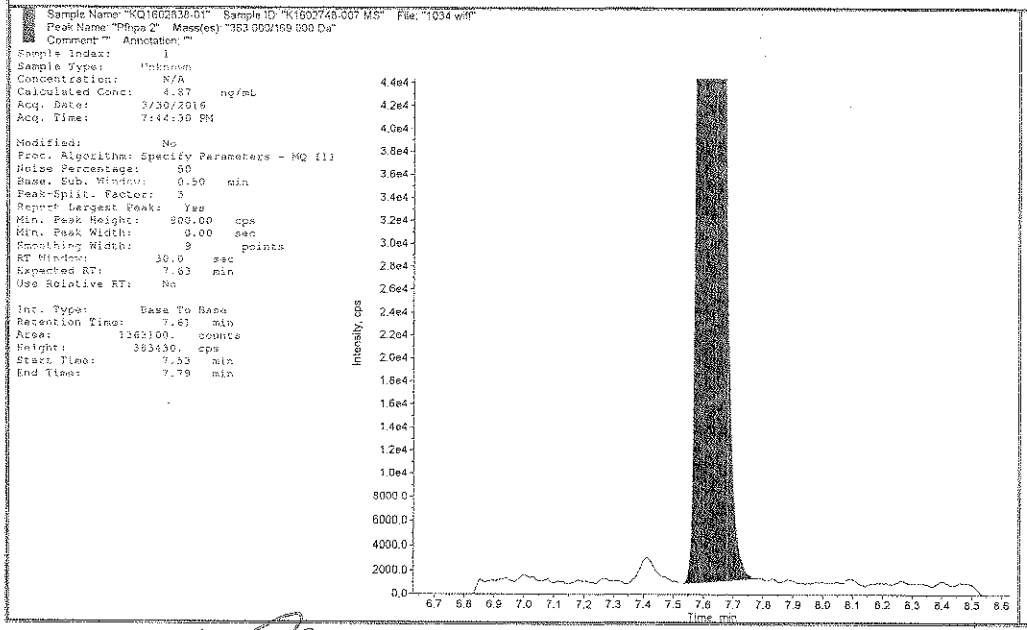
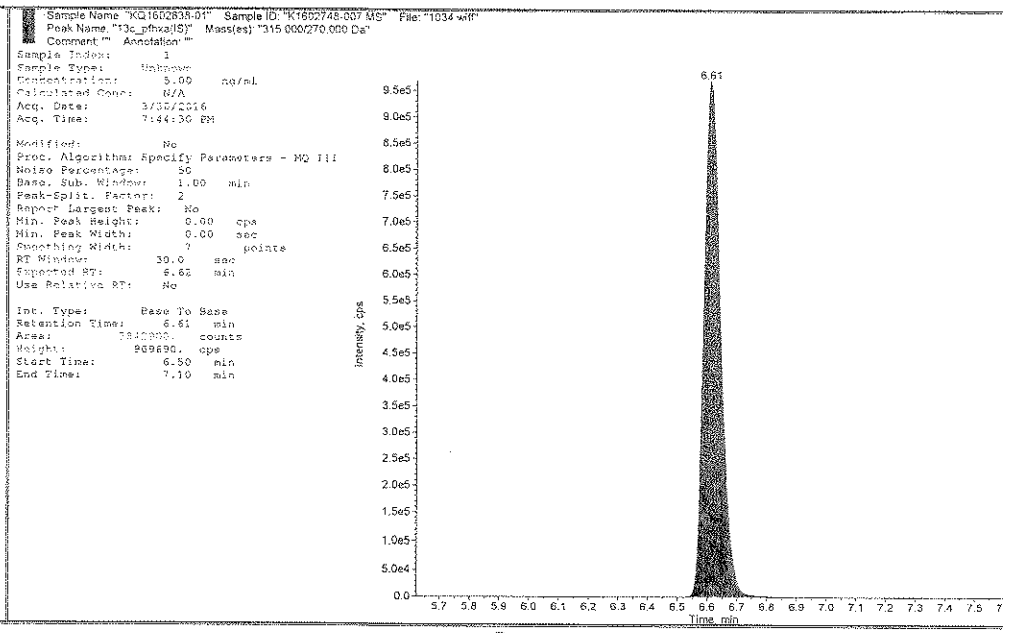
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1590	033016\1033.wiff	K1602748-007	Unknown	6_2-FTS 2	893780.	N/A	97524.	5.49
1591	033016\1033.wiff	K1602748-007	Unknown	8_2-FTS 1	599220.	N/A	97524.	4.73
1592	033016\1033.wiff	K1602748-007	Unknown	8_2-FTS 2	63563.	N/A	97524.	4.47
1593	033016\1033.wiff	K1602748-007	Unknown	13C2-6_2-FTS 1	97524.	N/A	787790.	3.38
1594	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 1	3154500.	N/A	3393000.	5.85
1595	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 2	3136800.	N/A	3393000.	5.38
1596	033016\1034.wiff	KQ1602838-01	Unknown	Pfpea 1	2803300.	N/A	3842900.	5.75
1597	033016\1034.wiff	KQ1602838-01	Unknown	Pfpea 2	2820800.	N/A	3842900.	5.74
1598	033016\1034.wiff	KQ1602838-01	Unknown	Pfbs 1	4813300.	N/A	1204100.	5.32
1599	033016\1034.wiff	KQ1602838-01	Unknown	Pfbs 2	2236200.	N/A	1204100.	5.17
1600	033016\1034.wiff	KQ1602838-01	Unknown	Pfhxa 1	4323800.	N/A	3842900.	5.86
1601	033016\1034.wiff	KQ1602838-01	Unknown	Pfhxa 2	344880.	N/A	3842900.	5.03
1602	033016\1034.wiff	KQ1602838-01	Unknown	Pfhpa 1	3136100.	N/A	3842900.	4.94





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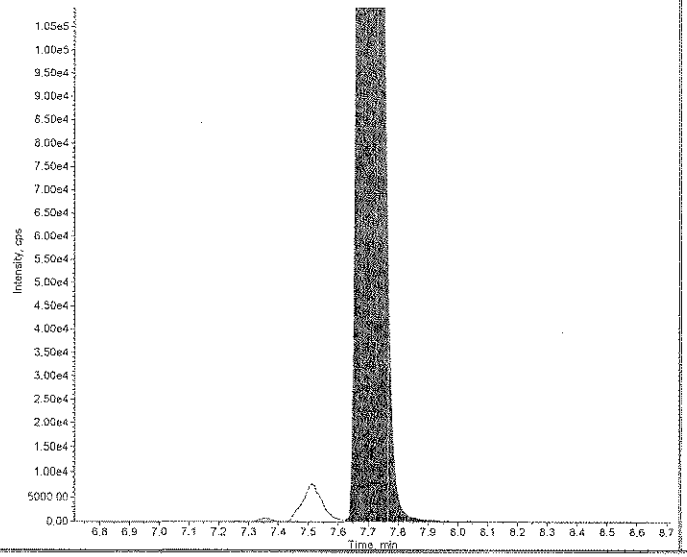
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1590	033016\1033.wiff	K1602748-007	Unknown	6_2-FTS 2	893780.	N/A	97524.	5.49
1591	033016\1033.wiff	K1602748-007	Unknown	8_2-FTS 1	599220.	N/A	97524.	4.73
1592	033016\1033.wiff	K1602748-007	Unknown	8_2-FTS 2	63563.	N/A	97524.	4.47
1593	033016\1033.wiff	K1602748-007	Unknown	13C2-6_2-FTS 1	97524.	N/A	787790.	3.38
1594	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 1	3154500.	N/A	3393000.	5.85
1595	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 2	3136800.	N/A	3393000.	5.38
1596	033016\1034.wiff	KQ1602838-01	Unknown	Pfpea 1	2803300.	N/A	3842900.	5.75
1597	033016\1034.wiff	KQ1602838-01	Unknown	Pfpea 2	2820800.	N/A	3842900.	5.74
1598	033016\1034.wiff	KQ1602838-01	Unknown	Pfbs 1	4813300.	N/A	1204100.	5.32
1599	033016\1034.wiff	KQ1602838-01	Unknown	Pfbs 2	2236200.	N/A	1204100.	5.17
1600	033016\1034.wiff	KQ1602838-01	Unknown	Pfhxa 1	4323800.	N/A	3842900.	5.86
1601	033016\1034.wiff	KQ1602838-01	Unknown	Pfhxa 2	344880.	N/A	3842900.	5.03
1602	033016\1034.wiff	KQ1602838-01	Unknown	Pfhpa 1	3136100.	N/A	3842900.	4.94

Sample Name: "KQ1602838-01" Sample ID: "K1602748-007 MS" File: "1034.wiff"
Peak Name: "Pfhxs 1" Mass(es): "399.000/80.000 Da"
Comment: "" Annotation: ""

Sample Index: 1
Sample Type: Unknown
Concentration: N/A
Calculated Conc: 4.86 ng/mL
Acq. Date: 3/30/2016
Acq. Time: 7:46:30 PM

Modified: No
Proc. Algorithm: Specify Parameters - MQ III
Noise Percentage: 50
Base. Sub. Window: 0.70 min
Peak-Split. Factor: 10
Report Largest Peak: Yes
Min. Peak Height: 1000.00 cps
Min. Peak Width: 0.00 sec
Smoothing Width: 7 points
RT Window: 30.0 sec
Expected RT: 7.72 min
Use Relative RT: No

Int. Type: Valley
Retention Time: 7.70 min
Area: 3161906. counts
Height: 801750. cps
Start Time: 7.62 min
End Time: 8.09 min

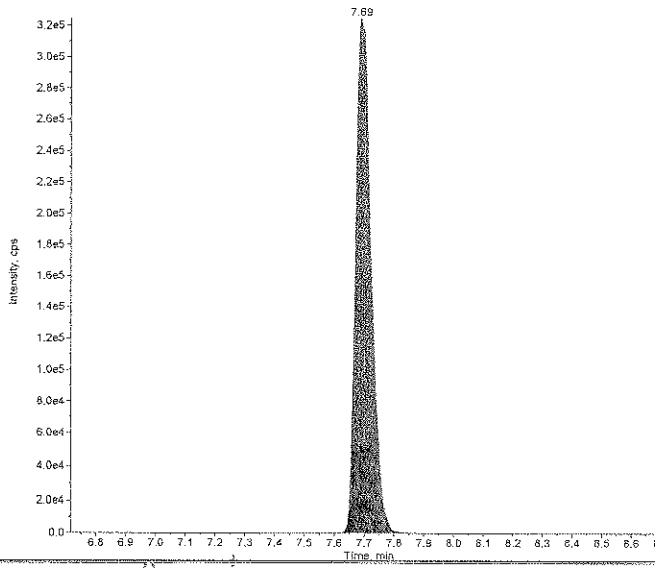


Sample Name: "KQ1602838-01" Sample ID: "K1602748-007 MS" File: "1034.wiff"
Peak Name: "13c-pfhs[6]" Mass(es): "403.000/103.000 Da"
Comment: "" Annotation: ""

Sample Index: 1
Sample Type: Unknown
Concentration: 5.00 ng/mL
Calculated Conc: N/A
Acq. Date: 3/30/2016
Acq. Time: 7:44:30 PM

Modified: Yes
Proc. Algorithm: Specify Parameters - MQ III
Noise Percentage: 50
Base. Sub. Window: 1.00 min
Peak-Split. Factor: 2
Report Largest Peak: Yes
Min. Peak Height: 1000.00 cps
Min. Peak Width: 0.00 sec
Smoothing Width: 5 points
RT Window: 30.0 sec
Expected RT: 7.72 min
Use Relative RT: No

Int. Type: Valley
Retention Time: 7.69 min
Area: 1204100. counts
Height: 324850. cps
Start Time: 7.60 min
End Time: 7.80 min



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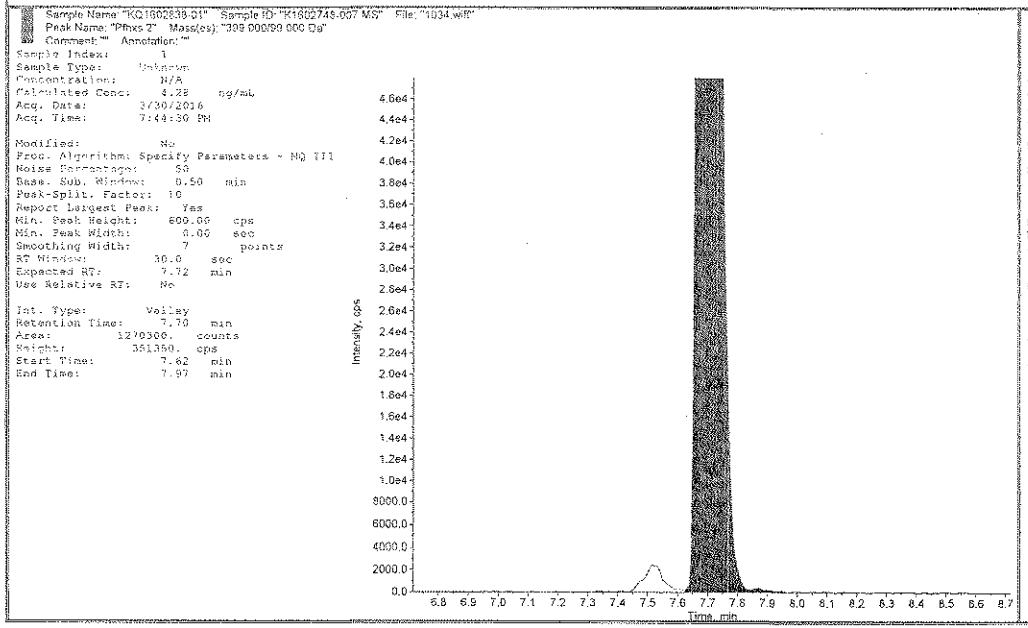
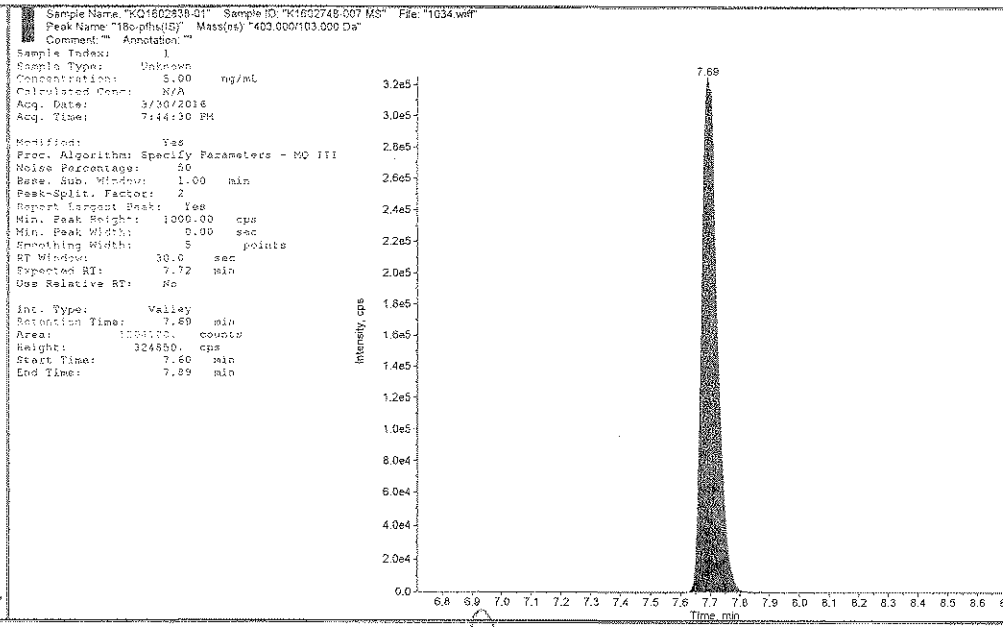
4/31/16

	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1590	033016\1033.wiff	K1602748-007	Unknown	6_2-FTS 2	893780.	N/A	97524.	5.49
1591	033016\1033.wiff	K1602748-007	Unknown	8_2-FTS 1	599220.	N/A	97524.	4.73
1592	033016\1033.wiff	K1602748-007	Unknown	8_2-FTS 2	63563.	N/A	97524.	4.47
1593	033016\1033.wiff	K1602748-007	Unknown	13C2-6_2-FTS 1	97524.	N/A	787790.	3.38
1594	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 1	3154500.	N/A	3393000.	5.85
1595	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 2	3136800.	N/A	3393000.	5.38
1596	033016\1034.wiff	KQ1602838-01	Unknown	Pfpea 1	2803300.	N/A	3842900.	5.75
1597	033016\1034.wiff	KQ1602838-01	Unknown	Pfpea 2	2820800.	N/A	3842900.	5.74
1598	033016\1034.wiff	KQ1602838-01	Unknown	Pfbs 1	4813300.	N/A	1204100.	5.32
1599	033016\1034.wiff	KQ1602838-01	Unknown	Pfbs 2	2236200.	N/A	1204100.	5.17
1600	033016\1034.wiff	KQ1602838-01	Unknown	Pfhxa 1	4323800.	N/A	3842900.	5.86
1601	033016\1034.wiff	KQ1602838-01	Unknown	Pfhxa 2	344880.	N/A	3842900.	5.03
1602	033016\1034.wiff	KQ1602838-01	Unknown	Pfhpa 1	3136100.	N/A	3842900.	4.94

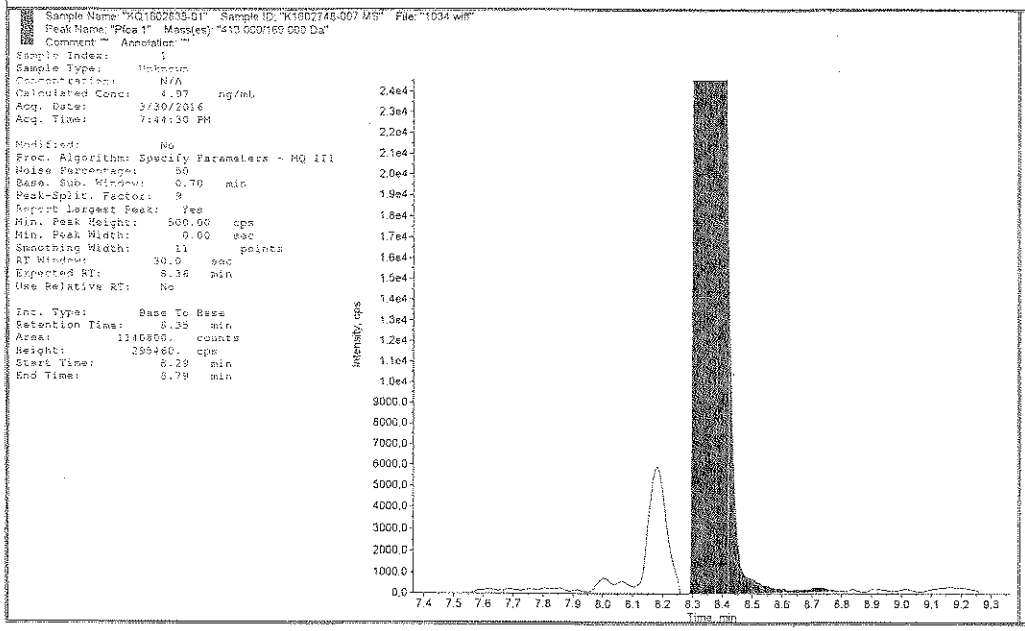


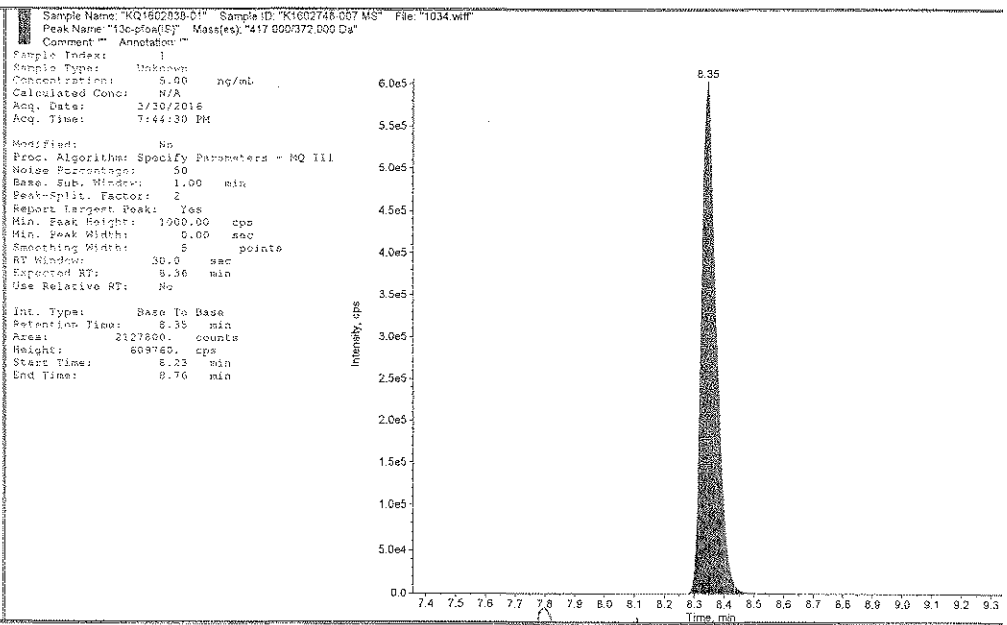


APR 0 1 2016

3/31/16

	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1592	033016\1033.wiff	K1602748-007	Unknown	8_2-FTS 2	63563.	N/A	97524.	4.47
1593	033016\1033.wiff	K1602748-007	Unknown	13C2-6_2-FTS 1	97524.	N/A	787790.	3.38
1594	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 1	3154500.	N/A	3393000.	5.85
1595	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 2	3136800.	N/A	3393000.	5.38
1596	033016\1034.wiff	KQ1602838-01	Unknown	Pfpea 1	2803300.	N/A	3842900.	5.75
1597	033016\1034.wiff	KQ1602838-01	Unknown	Pfpea 2	2820800.	N/A	3842900.	5.74
1598	033016\1034.wiff	KQ1602838-01	Unknown	Pfbs 1	4813300.	N/A	1204100.	5.32
1599	033016\1034.wiff	KQ1602838-01	Unknown	Pfbs 2	2236200.	N/A	1204100.	5.17
1600	033016\1034.wiff	KQ1602838-01	Unknown	Pfhxa 1	4323800.	N/A	3842900.	5.86
1601	033016\1034.wiff	KQ1602838-01	Unknown	Pfhxa 2	344880.	N/A	3842900.	5.03
1602	033016\1034.wiff	KQ1602838-01	Unknown	Pfhpa 1	3136100.	N/A	3842900.	4.94
1603	033016\1034.wiff	KQ1602838-01	Unknown	Pfhpa 2	1374000.	N/A	3842900.	4.91
1604	033016\1034.wiff	KQ1602838-01	Unknown	Pfhxs 1	3219800.	N/A	1204100.	4.92

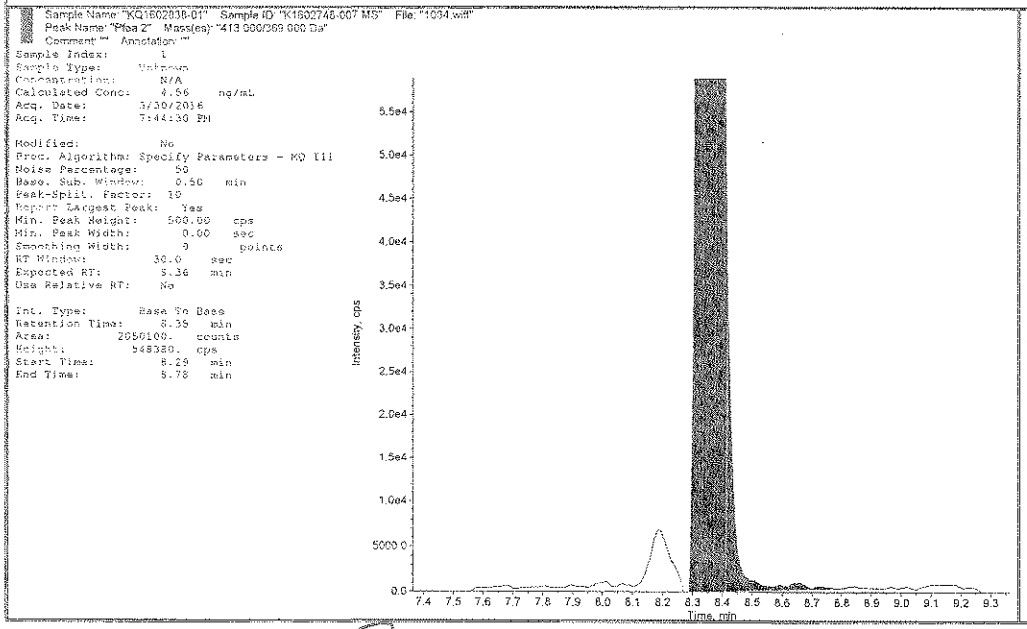


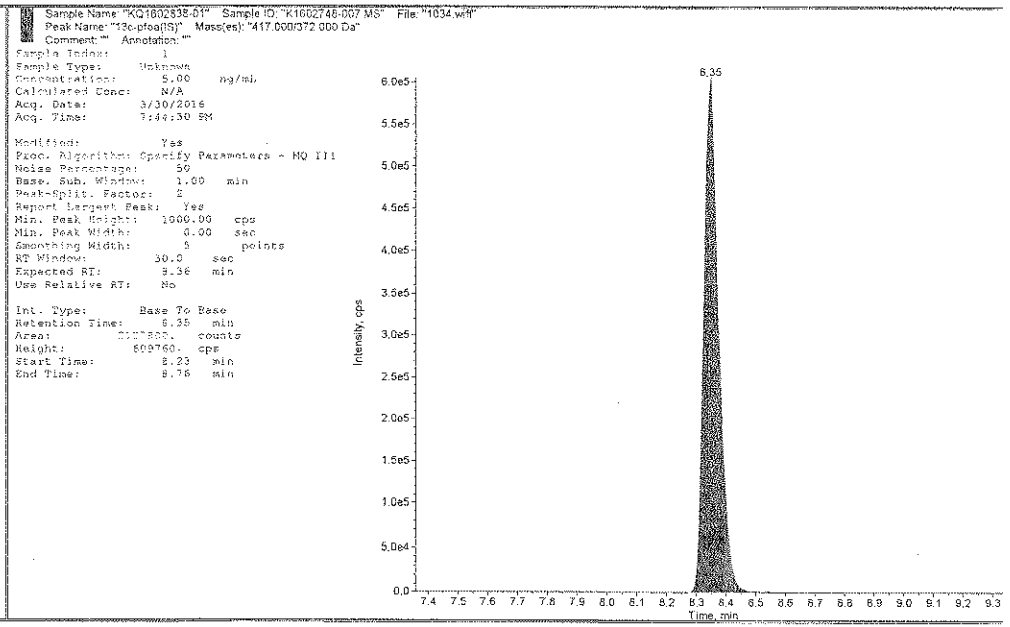


APR 0 1 2016

3/31/16

	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1592	033016\1033.wiff	K1602748-007	Unknown	8_2-FTS 2	63563.	N/A	97524.	4.47
1593	033016\1033.wiff	K1602748-007	Unknown	13C2-6_2-FTS 1	97524.	N/A	787790.	3.38
1594	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 1	3154500.	N/A	3393000.	5.85
1595	033016\1034.wiff	KQ1602838-01	Unknown	Pfba 2	3136800.	N/A	3393000.	5.38
1596	033016\1034.wiff	KQ1602838-01	Unknown	Pfpea 1	2803300.	N/A	3842900.	5.75
1597	033016\1034.wiff	KQ1602838-01	Unknown	Pfpea 2	2820800.	N/A	3842900.	5.74
1598	033016\1034.wiff	KQ1602838-01	Unknown	Pfbs 1	4813300.	N/A	1204100.	5.32
1599	033016\1034.wiff	KQ1602838-01	Unknown	Pfbs 2	2236200.	N/A	1204100.	5.17
1600	033016\1034.wiff	KQ1602838-01	Unknown	Pfhxa 1	4323800.	N/A	3842900.	5.86
1601	033016\1034.wiff	KQ1602838-01	Unknown	Pfhxa 2	344880.	N/A	3842900.	5.03
1602	033016\1034.wiff	KQ1602838-01	Unknown	Pfhpa 1	3136100.	N/A	3842900.	4.94
1603	033016\1034.wiff	KQ1602838-01	Unknown	Pfhpa 2	1374000.	N/A	3842900.	4.91
1604	033016\1034.wiff	KQ1602838-01	Unknown	Pfhxs 1	3219800.	N/A	1204100.	4.92





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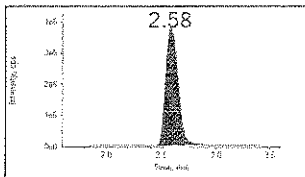
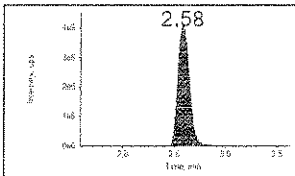
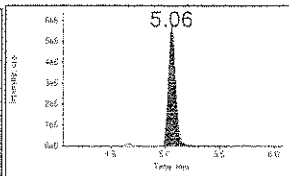
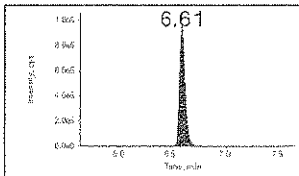
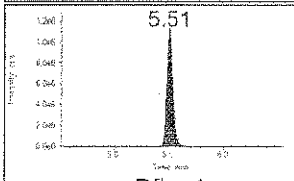
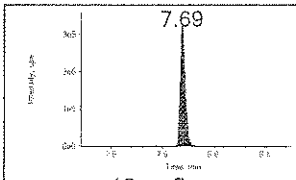
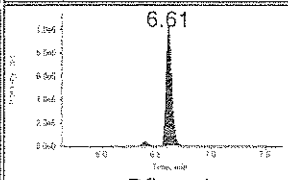
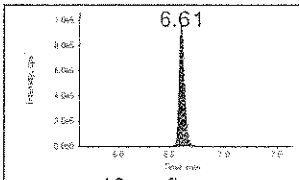
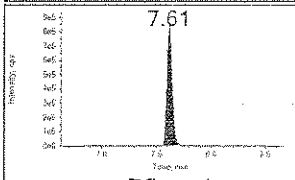
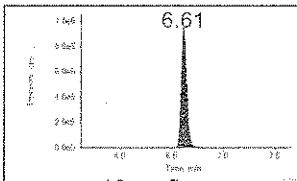
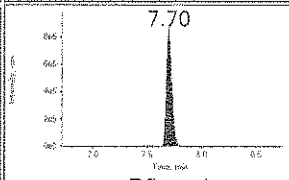
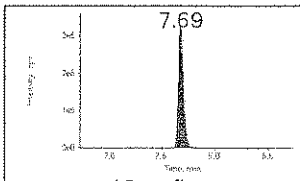
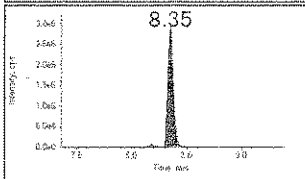
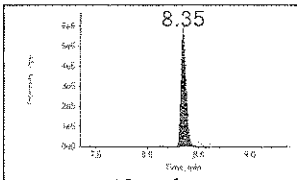
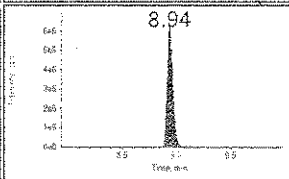
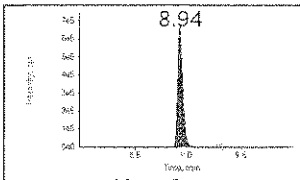
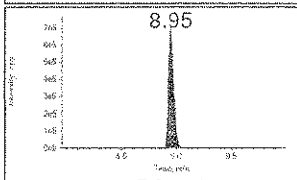
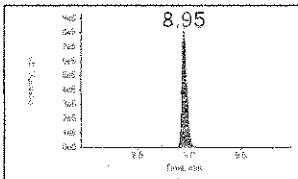
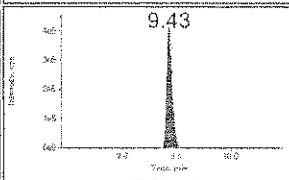
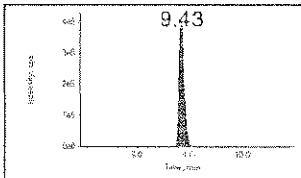
 2.58 Pfba 1 213.000/169.000 Da □ Baseline □ Missed □ Wrong Peak	 2.58 13c_pfba 217.000/172.000 Da □ Baseline □ Missed □ Wrong Peak	 5.06 Pfpea 1 263.000/219.000 Da □ Baseline □ Missed □ Wrong Peak	 6.61 13c_pfhxa 315.000/270.000 Da □ Baseline □ Missed □ Wrong Peak
 5.51 Pfbs 1 299.000/80.000 Da ☑ Baseline □ Missed □ Wrong Peak	 7.69 18o-pfhs 403.000/103.000 Da □ Baseline □ Missed □ Wrong Peak	 6.61 Pfhxa 1 313.000/269.000 Da ☑ Baseline □ Missed □ Wrong Peak	 6.61 13c_pfhxa 315.000/270.000 Da □ Baseline □ Missed □ Wrong Peak
 7.61 Pfhpa 1 363.000/319.000 Da ☑ Baseline □ Missed □ Wrong Peak	 6.61 13c_pfhxa 315.000/270.000 Da □ Baseline □ Missed □ Wrong Peak	 7.70 Pfhxs 1 399.000/80.000 Da ☑ Baseline □ Missed □ Wrong Peak	 7.69 18o-pfhs 403.000/103.000 Da □ Baseline □ Missed □ Wrong Peak
 8.35 Pfoa 1 413.000/169.000 Da ☑ Baseline □ Missed □ Wrong Peak	 8.35 13c-pfoa 417.000/372.000 Da □ Baseline □ Missed □ Wrong Peak	 8.94 Pfna 1 463.000/419.000 Da □ Baseline □ Missed □ Wrong Peak	 8.94 13c-pfna 468.000/423.000 Da □ Baseline □ Missed □ Wrong Peak
 8.95 Pfos 1 499.000/80.000 Da □ Baseline □ Missed □ Wrong Peak	 8.95 13c-pfos 503.000/80.000 Da □ Baseline □ Missed □ Wrong Peak	 9.43 Pfda 1 513.000/469.000 Da □ Baseline □ Missed □ Wrong Peak	 9.43 13c-pfda 515.000/470.000 Da □ Baseline □ Missed □ Wrong Peak

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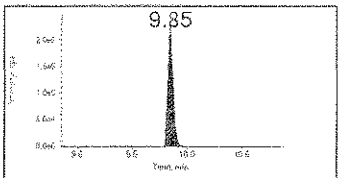
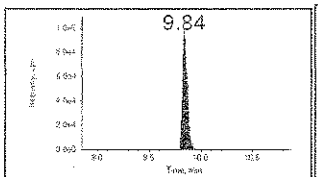
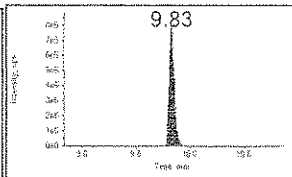


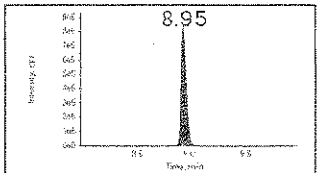
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



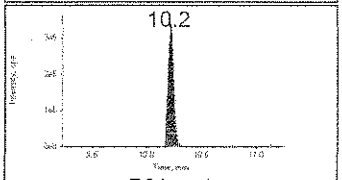
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



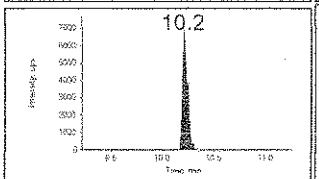
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



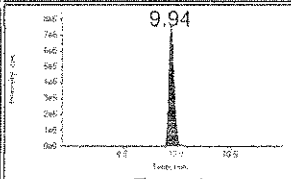
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



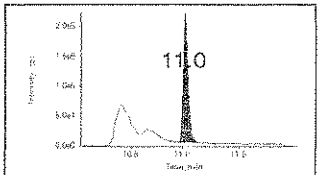
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



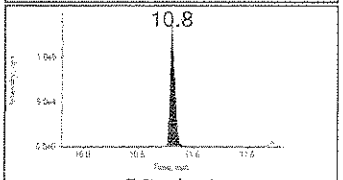
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



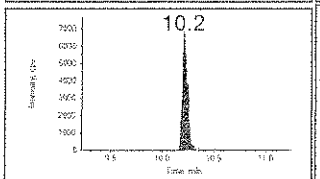
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



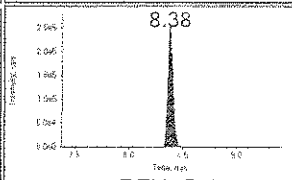
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



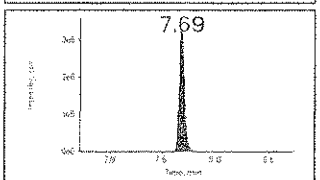
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



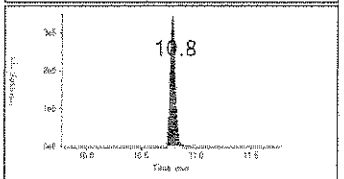
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



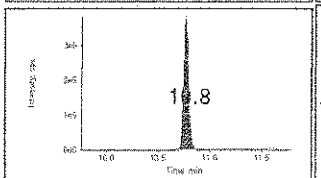
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



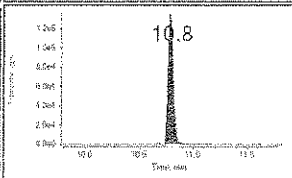
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



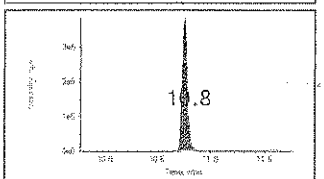
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



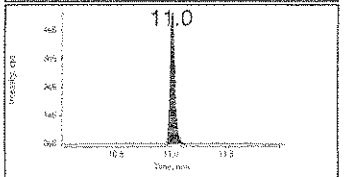
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



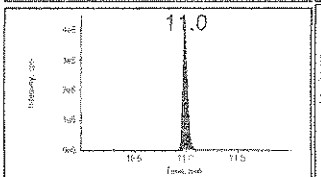
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



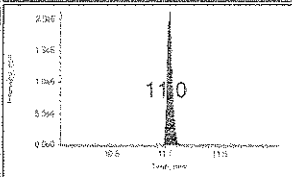
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



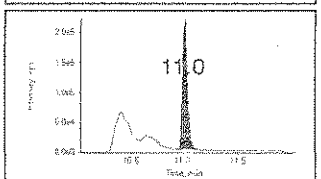
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



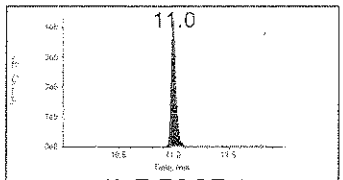
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



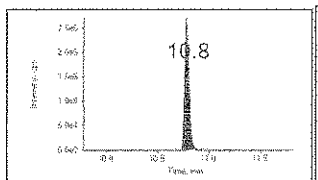
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



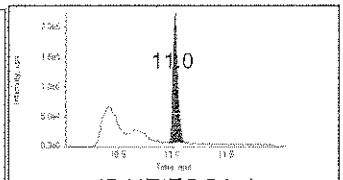
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



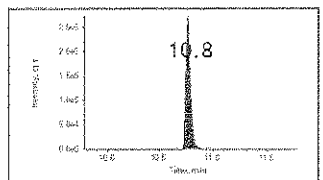
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



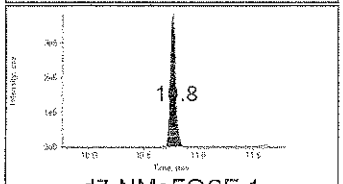
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



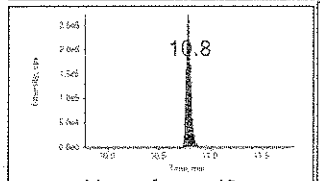
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



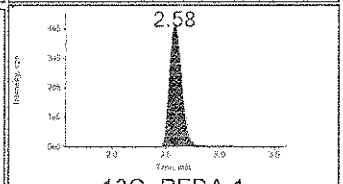
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



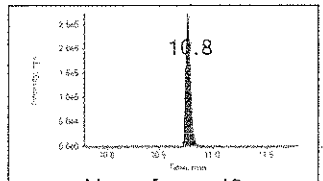
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



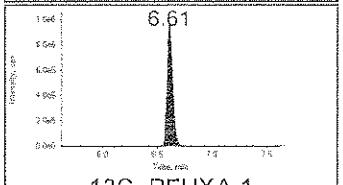
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



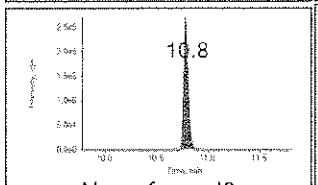
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



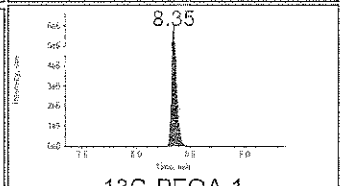
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



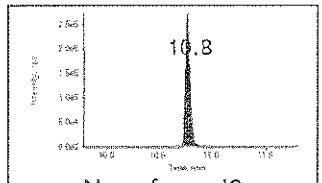
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



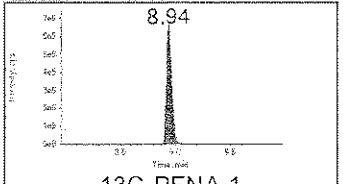
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



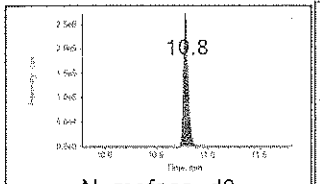
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



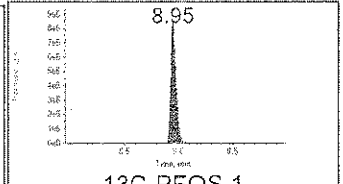
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



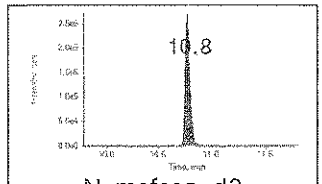
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



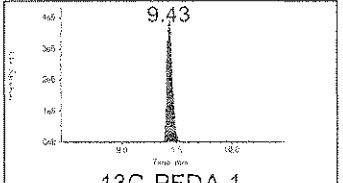
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



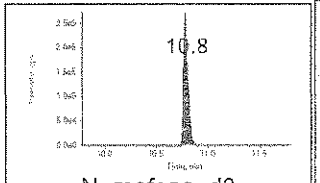
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



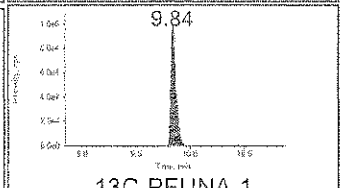
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



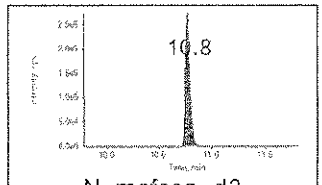
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



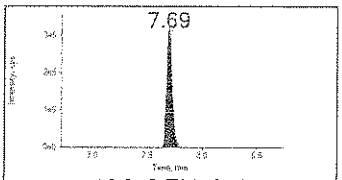
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



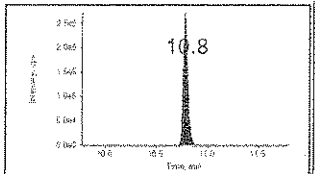
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



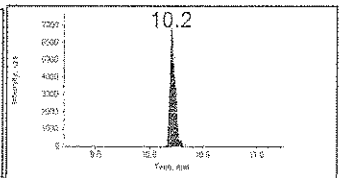
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



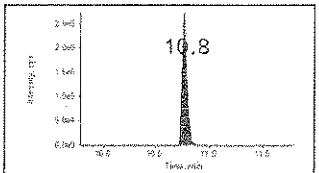
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



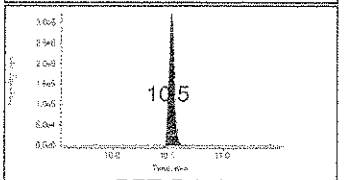
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



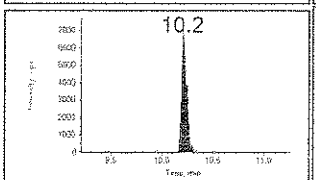
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



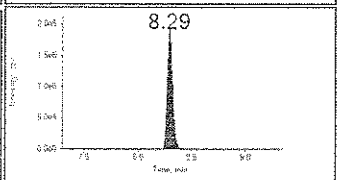
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



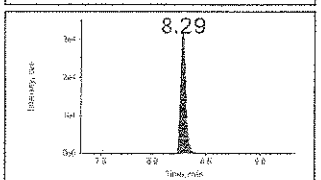
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



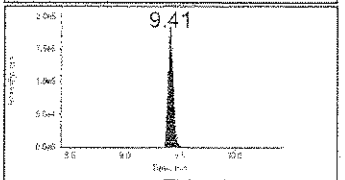
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



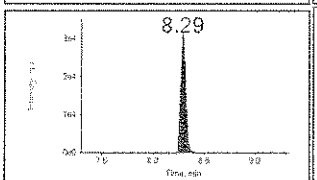
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



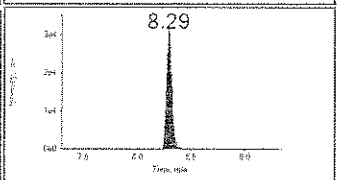
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



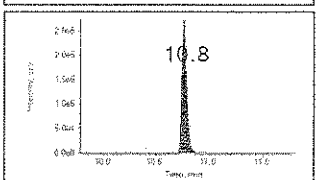
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

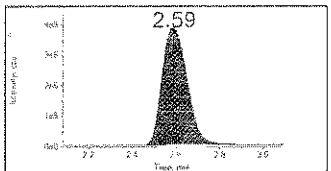


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

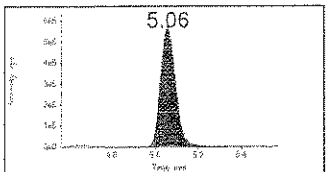


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

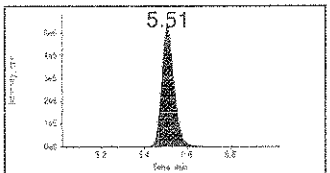
Ion Ratio Confirmation



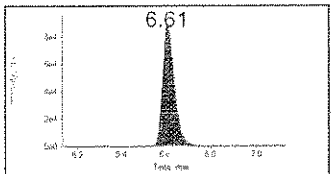
Pfba 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



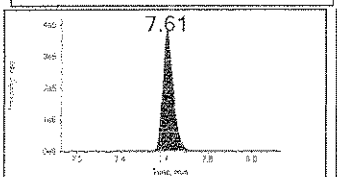
Pfpea 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



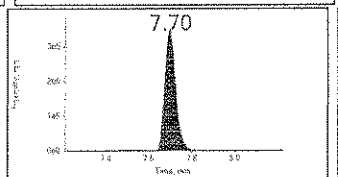
Pfbs 2
Mod? Yes
☑ Baseline □ Missed
□ Wrong Peak



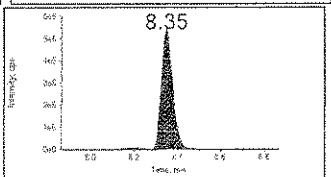
Pfhxa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



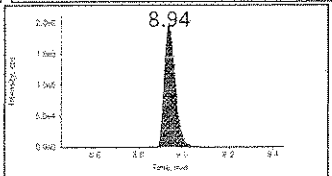
Pfhpa 2
Mod? Yes
☑ Baseline □ Missed
□ Wrong Peak



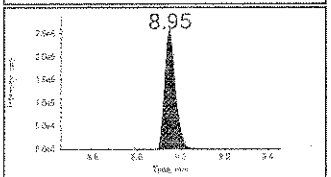
Pfhxs 2
Mod? Yes
☑ Baseline □ Missed
□ Wrong Peak



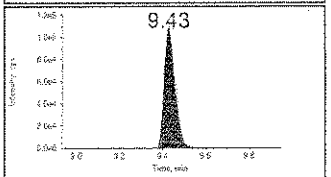
Pfoa 2
Mod? Yes
☑ Baseline □ Missed
□ Wrong Peak



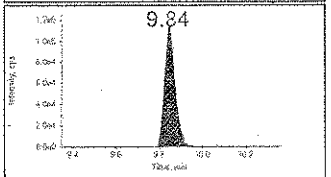
Pfna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



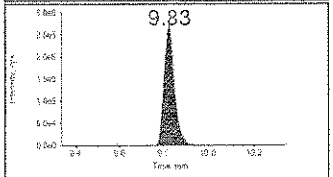
Pfos 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



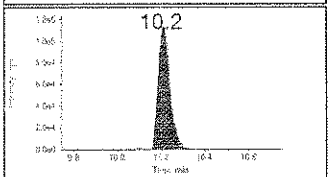
Pfda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



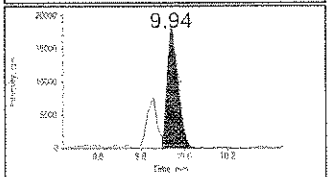
Pfuna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



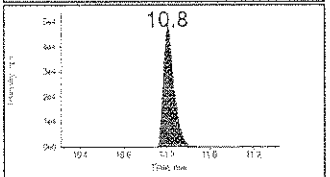
Pfds 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



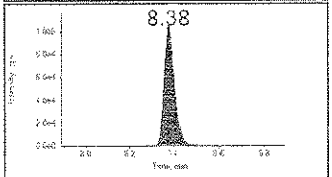
Pfdoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



Fosa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



Pfteda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



PFHpS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

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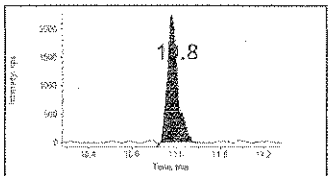
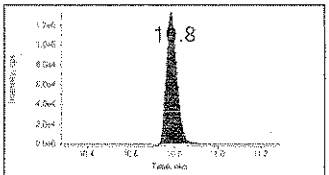
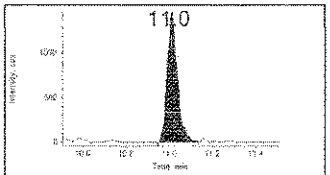


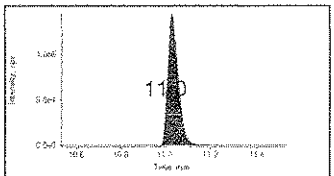
NMeFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



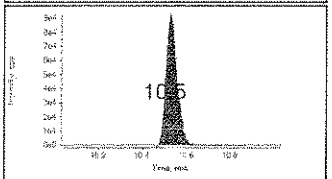
NMeFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



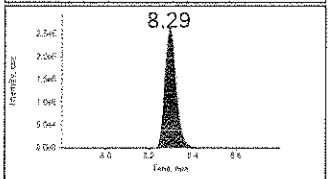
NEtFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



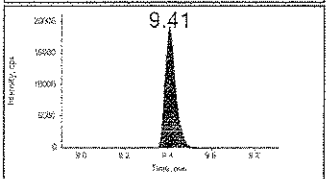
NEtFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

Quantitation Report

Data File:	033016\1033.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/30/16 19:25:12	**Vial:**	13
Run Type:	DMS	**Dilution:**	1
Lab ID:	KQ1602838-02	**Raw Units:**	ng/mL

Bottle ID:	K1602748-007.10	**Tier:**	I	**Matrix:**	Water
Prod Code:	PFOA	**Collect Date:**	3/17/16	**Recvie Date:**	3/18/16

Analysis Lot:	490080	**Prep Lot:**	258211	**Report Group:**	KQ1602838
Analysis Method:	PFC/537M	**Prep Method:**	EPA 3535A		
		Prep Date:	3/28/16		

Title:	Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS	**Calibration ID:**	KC1600038
		Report List ID:	14664

Internal Standard Compounds

Parameter Name	RT	Response	Solution Conc	Area Criteria
N-methyl-d3-perfluoro-1-octanesulfonamide	10.8	787792.36	5.00	OK

Surrogate Compounds

Parameter Name	RT	Response	Solution Conc	% Rec	% Rec Criteria
Perfluoro-n-[1,2,3,4-13C4] butanoic acid	2.59	3456576.24	3.957	79	19 - 126
Perfluoro-n-[1,2-13C2] hexanoic acid	6.62	3799067.08	4.052	81	10 - 151
Sodium perfluoro-1-hexane[18O2]sulfonate	7.69	1220222.64	3.902	78	20 - 128
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	8.34	2123216.45	4.035	81	13 - 142
Perfluoro-n-[1,2,3,4,5-13C5] nonanoic acid	8.93	2384728.21	3.937	79	15 - 143
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulf	8.94	2990264.43	3.906	78	11 - 131
Perfluoro-n-[1,2-13C2] decanoic acid	9.43	1462551.18	3.937	79	25 - 129
Perfluoro-n-[1,2-13C2]undecanoic Acid	9.85	367758.38	3.498	70	16 - 129
Perfluoro-n-[1,2-13C2]dodecanoic Acid	10.2	23583.67	3.483	70	17 - 114
S_N-ethyl-d5-perfluoro-1-octanesulfonamide	11.0	587797.05	2.819	56	19 - 103
d9-NEtFOSE (Surr)	11.0	1229968.55	3.151	63	20 - 113
d7-N-MeFOSE (Surr)	10.8	1285151.66	3.471	69	32 - 113
S_6:2 Fluorotelomer sulfonate-13C2	8.29	97524.36	3.379	68	10 - 187

Target Compounds

Final Conc.Units: ng/L

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorobutanoic Acid	2.60	2998055.80	5.459	151	
Perfluoropentanoic Acid	5.07	2660563.35	5.518	152	
Perfluorobutane Sulfonate	5.52	4455410.17	4.857	134	
Perfluorohexanoic Acid	6.61	4187647.05	5.743	158	
Perfluoroheptanoic Acid	7.61	3003124.14	4.790	132	
Perfluorohexane Sulfonate	7.69	3091754.88	4.659	129	
Perfluorooctanoic Acid	8.35	1098638.66	4.793	132	
Perfluorononanoic Acid	8.94	2007081.11	4.550	126	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

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Data File:	033016\1033.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/30/16 19:25:12	**Vial:**	13
Run Type:	DMS	**Dilution:**	1
Lab ID:	KQ1602838-02	**Raw Units:**	ng/mL

Target Compounds

Final Conc.Units: ng/L

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorooctane Sulfonate	8.94	2342064.56	4.439	122	
Perfluorodecanoic Acid	9.43	1265560.70	4.097	113	
Perfluoroundecanoic Acid	9.85	675114.02	3.888	107	
Perfluorodecane Sulfonate	9.83	2278694.62	3.447	95.1	
Perfluorododecanoic Acid	10.2	976374.95	3.681	102	
Perfluorooctylsulfonamide	9.95	2400700.25	5.075	140	
Perfluoro-n-tridecanoic acid	10.5	863131.21	3.300	91.0	
Perfluoro-n-tetradecanoic acid	10.8	437166.61	4.251	117	
Perfluoroheptane sulfonate	8.38	868574.41	4.139	114	
N-ethylperfluoro-1-octanesulfonamide	11.0	594890.69	5.566	154	
N-methylperfluoro-1-octanesulfonamide	10.8	407367.44	4.061	112	
2-(N-ethylperfluoro-1-octanesulfonamido)-eth	11.0	1384501.26	4.658	128	
2-(N-methylperfluoro-1-octanesulfonamido)-c	10.8	1217981.79	4.968	137	
6:2 Fluorotelomer sulfonate	8.29	646898.01	5.347	148	
8:2 Fluorotelomer sulfonate	9.41	599217.08	4.729	130	

Prep Amount:	290.0000 mL	**Dilution:**	1
Prep Final Amount:	8.00 mL	**Basis Factor:**	100.00

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Printed: 3/31/16 14:48

\\alprews001\starlims$\LIMSReps\QuantValidation.rpt

Project	Ewan's Projects\PFCs
Data File	033016\1033.wiff
Result Table	033016.rdb
Instrument Name	LCMS02

Sample Name	KQ1602838-02	Injection Volume	10
Acquisition Date	3/30/2016 7:25:12 PM	Sample Type	Unknown
Acquisition Method	PFC_090315 schedule mrm.dam	Dilution Factor	1.00
Injection Vial	25	Weight to Volume	0.00

Results Summary

Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
Pfba 1	13c_pfba	3456576	2.60 (2.60)	2998056	5.4590	No
Pfpea 1	13c_pfhxa	3799067	5.07 (5.06)	2660563	5.5180	No
Pfbs 1	18o-pfhs	1220223	5.52 (5.53)	4455410	4.8570	No
Pfhxa 1	13c_pfhxa	3799067	6.61 (6.63)	4187647	5.7430	Yes
Pfhpa 1	13c_pfhxa	3799067	7.61 (7.64)	3003124	4.7900	Yes
Pfhxs 1	18o-pfhs	1220223	7.69 (7.72)	3091755	4.6590	Yes
Pfoa 1	13c-pfoa	2123216	8.35 (8.36)	1098639	4.7930	Yes
Pfna 1	13c-pfna	2384728	8.94 (8.95)	2007081	4.5500	No
Pfos 1	13c-pfos	2990264	8.94 (8.96)	2342065	4.4390	No
Pfda 1	13c-pfda	1462551	9.43 (9.44)	1265561	4.0970	No
Pfuna 1	13c-pfuna	367758	9.85 (9.86)	675114	3.8880	No
Pfds 1	13c-pfos	2990264	9.83 (9.84)	2278695	3.4470	No
Pfdoa 1	13c-pfdoda	23584	10.20 (10.20)	976375	3.6810	No
Fosa 1	d5-NEtFOSA	587797	9.95 (9.94)	2400700	5.0750	No
Pfteda 1	13c-pfdoda	23584	10.80 (10.80)	437167	4.2510	No
PFHpS 1	18o-pfhs	1220223	8.38 (8.39)	868574	4.1390	No
NMeFOSE 1	d7-NMeFOSE	1285152	10.80 (10.80)	1217982	4.9680	No
NMeFOSA 1	d7-NMeFOSE	1285152	10.80 (10.80)	407367	4.0610	No
NEtFOSE 1	d9-EtFOSE	1229969	11.00 (11.00)	1384501	4.6580	No
NEtFOSA 1	d5-NEtFOSA	587797	11.00 (11.00)	594891	5.5660	No

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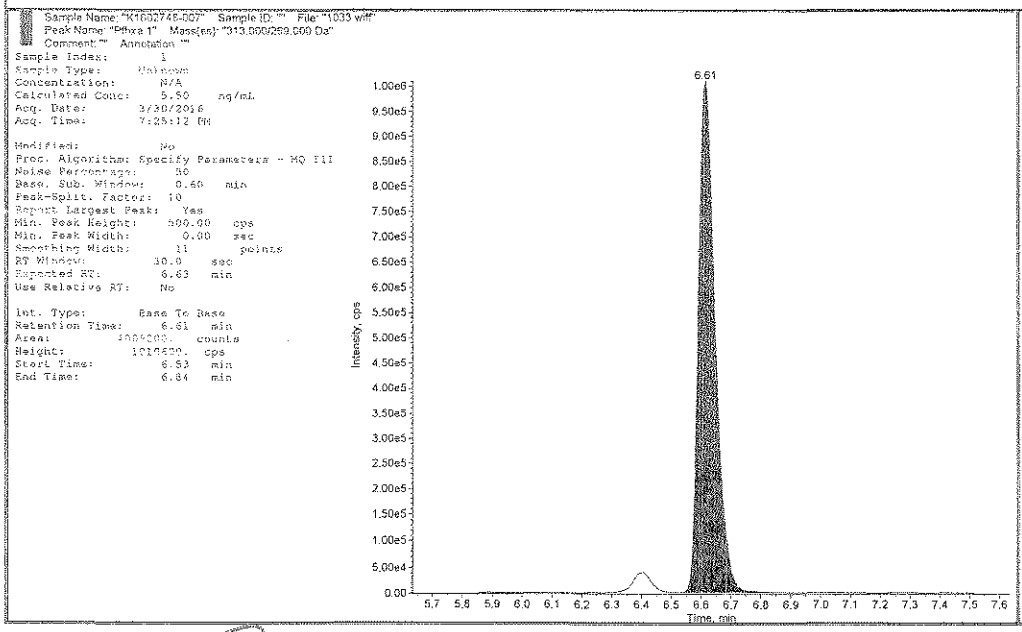
Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
d9-EtFOSE 1	N_mefosa_d3	787792	11.00 (11.00)	1229969	3.1510	No
d5-NEtFOSA 1	N_mefosa_d3	787792	11.00 (11.00)	587797	2.8190	No
d7-NMeFOSE 1	N_mefosa_d3	787792	10.80 (10.80)	1285152	3.4710	No
13C_PFBA 1	N_mefosa_d3	787792	2.59 (2.58)	3456576	3.9570	No
13C_PFHXA 1	N_mefosa_d3	787792	6.62 (6.63)	3799067	4.0520	No
13C-PFOA 1	N_mefosa_d3	787792	8.34 (8.35)	2123216	4.0350	No
13C-PFNA 1	N_mefosa_d3	787792	8.93 (8.96)	2384728	3.9370	No
13C-PFOS 1	N_mefosa_d3	787792	8.94 (8.95)	2990264	3.9060	No
13C-PFDA 1	N_mefosa_d3	787792	9.43 (9.45)	1462551	3.9370	No
13C-PFUNA 1	N_mefosa_d3	787792	9.85 (9.85)	367758	3.4980	No
18O-PFHxS 1	N_mefosa_d3	787792	7.69 (7.72)	1220223	3.9020	No
13C-PFDoA 1	N_mefosa_d3	787792	10.20 (10.20)	23584	3.4830	No
PFTrDA 1	13c-pfdoda	23584	10.50 (10.50)	863131	3.3000	No
6_2-FTS 1	13C2-6_2-FTS	97524	8.29 (8.31)	646898	5.3470	No
8_2-FTS 1	13C2-6_2-FTS	97524	9.41 (9.42)	599217	4.7290	No
13C2-6_2-FTS 1	N_mefosa_d3	787792	8.29 (8.31)	97524	3.3790	No

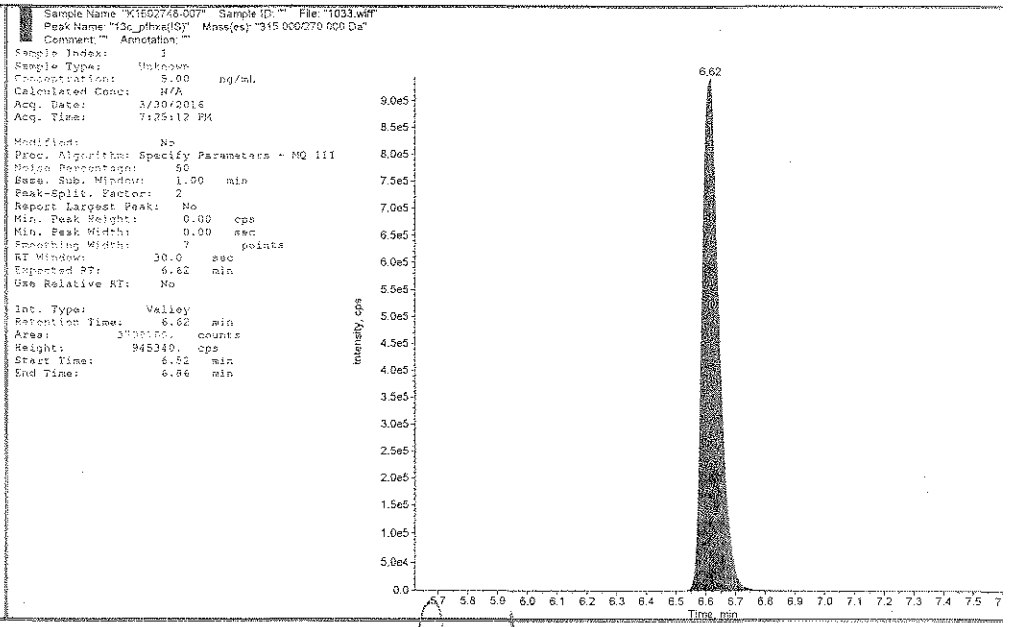
IRC Summary

Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfba 2	2.60 (2.58)	2985003	No	1.00 (0.98)	YES
Pfpea 2	5.07 (5.07)	2695323	No	1.01 (1.01)	YES
Pfbs 2	5.52 (5.52)	2085943	No	0.47 (0.48)	YES
Pfhxa 2	6.61 (6.63)	337639	No	0.08 (0.09)	YES
Pfhpa 2	7.61 (7.63)	1241456	Yes	0.41 (0.44)	YES
Pfhxs 2	7.69 (7.72)	1221673	Yes	0.40 (0.40)	YES
Pfoa 2	8.34 (8.36)	1921887	Yes	1.75 (1.81)	YES
Pfna 2	8.94 (8.95)	649734	No	0.32 (0.33)	YES

Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfos 2	8.94 (8.95)	846110	No	0.36 (0.36)	YES
Pfda 2	9.43 (9.44)	330171	No	0.26 (0.26)	YES
Pfuna 2	9.85 (9.85)	305862	No	0.45 (0.50)	YES
Pfds 2	9.83 (9.84)	778599	No	0.34 (0.36)	YES
Pfdoa 2	10.20 (10.20)	333753	No	0.34 (0.37)	YES
Fosa 2	9.94 (9.94)	55571	No	0.02 (0.03)	No
Pfteda 2	10.80 (10.80)	185759	No	0.42 (0.42)	YES
PFHpS 2	8.38 (8.39)	352643	No	0.41 (0.39)	YES
NMeFOSE 2	10.80 (10.80)	6859	No	0.01 (0.00)	YES
NMeFOSA 2	10.80 (10.80)	390793	No	0.96 (0.93)	YES
NEtFOSE 2	11.00 (11.00)	4072	No	0.00 (0.00)	YES
NEtFOSA 2	11.00 (11.00)	421862	No	0.71 (0.70)	YES
PFTrDA 2	10.50 (10.50)	271736	No	0.31 (0.32)	YES
6_2-FTS 2	8.29 (8.30)	893778	No	1.38 (1.35)	YES
8_2-FTS 2	9.41 (9.41)	63563	No	0.11 (0.12)	YES

	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1531	033016\1032.wiff	IB	Unknown	6_2-FTS 2	0.0000	N/A	111190.	No Peak
1532	033016\1032.wiff	IB	Unknown	8_2-FTS 1	0.0000	N/A	111190.	No Peak
1533	033016\1032.wiff	IB	Unknown	8_2-FTS 2	0.0000	N/A	111190.	No Peak
1534	033016\1032.wiff	IB	Unknown	13C2-6_2-FTS 1	111190.	N/A	707110.	4.29
1535	033016\1033.wiff	K1602748-007	Unknown	Pfba 1	2998100.	N/A	3456600.	5.46
1536	033016\1033.wiff	K1602748-007	Unknown	Pfba 2	2985000.	N/A	3456600.	5.03
1537	033016\1033.wiff	K1602748-007	Unknown	Pfpea 1	2660600.	N/A	3799100.	5.52
1538	033016\1033.wiff	K1602748-007	Unknown	Pfpea 2	2695300.	N/A	3799100.	5.55
1539	033016\1033.wiff	K1602748-007	Unknown	Pfbs 1	4455400.	N/A	1220200.	4.86
1540	033016\1033.wiff	K1602748-007	Unknown	Pfbs 2	2085900.	N/A	1220200.	4.76
1541	033016\1033.wiff	K1602748-007	Unknown	Pfhxa 1	4009200.	N/A	3799100.	5.50
1542	033016\1033.wiff	K1602748-007	Unknown	Pfhxa 2	337640.	N/A	3799100.	4.99
1543	033016\1033.wiff	K1602748-007	Unknown	Pfhpa 1	2975400.	N/A	3799100.	4.75





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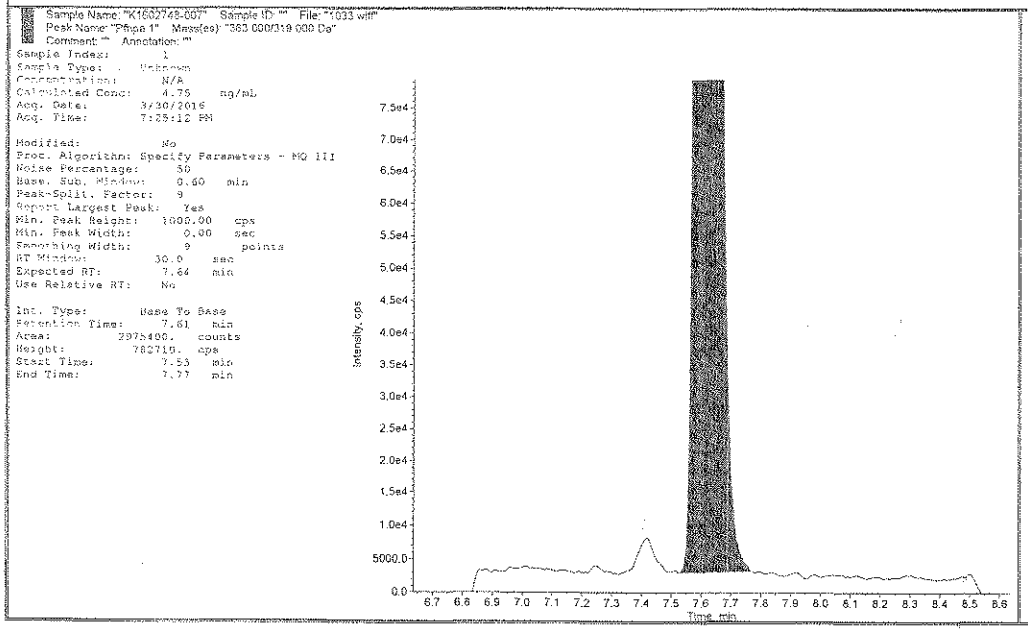
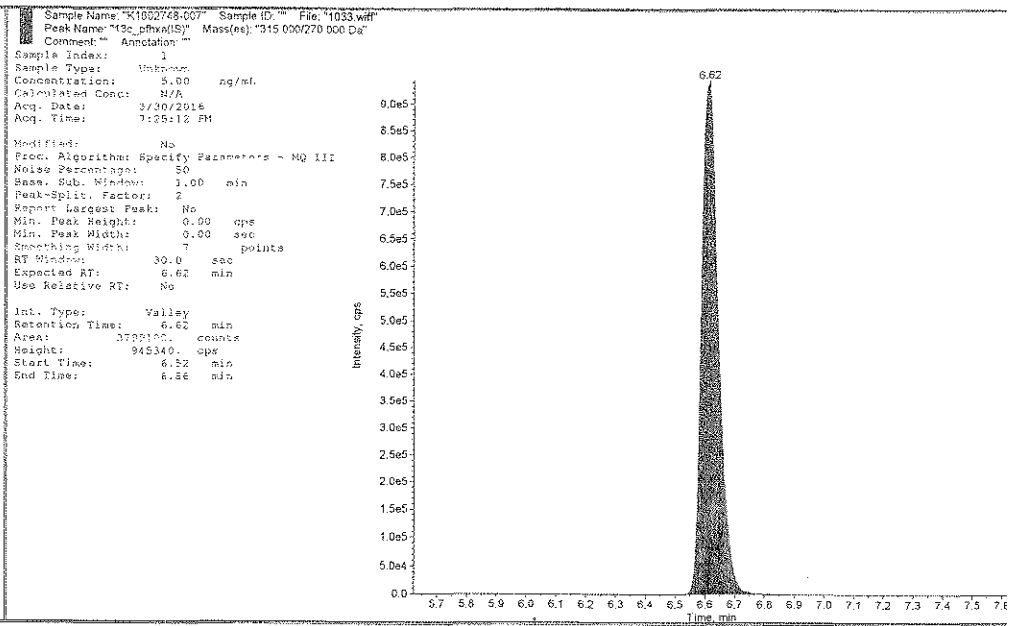
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1532	033016\1032.wiff	IB	Unknown	8_2-FTS 1	0.0000	N/A	111190.	No Peak
1533	033016\1032.wiff	IB	Unknown	8_2-FTS 2	0.0000	N/A	111190.	No Peak
1534	033016\1032.wiff	IB	Unknown	13C2-6_2-FTS 1	111190.	N/A	707110.	4.29
1535	033016\1033.wiff	K1602748-007	Unknown	Pfba 1	2998100.	N/A	3456600.	5.46
1536	033016\1033.wiff	K1602748-007	Unknown	Pfba 2	2985000.	N/A	3456600.	5.03
1537	033016\1033.wiff	K1602748-007	Unknown	Pfpea 1	2660600.	N/A	3799100.	5.52
1538	033016\1033.wiff	K1602748-007	Unknown	Pfpea 2	2695300.	N/A	3799100.	5.55
1539	033016\1033.wiff	K1602748-007	Unknown	Pfbs 1	4455400.	N/A	1220200.	4.86
1540	033016\1033.wiff	K1602748-007	Unknown	Pfbs 2	2085900.	N/A	1220200.	4.76
1541	033016\1033.wiff	K1602748-007	Unknown	Pfhxa 1	4187600.	N/A	3799100.	5.74
1542	033016\1033.wiff	K1602748-007	Unknown	Pfhxa 2	337640.	N/A	3799100.	4.99
1543	033016\1033.wiff	K1602748-007	Unknown	Pfhpa 1	2975400.	N/A	3799100.	4.75
1544	033016\1033.wiff	K1602748-007	Unknown	Pfhpa 2	1234400.	N/A	3799100.	4.46





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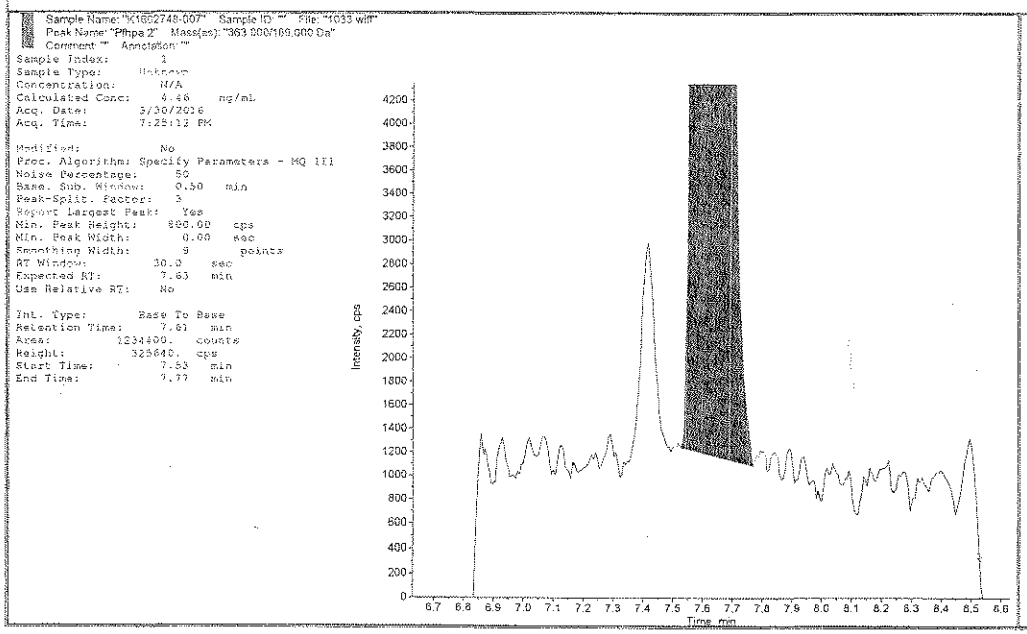
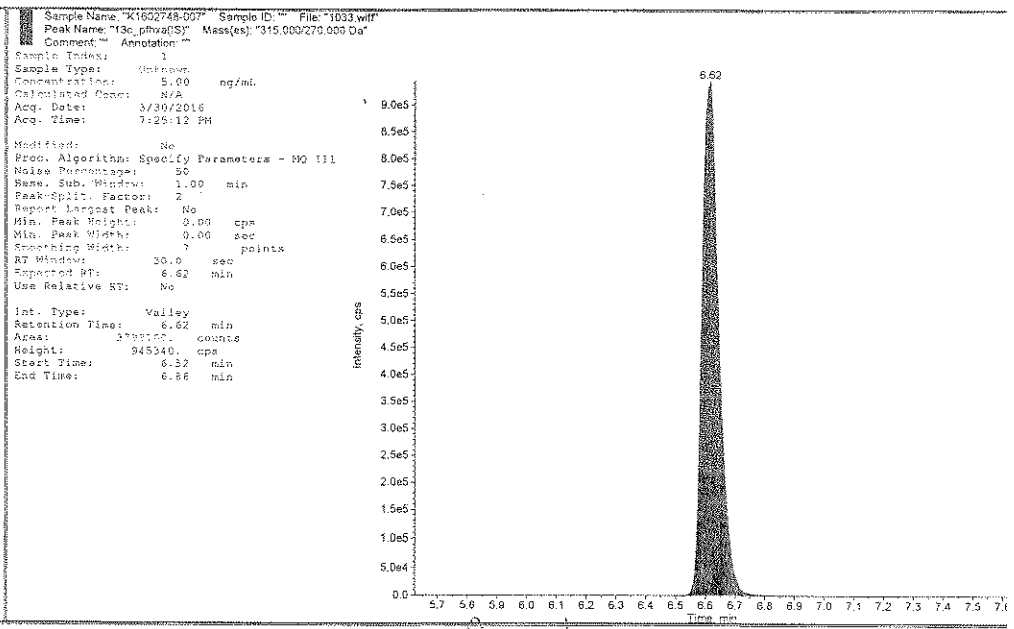
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1533	033016\1032.wiff	IB	Unknown	8_2-FTS 2	0.0000	N/A	111190.	No Peak
1534	033016\1032.wiff	IB	Unknown	13C2-6_2-FTS 1	111190.	N/A	707110.	4.29
1535	033016\1033.wiff	K1602748-007	Unknown	Pfba 1	2998100.	N/A	3456600.	5.46
1536	033016\1033.wiff	K1602748-007	Unknown	Pfba 2	2985000.	N/A	3456600.	5.03
1537	033016\1033.wiff	K1602748-007	Unknown	Pfpea 1	2660600.	N/A	3799100.	5.52
1538	033016\1033.wiff	K1602748-007	Unknown	Pfpea 2	2695300.	N/A	3799100.	5.55
1539	033016\1033.wiff	K1602748-007	Unknown	Pfbs 1	4455400.	N/A	1220200.	4.86
1540	033016\1033.wiff	K1602748-007	Unknown	Pfbs 2	2085900.	N/A	1220200.	4.76
1541	033016\1033.wiff	K1602748-007	Unknown	Pfhxa 1	4187600.	N/A	3799100.	5.74
1542	033016\1033.wiff	K1602748-007	Unknown	Pfhxa 2	337640.	N/A	3799100.	4.99
1543	033016\1033.wiff	K1602748-007	Unknown	Pfhpa 1	3003100.	N/A	3799100.	4.79
1544	033016\1033.wiff	K1602748-007	Unknown	Pfhpa 2	1234400.	N/A	3799100.	4.46
1545	033016\1033.wiff	K1602748-007	Unknown	Pfhxs 1	3055400.	N/A	1220200.	4.60





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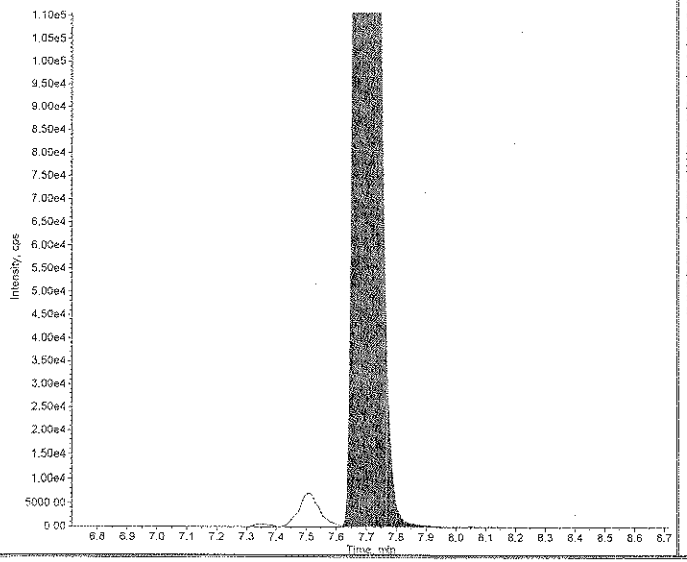
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1533	033016\1032.wiff	IB	Unknown	8_2-FTS 2	0.0000	N/A	111190.	No Peak
1534	033016\1032.wiff	IB	Unknown	13C2-6_2-FTS 1	111190.	N/A	707110.	4.29
1535	033016\1033.wiff	K1602748-007	Unknown	Pfba 1	2998100.	N/A	3456600.	5.46
1536	033016\1033.wiff	K1602748-007	Unknown	Pfba 2	2985000.	N/A	3456600.	5.03
1537	033016\1033.wiff	K1602748-007	Unknown	Pfpea 1	2660600.	N/A	3799100.	5.52
1538	033016\1033.wiff	K1602748-007	Unknown	Pfpea 2	2695300.	N/A	3799100.	5.55
1539	033016\1033.wiff	K1602748-007	Unknown	Pfbs 1	4455400.	N/A	1220200.	4.86
1540	033016\1033.wiff	K1602748-007	Unknown	Pfbs 2	2085900.	N/A	1220200.	4.76
1541	033016\1033.wiff	K1602748-007	Unknown	Pfhxa 1	4187600.	N/A	3799100.	5.74
1542	033016\1033.wiff	K1602748-007	Unknown	Pfhxa 2	337640.	N/A	3799100.	4.99
1543	033016\1033.wiff	K1602748-007	Unknown	Pfhpa 1	3003100.	N/A	3799100.	4.79
1544	033016\1033.wiff	K1602748-007	Unknown	Pfhpa 2	1241500.	N/A	3799100.	4.49
1545	033016\1033.wiff	K1602748-007	Unknown	Pfhxs 1	3055400.	N/A	1220200.	4.60

Sample Name: "K1602748-007" Sample ID: "" File: "1033.wiff"
Peak Name: "Pfhxs 1" Mass(es): "399.000/80.000 Da"
Comment: "" Annotation: ""

```
Sample Index:        1
Sample Type:      Unknown
Concentration:      N/A
Calculated Conc:    4.60    ng/mL
Acq. Date:       3/30/2016
Acq. Time:       7:25:12 PM

Modified:           No
Proc. Algorithm: Specify Parameters - MQ III
Noise Percentage:    50
Base. Sub. Window:   0.70   min
Peak-Split. Factor:  10
Report Largest Peak:  Yes
Min. Peak Height:   1000.00   cps
Min. Peak Width:       0.00   sec
Smoothing Width:          7       points
RT Window:           30.0    sec
Expected RT:         7.71    min
Use Relative RT:     No

Int. Type:         Valley
Retention Time:     7.69    min
Area:           3055400.    counts
Height:          852000.    cps
Start Time:         7.62    min
End Time:           8.03    min
```

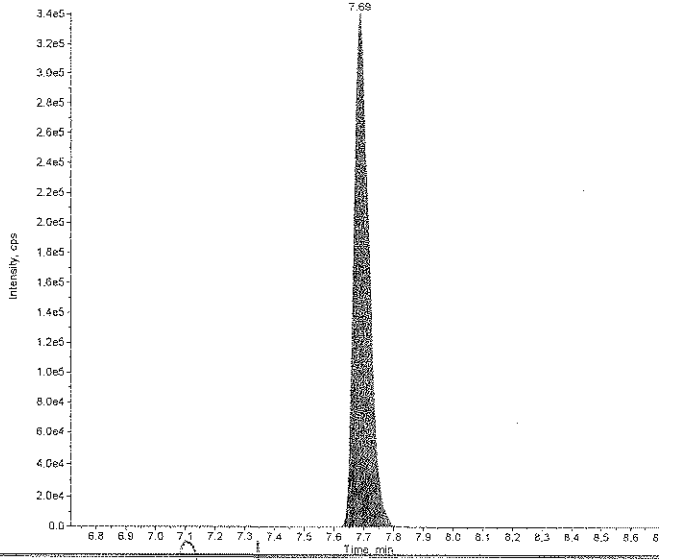


Sample Name: "K1602748-007" Sample ID: "" File: "1033.wiff"
Peak Name: "13c-pfhs(IS)" Mass(es): "403.000/103.000 Da"
Comment: "" Annotation: ""

```
Sample Index:        1
Sample Type:      Unknown
Concentration:      5.00    ng/mL
Calculated Conc:    N/A
Acq. Date:       3/30/2016
Acq. Time:       7:25:12 PM

Modified:           No
Proc. Algorithm: Specify Parameters - MQ III
Noise Percentage:    50
Base. Sub. Window:   1.00   min
Peak-Split. Factor:  2
Report Largest Peak:  Yes
Min. Peak Height:   1000.00   cps
Min. Peak Width:       0.00   sec
Smoothing Width:          5       points
RT Window:           30.0    sec
Expected RT:         7.72    min
Use Relative RT:     No

Int. Type:         Valley
Retention Time:     7.69    min
Area:           1278500.    counts
Height:          341910.    cps
Start Time:         7.59    min
End Time:           7.87    min
```



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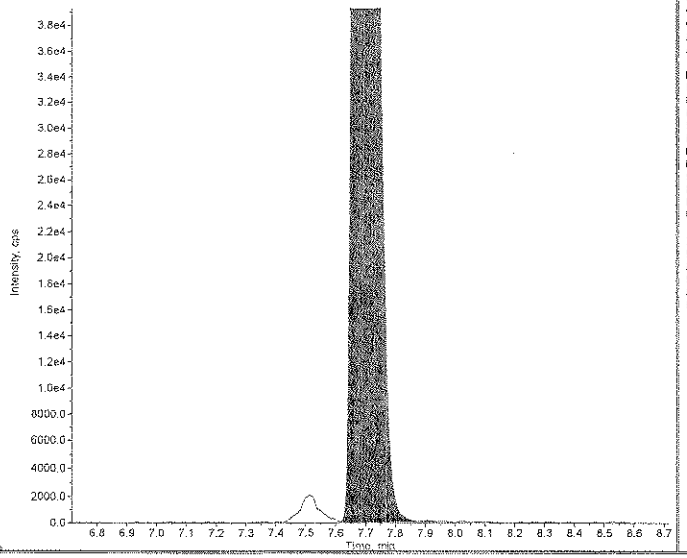
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1533	033016\1032.wiff	IB	Unknown	8_2-FTS 2	0.0000	N/A	111190.	No Peak
1534	033016\1032.wiff	IB	Unknown	13C2-6_2-FTS 1	111190.	N/A	707110.	4.29
1535	033016\1033.wiff	K1602748-007	Unknown	Pfba 1	2998100.	N/A	3456600.	5.46
1536	033016\1033.wiff	K1602748-007	Unknown	Pfba 2	2985000.	N/A	3456600.	5.03
1537	033016\1033.wiff	K1602748-007	Unknown	Pfpea 1	2660600.	N/A	3799100.	5.52
1538	033016\1033.wiff	K1602748-007	Unknown	Pfpea 2	2695300.	N/A	3799100.	5.55
1539	033016\1033.wiff	K1602748-007	Unknown	Pfbs 1	4455400.	N/A	1220200.	4.86
1540	033016\1033.wiff	K1602748-007	Unknown	Pfbs 2	2085900.	N/A	1220200.	4.76
1541	033016\1033.wiff	K1602748-007	Unknown	Pfhxa 1	4187600.	N/A	3799100.	5.74
1542	033016\1033.wiff	K1602748-007	Unknown	Pfhxa 2	337640.	N/A	3799100.	4.99
1543	033016\1033.wiff	K1602748-007	Unknown	Pfhpa 1	3003100.	N/A	3799100.	4.79
1544	033016\1033.wiff	K1602748-007	Unknown	Pfhpa 2	1241500.	N/A	3799100.	4.49
1545	033016\1033.wiff	K1602748-007	Unknown	Pfhxs 1	3091800.	N/A	1220200.	4.66

Sample Name: "K1602748-007" Sample ID: "" File: "1033.wiff"
Peak Name: "Pfhxs 2" Mass(es): "399.900/99.000 Da"
Comment: "" Annotation: ""

Sample Index: 1
Sample Type: Unknown
Concentration: N/A
Calculated Conc: 4.03 ng/mL
Acq. Date: 3/30/2016
Acq. Time: 7:25:12 PM

Modified: No
Proc. Algorithm: Specify Parameters - MQ III
Noise Percentage: 50
Base. Sub. Window: 0.50 min
Peak-Split. Factor: 10
Report Largest Peak: Yes
Min. Peak Height: 600.00 cps
Min. Peak Width: 0.00 sec
Smoothing Width: 7 points
RT Window: 30.0 sec
Expected RT: 7.73 min
Use Relative RT: No

Int. Type: Base To Base
Retention Time: 7.69 min
Area: 1212400. counts
Height: 341530. cps
Start Time: 7.62 min
End Time: 7.96 min

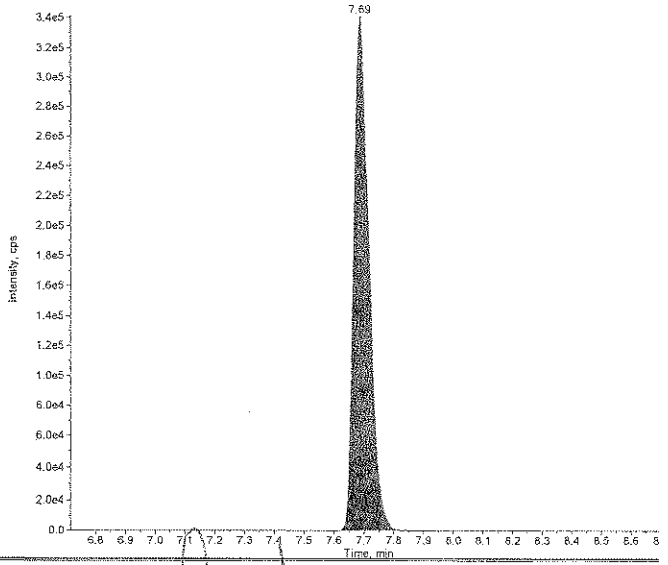


Sample Name: "K1602748-007" Sample ID: "" File: "1033.wiff"
Peak Name: "13c-pfhs(S)" Mass(es): "403.000/103.000 Da"
Comment: "" Annotation: ""

Sample Index: 1
Sample Type: Unknown
Concentration: 5.00 ng/mL
Calculated Conc: N/A
Acq. Date: 3/30/2016
Acq. Time: 7:25:12 PM

Modified: No
Proc. Algorithm: Specify Parameters - MQ III
Noise Percentage: 50
Base. Sub. Window: 1.00 min
Peak-Split. Factor: 2
Report Largest Peak: Yes
Min. Peak Height: 1000.00 cps
Min. Peak Width: 0.00 sec
Smoothing Width: 5 points
RT Window: 30.0 sec
Expected RT: 7.72 min
Use Relative RT: No

Int. Type: Valley
Retention Time: 7.69 min
Area: 1220200. counts
Height: 341910. cps
Start Time: 7.59 min
End Time: 7.87 min



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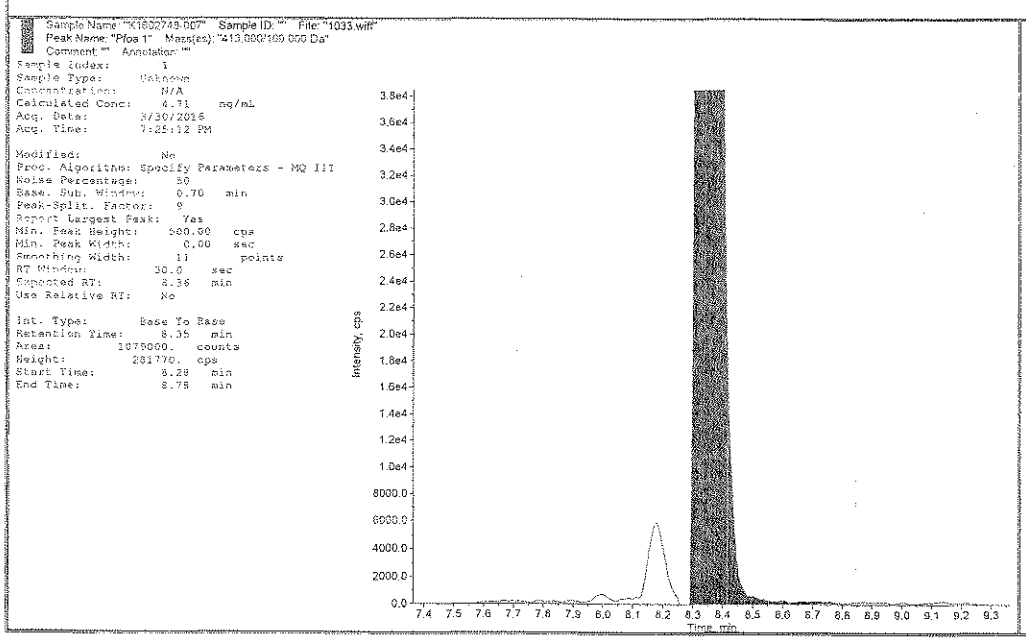
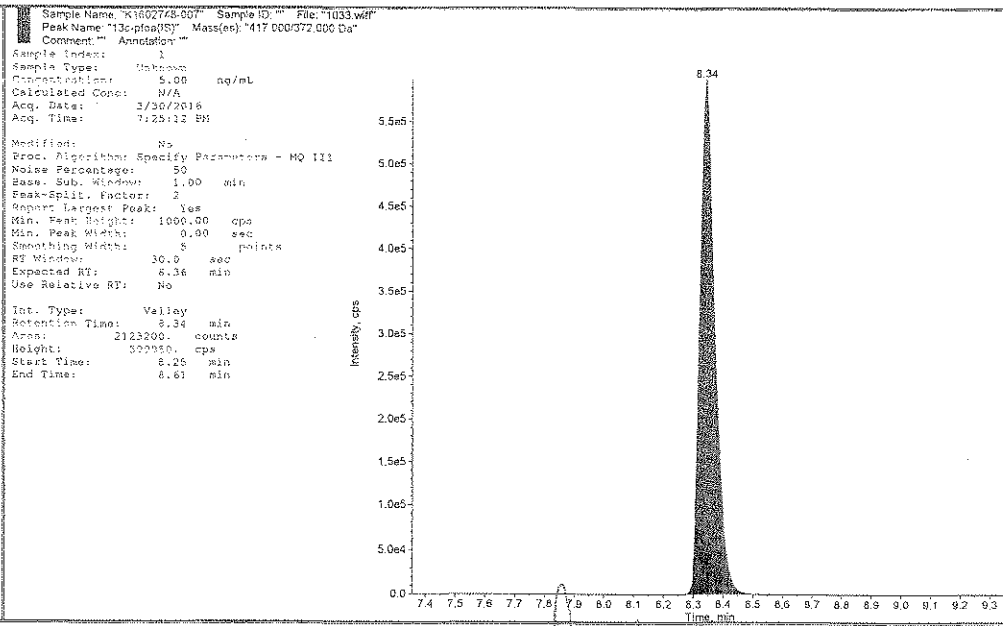
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1533	033016\1032.wiff	IB	Unknown	8_2-FTS 2	0.0000	N/A	111190.	No Peak
1534	033016\1032.wiff	IB	Unknown	13C2-6_2-FTS 1	111190.	N/A	707110.	4.29
1535	033016\1033.wiff	K1602748-007	Unknown	Pfba 1	2998100.	N/A	3456600.	5.46
1536	033016\1033.wiff	K1602748-007	Unknown	Pfba 2	2985000.	N/A	3456600.	5.03
1537	033016\1033.wiff	K1602748-007	Unknown	Pfpea 1	2660600.	N/A	3799100.	5.52
1538	033016\1033.wiff	K1602748-007	Unknown	Pfpea 2	2695300.	N/A	3799100.	5.55
1539	033016\1033.wiff	K1602748-007	Unknown	Pfbs 1	4455400.	N/A	1220200.	4.86
1540	033016\1033.wiff	K1602748-007	Unknown	Pfbs 2	2085900.	N/A	1220200.	4.76
1541	033016\1033.wiff	K1602748-007	Unknown	Pfhxa 1	4187600.	N/A	3799100.	5.74
1542	033016\1033.wiff	K1602748-007	Unknown	Pfhxa 2	337640.	N/A	3799100.	4.99
1543	033016\1033.wiff	K1602748-007	Unknown	Pfhpa 1	3003100.	N/A	3799100.	4.79
1544	033016\1033.wiff	K1602748-007	Unknown	Pfhpa 2	1241500.	N/A	3799100.	4.49
1545	033016\1033.wiff	K1602748-007	Unknown	Pfhxs 1	3091800.	N/A	1220200.	4.66





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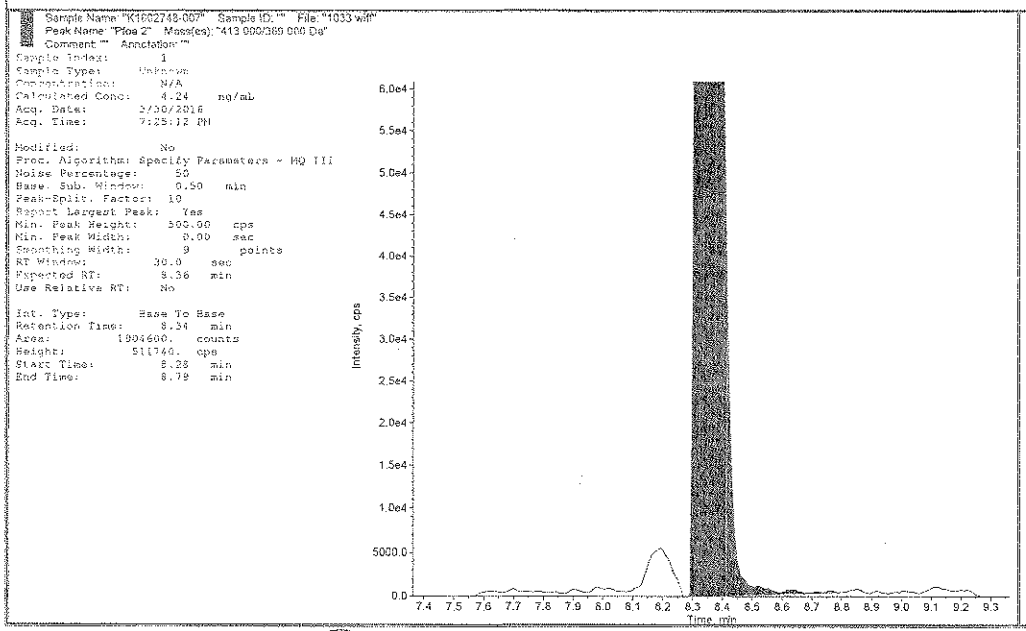
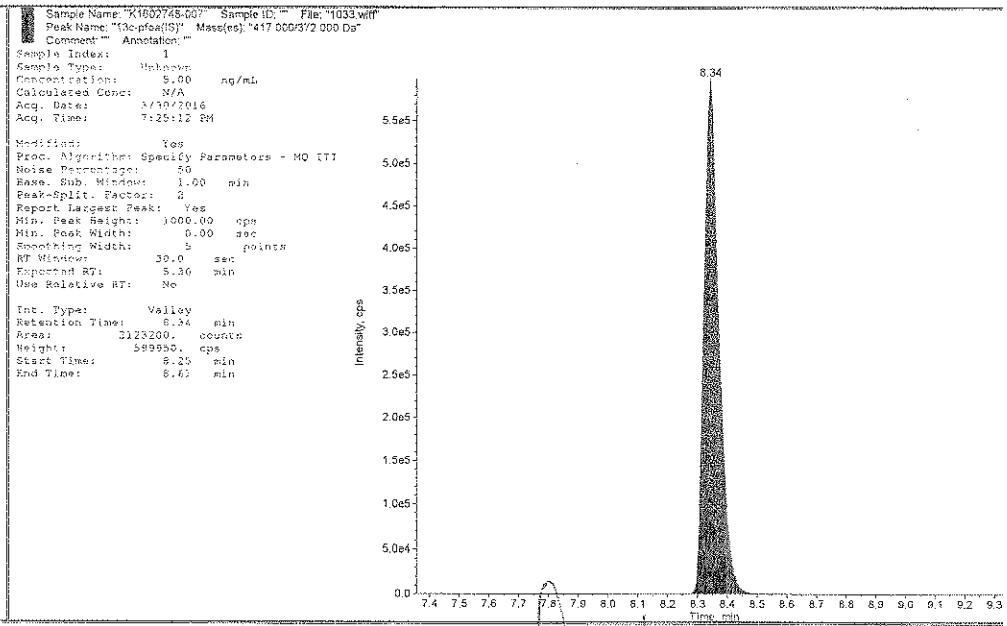
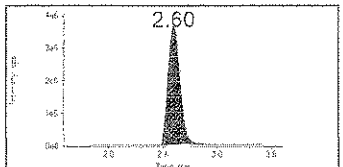
	File Name	Sample Name	Sample Type	Analyte Peak Name	Analyte Peak Area (counts)	Analyte Concentration (ng/mL)	IS Peak Area (counts)	Calculated Concentration (ng/mL)
1533	033016\1032.wiff	IB	Unknown	8_2-FTS 2	0.0000	N/A	111190.	No Peak
1534	033016\1032.wiff	IB	Unknown	13C2-6_2-FTS 1	111190.	N/A	707110.	4.29
1535	033016\1033.wiff	K1602748-007	Unknown	Pfba 1	2998100.	N/A	3456600.	5.46
1536	033016\1033.wiff	K1602748-007	Unknown	Pfba 2	2985000.	N/A	3456600.	5.03
1537	033016\1033.wiff	K1602748-007	Unknown	Pfpea 1	2660600.	N/A	3799100.	5.52
1538	033016\1033.wiff	K1602748-007	Unknown	Pfpea 2	2695300.	N/A	3799100.	5.55
1539	033016\1033.wiff	K1602748-007	Unknown	Pfbs 1	4455400.	N/A	1220200.	4.86
1540	033016\1033.wiff	K1602748-007	Unknown	Pfbs 2	2085900.	N/A	1220200.	4.76
1541	033016\1033.wiff	K1602748-007	Unknown	Pfhxa 1	4187600.	N/A	3799100.	5.74
1542	033016\1033.wiff	K1602748-007	Unknown	Pfhxa 2	337640.	N/A	3799100.	4.99
1543	033016\1033.wiff	K1602748-007	Unknown	Pfhpa 1	3003100.	N/A	3799100.	4.79
1544	033016\1033.wiff	K1602748-007	Unknown	Pfhpa 2	1241500.	N/A	3799100.	4.49
1545	033016\1033.wiff	K1602748-007	Unknown	Pfhxs 1	3091800.	N/A	1220200.	4.66



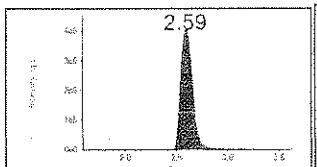


APR 0 1 2016

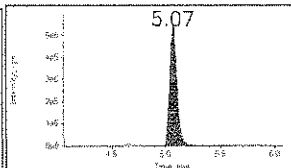
W 3/31/16



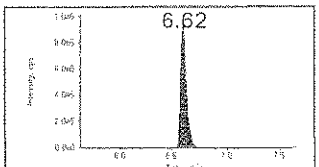
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



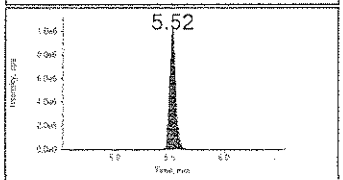
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



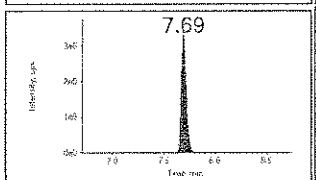
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



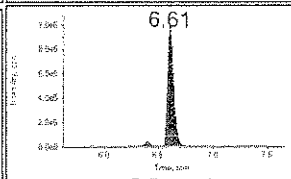
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



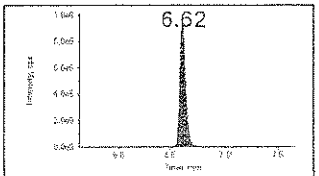
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



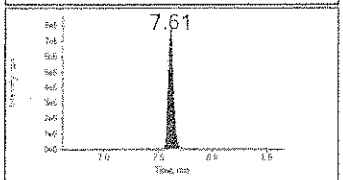
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



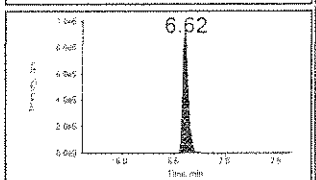
Pfhxa 1
313.000/269.000 Da
☑ Baseline □ Missed
□ Wrong Peak



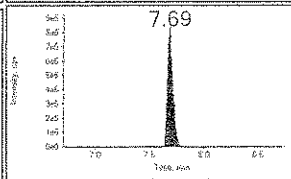
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



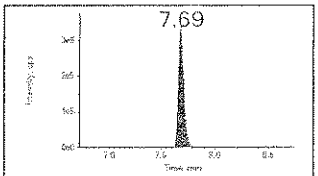
Pfhpa 1
363.000/319.000 Da
☑ Baseline □ Missed
□ Wrong Peak



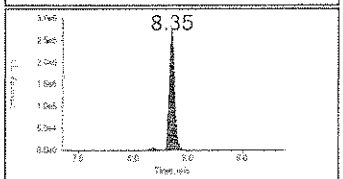
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



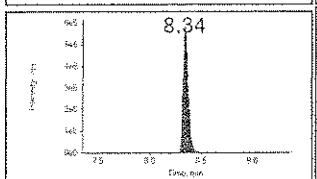
Pfhxs 1
399.000/80.000 Da
☑ Baseline □ Missed
□ Wrong Peak



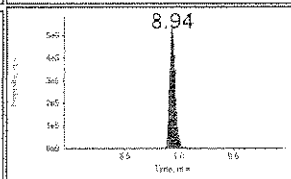
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



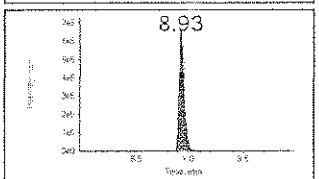
Pfoa 1
413.000/169.000 Da
☑ Baseline □ Missed
□ Wrong Peak



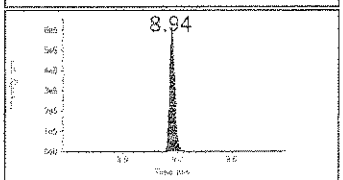
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



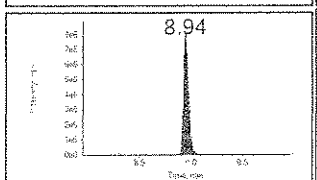
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



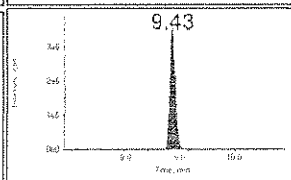
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



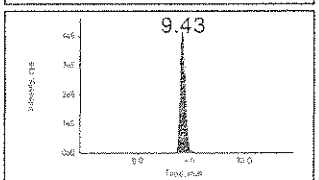
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak

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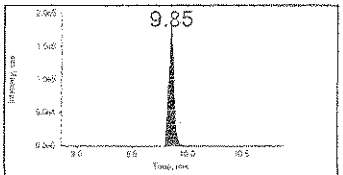
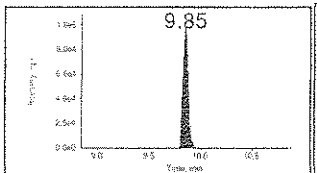
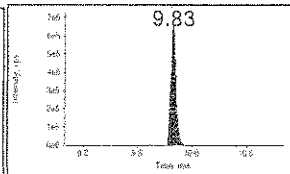


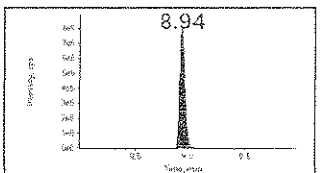
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



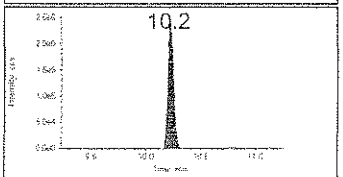
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



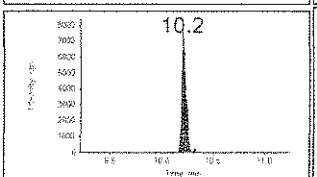
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



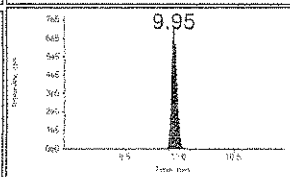
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



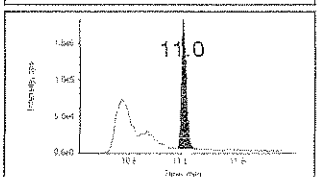
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



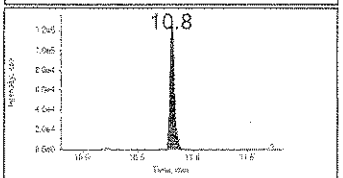
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



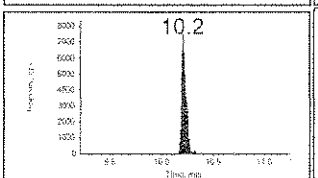
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



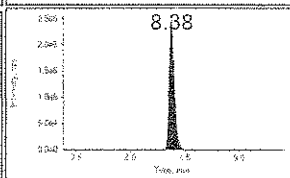
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



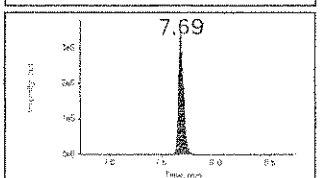
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



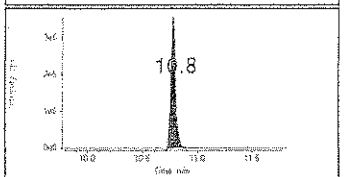
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



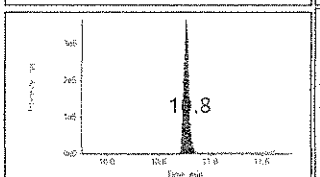
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



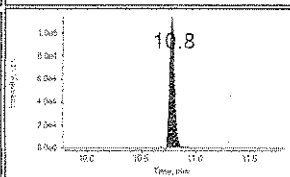
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



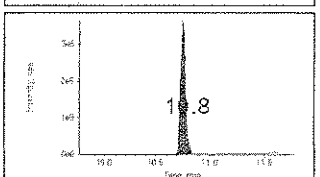
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



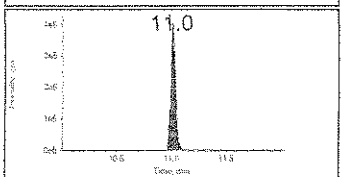
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



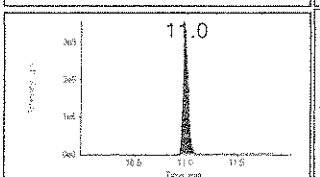
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



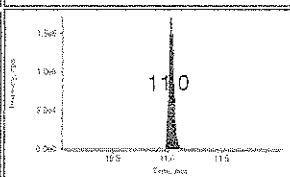
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



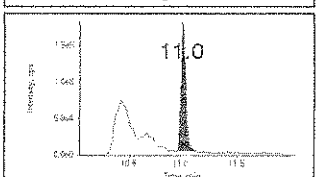
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



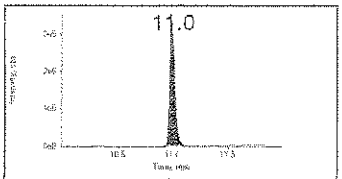
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



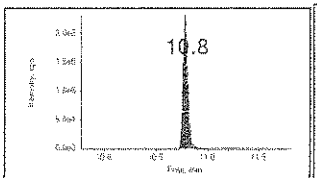
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



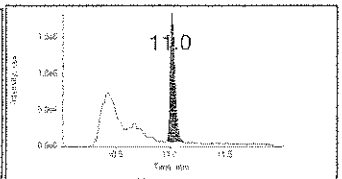
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



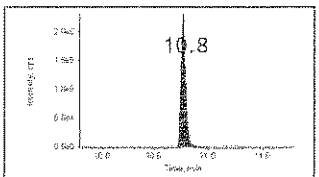
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



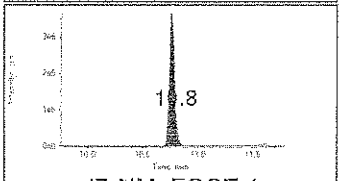
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



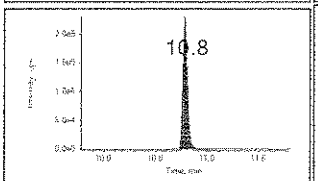
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



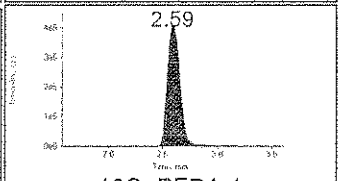
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



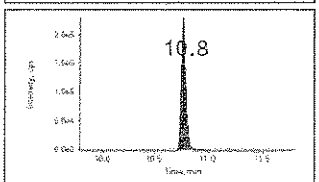
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



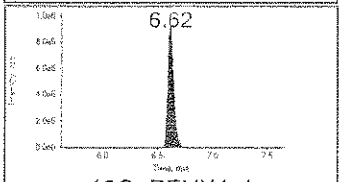
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



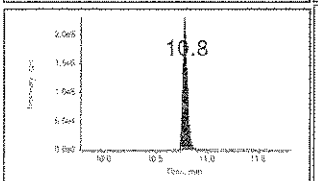
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



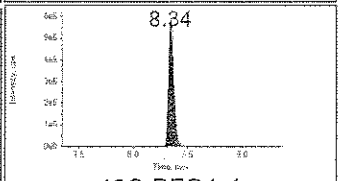
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



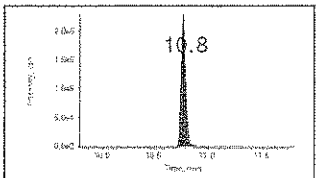
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



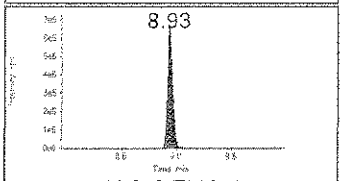
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



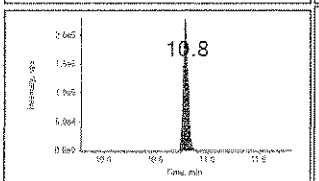
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



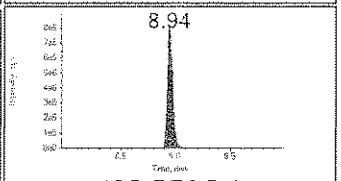
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



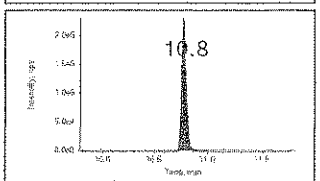
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



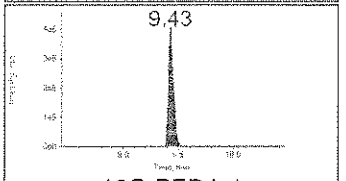
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



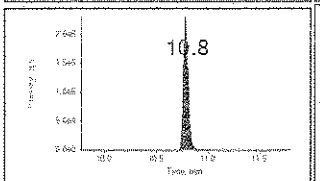
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



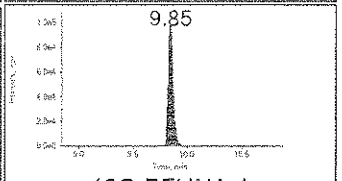
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



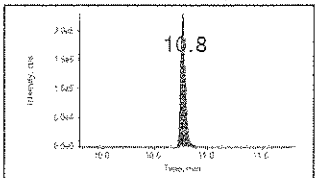
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



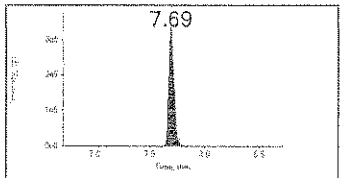
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



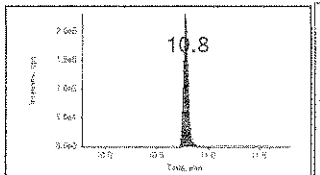
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



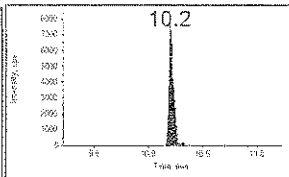
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



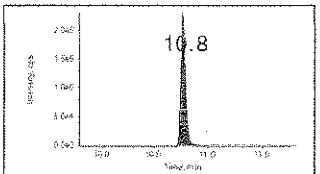
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



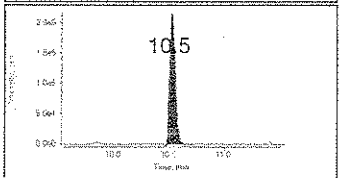
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



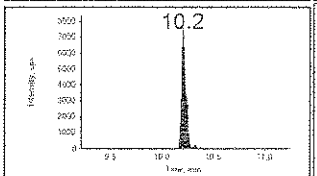
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



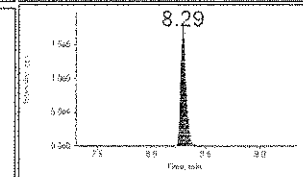
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



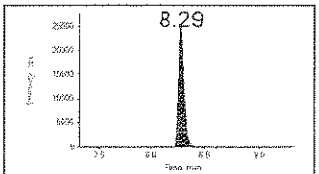
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



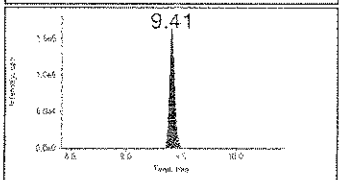
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



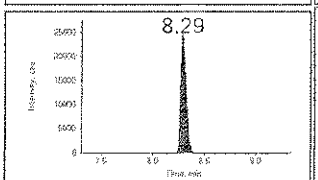
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



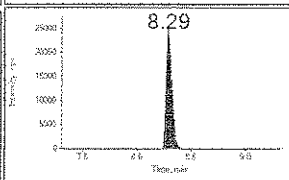
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



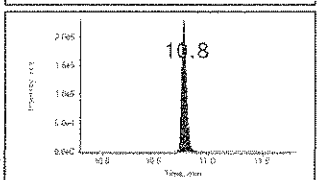
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

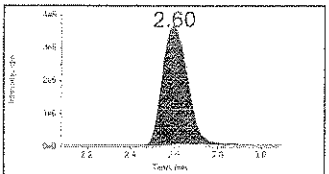


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

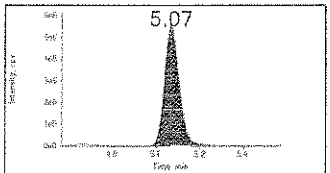


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

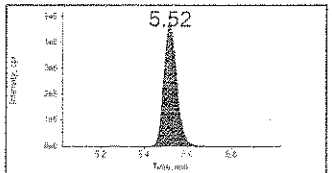
Ion Ratio Confirmation



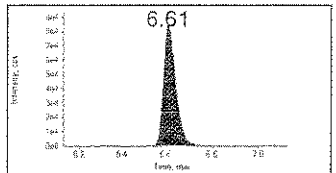
Pfba 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



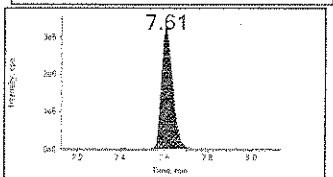
Pfpea 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



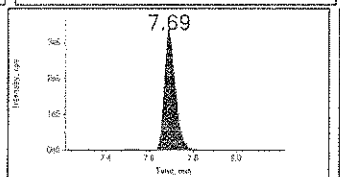
Pfbs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



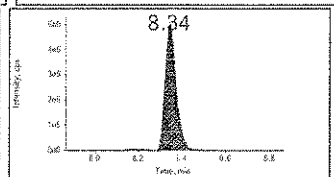
Pfhxa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



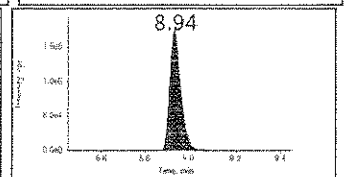
Pfhpa 2
Mod? Yes
□ Baseline □ Missed
□ Wrong Peak



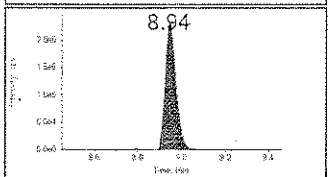
Pfhxs 2
Mod? Yes
□ Baseline □ Missed
□ Wrong Peak



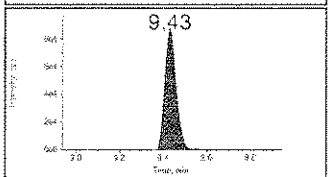
Pfoa 2
Mod? Yes
□ Baseline □ Missed
□ Wrong Peak



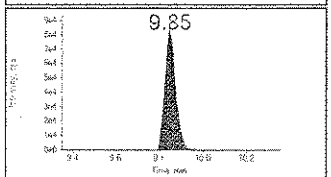
Pfna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



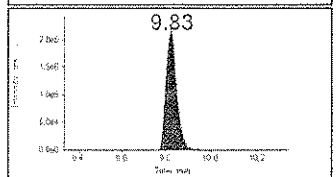
Pfos 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



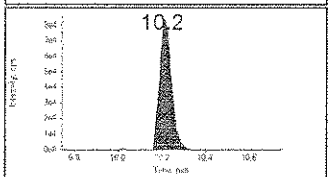
Pfda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



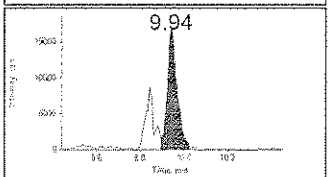
Pfuna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



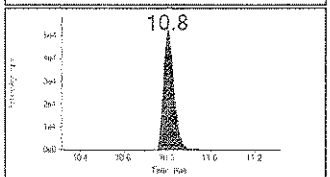
Pfds 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



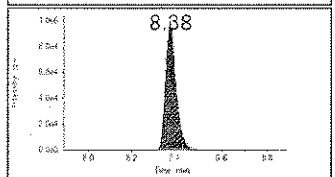
Pfdoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



Fosa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



Pfteda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



PFHpS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

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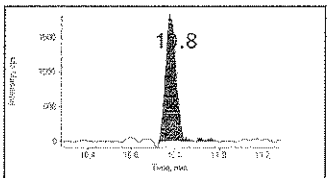
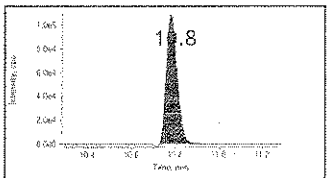
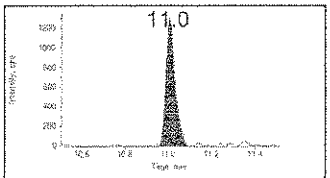
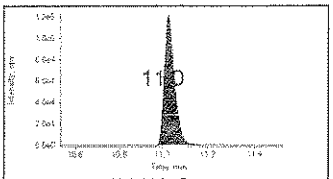
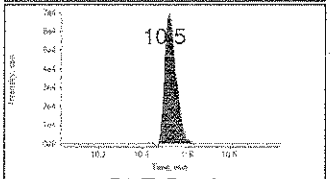

NMeFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

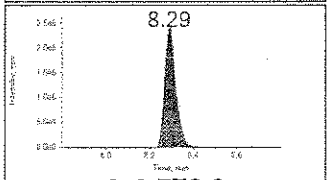

NMeFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



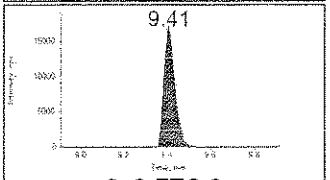
NEtFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak


NEtFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak


PFTrDA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

Quantitation Report

Data File:	033016\1022.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/30/16 15:52:39	**Vial:**	3
Run Type:	LCS	**Dilution:**	1
Lab ID:	KQ1602838-03	**Raw Units:**	ng/mL

Bottle ID:		**Tier:**	I	**Matrix:**	Water
Prod Code:	PFOA	**Collect Date:**	3/17/16	**Receive Date:**	3/18/16

Analysis Lot:	490080	**Prep Lot:**	258211	**Report Group:**	KQ1602838
Analysis Method:	PFC/537M	**Prep Method:**	EPA 3535A		
		Prep Date:	3/28/16		

Title:	Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS	**Calibration ID:**	KC1600038
		Report List ID:	14664

Internal Standard Compounds

Parameter Name	RT	Response	Solution Conc	Area Criteria
N-methyl-d3-perfluoro-1-octanesulfonamide	10.8	803045.41	5.00	OK

Surrogate Compounds

Parameter Name	RT	Response	Solution Conc	% Rec	% Rec Criteria
Perfluoro-n-[1,2,3,4-13C4] butanoic acid	2.60	3139692.03	3.526	71	19 - 126
Perfluoro-n-[1,2-13C2] hexanoic acid	6.62	3581874.82	3.747	75	10 - 151
Sodium perfluoro-1-hexane[18O2]sulfonate	7.70	1093529.85	3.431	69	20 - 128
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	8.35	1971848.55	3.677	74	13 - 142
Perfluoro-n-[1,2,3,4,5-13C5] nonanoic acid	8.95	2202273.27	3.567	71	15 - 143
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulf	8.95	2760217.44	3.537	71	11 - 131
Perfluoro-n-[1,2-13C2] decanoic acid	9.44	1349588.28	3.564	71	25 - 129
Perfluoro-n-[1,2-13C2]undecanoic Acid	9.85	333846.69	3.115	62	16 - 129
Perfluoro-n-[1,2-13C2]dodecanoic Acid	10.2	23225.54	3.365	67	17 - 114
S_N-ethyl-d5-perfluoro-1-octanesulfonamide	11.0	551117.21	2.593	52	19 - 103
d9-NEtFOSE (Surr)	11.0	1326993.83	3.335	67	20 - 113
d7-N-MeFOSE (Surr)	10.8	1319077.58	3.495	70	32 - 113
S_6:2 Fluorotelomer sulfonate-13C2	8.31	96825.90	3.291	66	10 - 187

Target Compounds

Final Conc.Units: ng/L

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorobutanoic Acid	2.60	2623047.57	5.259	168	
Perfluoropentanoic Acid	5.08	2262434.58	4.977	159	
Perfluorobutane Sulfonate	5.52	4002375.06	4.869	156	
Perfluorohexanoic Acid	6.62	3312318.18	4.818	154	
Perfluoroheptanoic Acid	7.61	2771010.58	4.688	150	
Perfluorohexane Sulfonate	7.69	2931459.44	4.929	158	
Perfluorooctanoic Acid	8.36	1049113.41	4.928	158	
Perfluorononanoic Acid	8.95	2070593.41	5.083	163	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

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Data File:	033016\1022.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/30/16 15:52:39	**Vial:**	3
Run Type:	LCS	**Dilution:**	1
Lab ID:	KQ1602838-03	**Raw Units:**	ng/mL

Target Compounds

Final Conc.Units: ng/L

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorooctane Sulfonate	8.96	2439057.21	5.008	160	
Perfluorodecanoic Acid	9.44	1385257.08	4.860	156	
Perfluoroundecanoic Acid	9.85	833383.54	5.287	169	
Perfluorodecane Sulfonate	9.83	2744570.25	4.498	144	
Perfluorododecanoic Acid	10.2	1232024.50	4.716	151	
Perfluorooctylsulfonamide	9.95	2719367.91	6.132	196	
Perfluoro-n-tridecanoic acid	10.5	957411.37	3.717	119	
Perfluoro-n-tetradecanoic acid	10.8	516269.24	5.181	166	
Perfluoroheptane sulfonate	8.39	949604.05	5.050	162	
N-ethylperfluoro-1-octanesulfonamide	11.0	601435.44	6.002	192	
N-methylperfluoro-1-octanesulfonamide	10.8	407361.79	3.957	127	
2-(N-ethylperfluoro-1-octanesulfonamido)-eth	11.0	1610297.76	5.021	161	
2-(N-methylperfluoro-1-octanesulfonamido)-e	10.8	1418811.80	5.638	180	
6:2 Fluorotelomer sulfonate	8.31	666146.06	5.546	177	
8:2 Fluorotelomer sulfonate	9.42	682365.58	5.423	174	

Prep Amount:	250.0000 mL	**Dilution:**	1
Prep Final Amount:	8.00 mL	**Basis Factor:**	100.00

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

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Project	Ewan's Projects\PFCs
Data File	033016\1022.wiff
Result Table	033016.rdb
Instrument Name	LCMS02

Sample Name	KQ1602838-03	Injection Volume	10
Acquisition Date	3/30/2016 3:52:39 PM	Sample Type	Unknown
Acquisition Method	PFC_090315 schedule mrm.dam	Dilution Factor	1.00
Injection Vial	16	Weight to Volume	0.00

Results Summary

Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
Pfba 1	13c_pfba	3139692	2.60 (2.60)	2623048	5.2590	No
Pfpea 1	13c_pfhxa	3581875	5.08 (5.06)	2262435	4.9770	No
Pfbs 1	18o-pfhs	1093530	5.52 (5.53)	4002375	4.8690	No
Pfhxa 1	13c_pfhxa	3581875	6.62 (6.63)	3312318	4.8180	No
Pfhpa 1	13c_pfhxa	3581875	7.61 (7.64)	2771011	4.6880	No
Pfhxs 1	18o-pfhs	1093530	7.69 (7.72)	2931459	4.9290	No
Pfoa 1	13c-pfoa	1971849	8.36 (8.36)	1049113	4.9280	No
Pfna 1	13c-pfna	2202273	8.95 (8.95)	2070593	5.0830	No
Pfos 1	13c-pfos	2760217	8.96 (8.96)	2439057	5.0080	No
Pfda 1	13c-pfda	1349588	9.44 (9.44)	1385257	4.8600	No
Pfuna 1	13c-pfuna	333847	9.85 (9.86)	833384	5.2870	No
Pfds 1	13c-pfos	2760217	9.83 (9.84)	2744570	4.4980	No
Pfdoa 1	13c-pfdoda	23226	10.20 (10.20)	1232025	4.7160	No
Fosa 1	d5-NEtFOSA	551117	9.95 (9.94)	2719368	6.1320	No
Pfteda 1	13c-pfdoda	23226	10.80 (10.80)	516269	5.1810	No
PFHpS 1	18o-pfhs	1093530	8.39 (8.39)	949604	5.0500	No
NMeFOSE 1	d7-NMeFOSE	1319078	10.80 (10.80)	1418812	5.6380	No
NMeFOSA 1	d7-NMeFOSE	1319078	10.80 (10.80)	407362	3.9570	No
NEtFOSE 1	d9-EtFOSE	1326994	11.00 (11.00)	1610298	5.0210	No
NEtFOSA 1	d5-NEtFOSA	551117	11.00 (11.00)	601435	6.0020	No

APR 01 2016

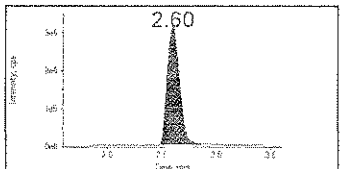
Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
d9-EtFOSE 1	N_mefosa_d3	803045	11.00 (11.00)	1326994	3.3350	No
d5-NEtFOSA 1	N_mefosa_d3	803045	11.00 (11.00)	551117	2.5930	No
d7-NMeFOSE 1	N_mefosa_d3	803045	10.80 (10.80)	1319078	3.4950	No
13C_PFBA 1	N_mefosa_d3	803045	2.60 (2.58)	3139692	3.5260	No
13C_PFHXA 1	N_mefosa_d3	803045	6.62 (6.63)	3581875	3.7470	No
13C-PFOA 1	N_mefosa_d3	803045	8.35 (8.35)	1971849	3.6770	No
13C-PFNA 1	N_mefosa_d3	803045	8.95 (8.96)	2202273	3.5670	No
13C-PFOS 1	N_mefosa_d3	803045	8.95 (8.95)	2760217	3.5370	No
13C-PFDA 1	N_mefosa_d3	803045	9.44 (9.45)	1349588	3.5640	No
13C-PFUNA 1	N_mefosa_d3	803045	9.85 (9.85)	333847	3.1150	No
18O-PFHxS 1	N_mefosa_d3	803045	7.70 (7.72)	1093530	3.4310	No
13C-PFDoA 1	N_mefosa_d3	803045	10.20 (10.20)	23226	3.3650	No
PFTrDA 1	13c-pfdoda	23226	10.50 (10.50)	957411	3.7170	No
6_2-FTS 1	13C2-6_2-FTS	96826	8.31 (8.31)	666146	5.5460	No
8_2-FTS 1	13C2-6_2-FTS	96826	9.42 (9.42)	682366	5.4230	No
13C2-6_2-FTS 1	N_mefosa_d3	803045	8.31 (8.31)	96826	3.2910	No

IRC Summary

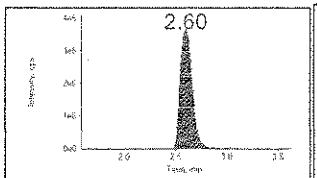
Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfba 2	2.60 (2.58)	2619199	No	1.00 (0.98)	YES
Pfpea 2	5.07 (5.07)	2288570	No	1.01 (1.01)	YES
Pfbs 2	5.52 (5.52)	1859049	No	0.46 (0.48)	YES
Pfhxa 2	6.62 (6.63)	275865	No	0.08 (0.09)	YES
Pfhpa 2	7.61 (7.63)	1203511	No	0.43 (0.44)	YES
Pfhxs 2	7.69 (7.72)	1142826	No	0.39 (0.40)	YES
Pfoa 2	8.36 (8.36)	1877744	No	1.79 (1.81)	YES
Pfna 2	8.95 (8.95)	677022	No	0.33 (0.33)	YES

Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfos 2	8.96 (8.95)	855862	No	0.35 (0.36)	YES
Pfda 2	9.44 (9.44)	364684	No	0.26 (0.26)	YES
Pfuna 2	9.85 (9.85)	384409	No	0.46 (0.50)	YES
Pfds 2	9.83 (9.84)	943779	No	0.34 (0.36)	YES
Pfdoa 2	10.20 (10.20)	461255	No	0.37 (0.37)	YES
Fosa 2	9.94 (9.94)	64116	No	0.02 (0.03)	No
Pfteda 2	10.80 (10.80)	191184	No	0.37 (0.42)	YES
PFHpS 2	8.39 (8.39)	378943	No	0.40 (0.39)	YES
NMeFOSE 2	10.80 (10.80)	7218	No	0.01 (0.00)	YES
NMeFOSA 2	10.80 (10.80)	393051	No	0.96 (0.93)	YES
NEtFOSE 2	11.00 (11.00)	4701	No	0.00 (0.00)	YES
NEtFOSA 2	11.00 (11.00)	431721	No	0.72 (0.70)	YES
PFTrDA 2	10.50 (10.50)	336944	No	0.35 (0.32)	YES
6_2-FTS 2	8.31 (8.30)	907707	No	1.36 (1.35)	YES
8_2-FTS 2	9.42 (9.41)	68769	No	0.10 (0.12)	YES

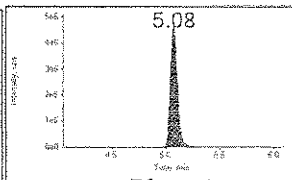
Quantitative Peak Review KQ1602838-03 LCS



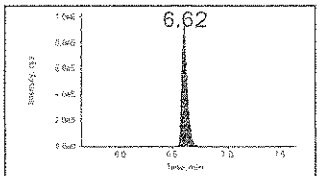
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



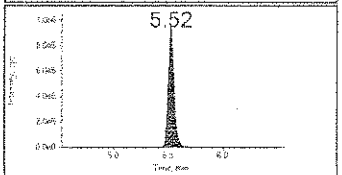
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



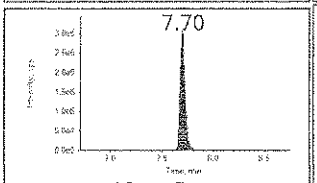
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



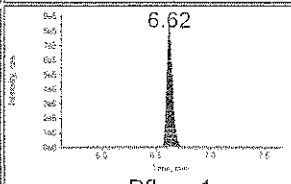
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



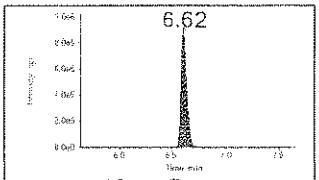
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



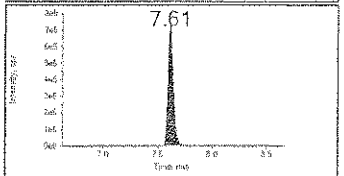
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



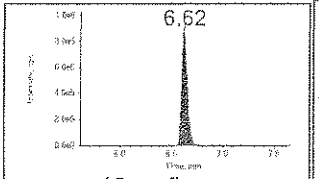
Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak



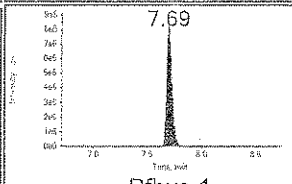
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



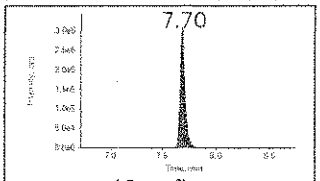
Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



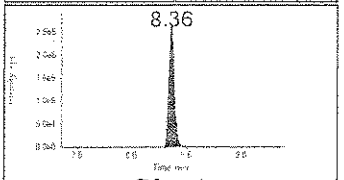
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



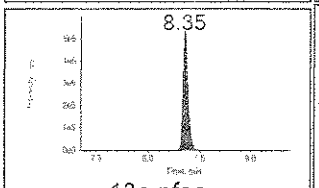
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



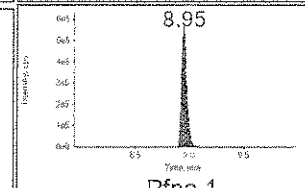
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



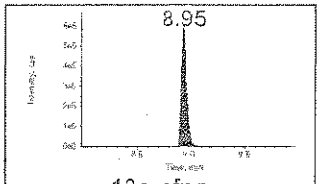
Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



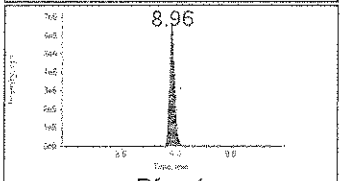
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



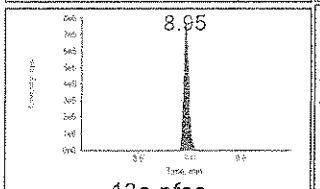
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



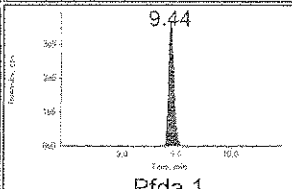
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



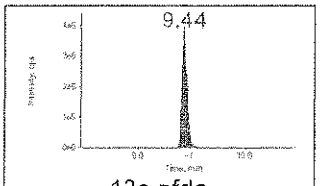
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



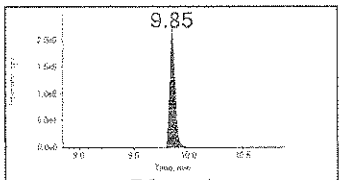
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



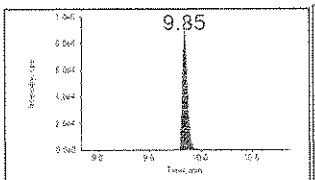
Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



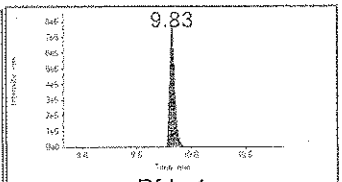
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



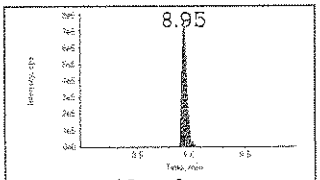
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



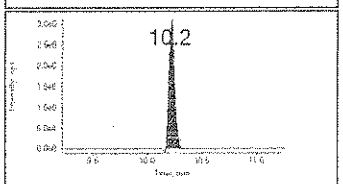
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



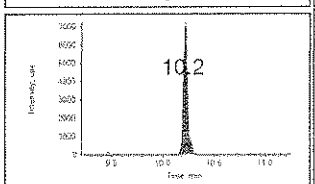
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



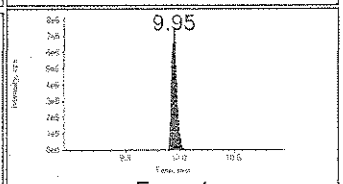
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



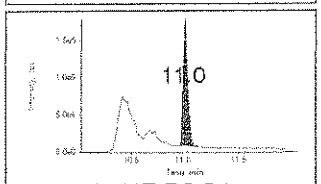
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



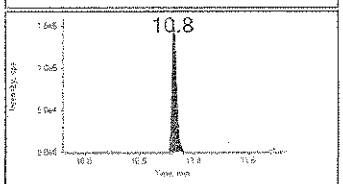
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



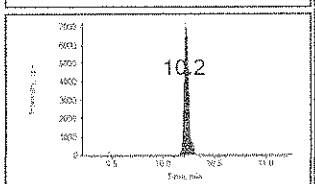
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



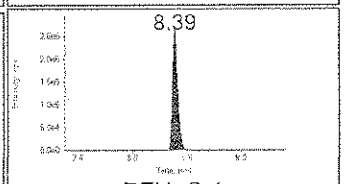
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



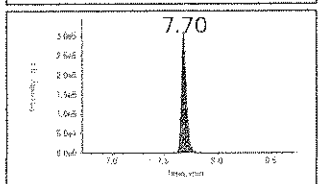
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



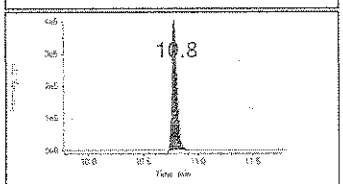
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



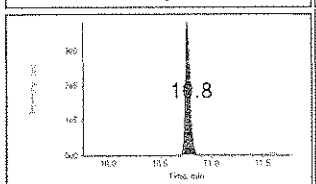
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



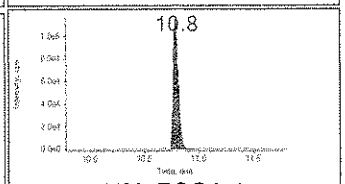
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



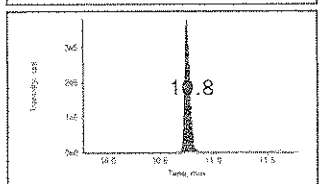
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



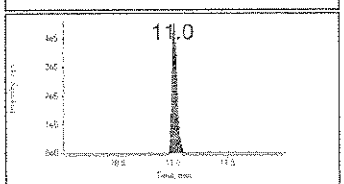
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



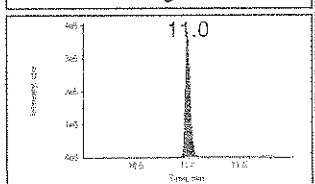
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



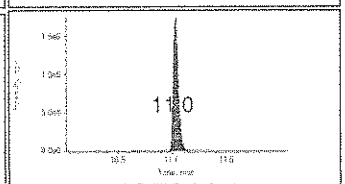
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



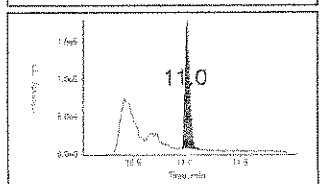
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



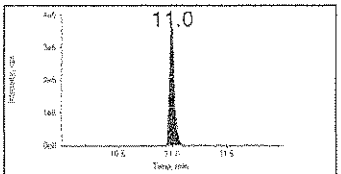
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



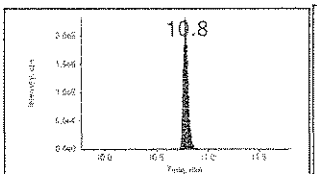
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



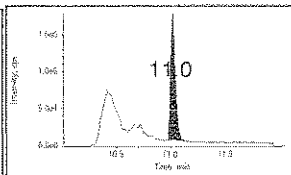
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



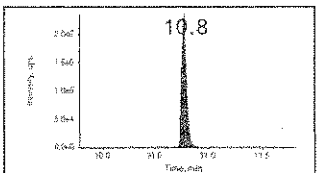
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



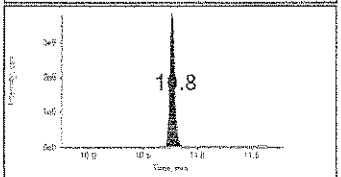
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



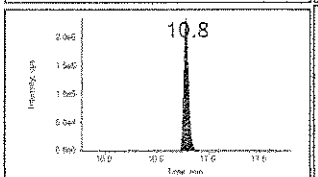
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



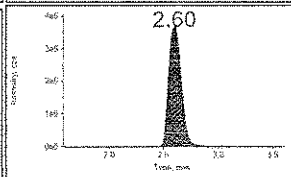
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



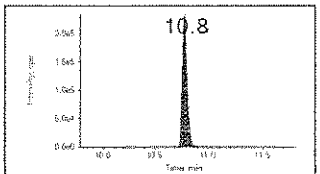
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



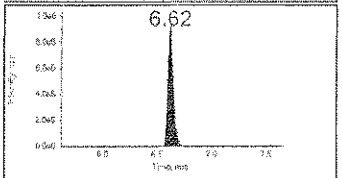
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



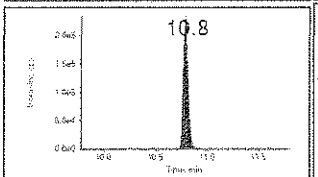
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



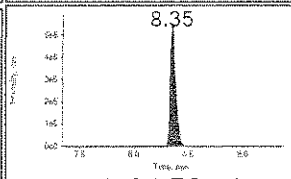
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



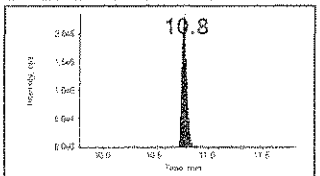
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



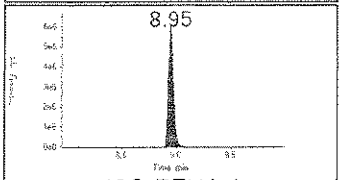
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



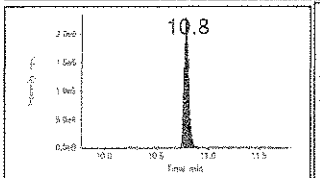
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



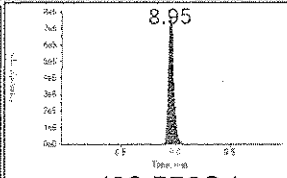
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



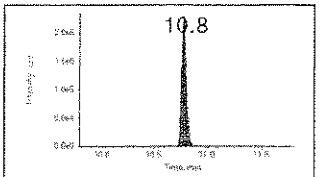
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



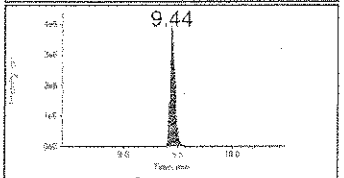
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



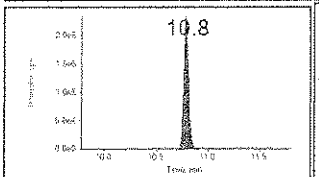
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



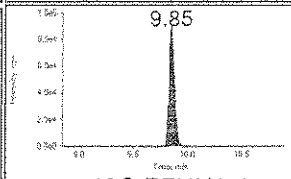
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



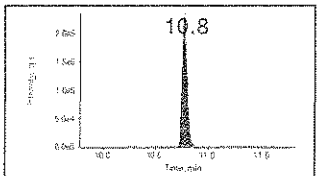
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



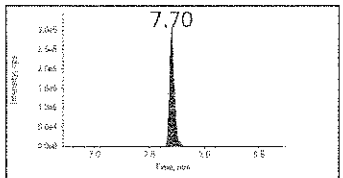
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



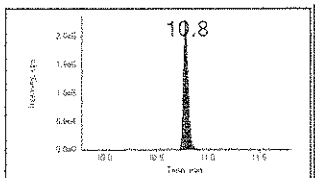
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



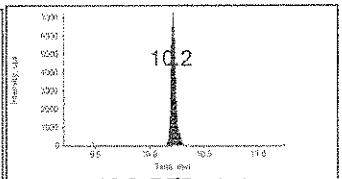
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



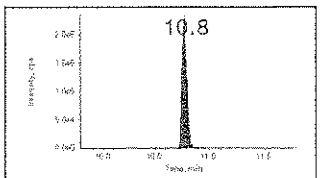
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



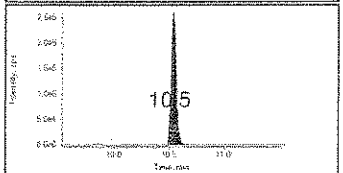
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



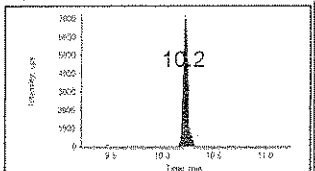
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



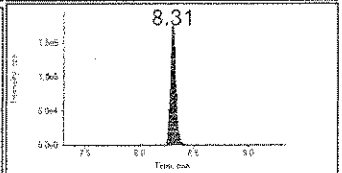
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



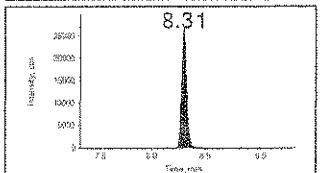
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



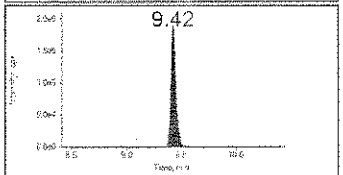
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



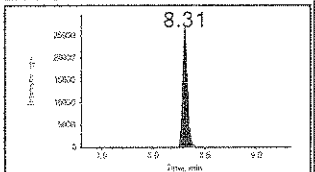
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



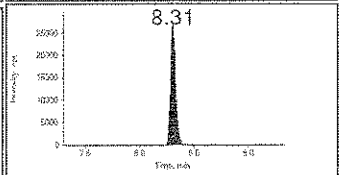
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



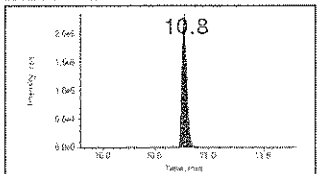
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

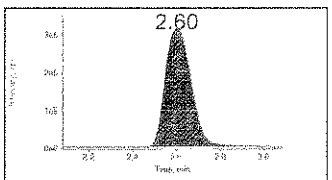


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

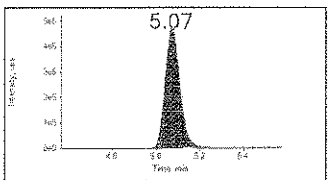


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

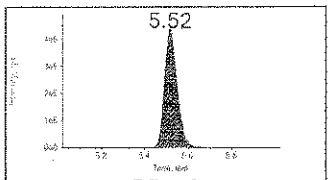
Ion Ratio Confirmation



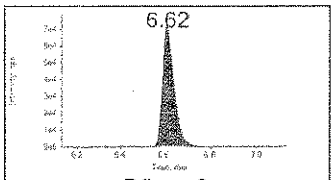
Pfba 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



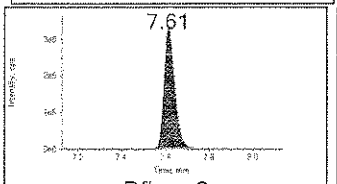
Pfpea 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



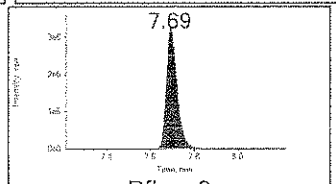
Pfbs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



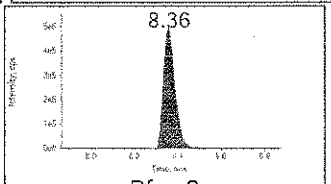
Pfhxa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



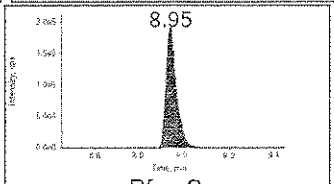
Pfhpa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



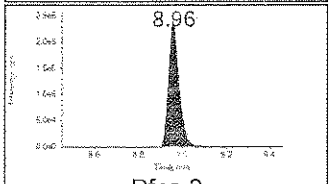
Pfhxs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



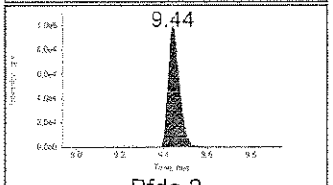
Pfoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



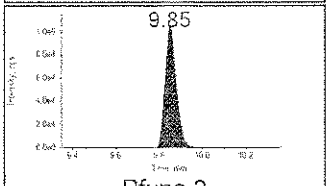
Pfna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



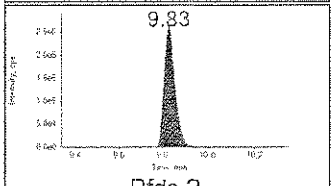
Pfos 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



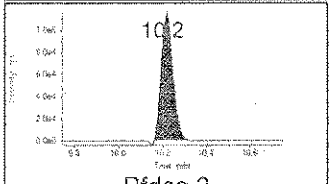
Pfda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



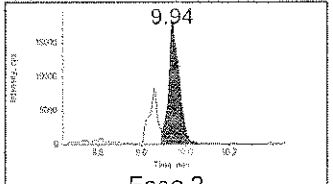
Pfuna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



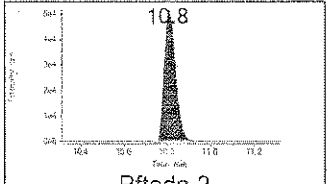
Pfds 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



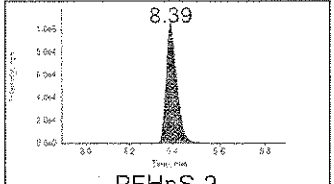
Pfdoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



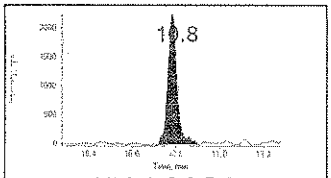
Fosa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



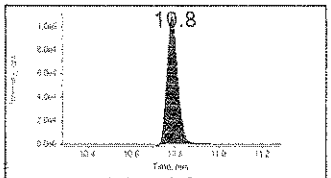
Pfteda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



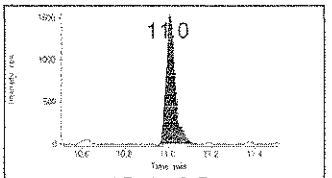
PFHpS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



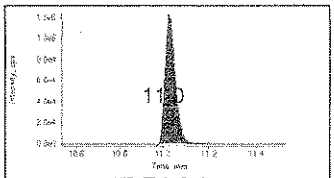
NMeFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



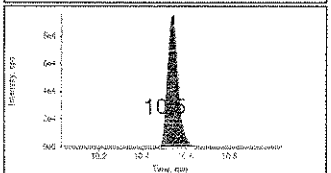
NMeFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



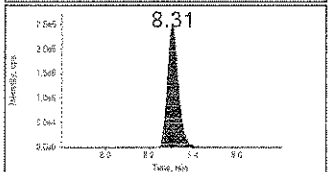
NEtFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



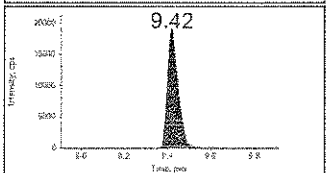
NEtFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

Date:03/30/16

ALS Environmental

ICAL Date: 03/30/16

Cal. Std. xp: 4/14/16

1st Review: Wanda Nagel

Injection Log

ICAL ID: KC1600038

2nd Review: APR 0 1 2016

LCMS02 - API 5000

LIMS ID: 490080

Column: Kinetex EVO C18 100x4.6mm s/n: H15-022943

Mobile Phases A: 5mM Am.Ace. In water 15-OLC-01-32H B: 5mM Am.Ace. In MeOH 15-OLC-01-32I

	Sample Name		File Name	Acquisition Method	Dilution	R	Comments
1	IB		033016\1007.wiff	PFC_090315 schedule mrm.dam	1x	✓	
2	PFC 0.02ppb	15-OLC-02-35A	033016\1008.wiff	PFC_090315 schedule mrm.dam	1x	✓	
3	PFC 0.05ppb	15-OLC-02-35B	033016\1009.wiff	PFC_090315 schedule mrm.dam	1x	✓	
4	PFC 0.10ppb	15-OLC-02-35C	033016\1010.wiff	PFC_090315 schedule mrm.dam	1x	✓	
5	PFC 0.25ppb	15-OLC-02-35D	033016\1011.wiff	PFC_090315 schedule mrm.dam	1x	✓	
6	PFC 0.50ppb	15-OLC-02-35E	033016\1012.wiff	PFC_090315 schedule mrm.dam	1x	✓	
7	PFC 1.0ppb	15-OLC-02-35F	033016\1013.wiff	PFC_090315 schedule mrm.dam	1x	✓	
8	PFC 5.0ppb	15-OLC-02-35G	033016\1014.wiff	PFC_090315 schedule mrm.dam	1x	✓	
9	PFC 10ppb	15-OLC-02-35H	033016\1015.wiff	PFC_090315 schedule mrm.dam	1x	✓	
10	PFC 20ppb	15-OLC-02-35I	033016\1016.wiff	PFC_090315 schedule mrm.dam	1x	✓	
11	PFC 50ppb	15-OLC-02-35J	033016\1017.wiff	PFC_090315 schedule mrm.dam	1x	✓	
12	IB		033016\1018.wiff	PFC_090315 schedule mrm.dam	1x	✓	
13	PFC 2ppb ICV	15-OLC-02-35M	033016\1019.wiff	PFC_090315 schedule mrm.dam	1x	✓	
14	IB		033016\1020.wiff	PFC_090315 schedule mrm.dam	1x	✓	
15	KQ1602838-04	MB	033016\1021.wiff	PFC_090315 schedule mrm.dam	1x	✓	
16	KQ1602838-03	LCS	033016\1022.wiff	PFC_090315 schedule mrm.dam	1x	✓	
17	K1602709-001		033016\1023.wiff	PFC_090315 schedule mrm.dam	1x	✓	
18	K1602665-003		033016\1024.wiff	PFC_090315 schedule mrm.dam	1x	✓	
19	K1602665-004		033016\1025.wiff	PFC_090315 schedule mrm.dam	1x	✓	
20	K1602748-002		033016\1026.wiff	PFC_090315 schedule mrm.dam	1x	✓	
21	K1602748-003		033016\1027.wiff	PFC_090315 schedule mrm.dam	1x	✓	
22	K1602748-004		033016\1028.wiff	PFC_090315 schedule mrm.dam	1x	✓	
23	K1602748-005		033016\1029.wiff	PFC_090315 schedule mrm.dam	1x	✓	
24	K1602748-006		033016\1030.wiff	PFC_090315 schedule mrm.dam	1x	✓	
25	PFC 1.0ppb	15-OLC-02-35F	033016\1031.wiff	PFC_090315 schedule mrm.dam	1x	✓	
26	IB		033016\1032.wiff	PFC_090315 schedule mrm.dam	1x	✓	
27	KQ1602838-02	K1602748-007 DMS	033016\1033.wiff	PFC_090315 schedule mrm.dam	1x	✓	
28	KQ1602838-01	K1602748-007 MS	033016\1034.wiff	PFC_090315 schedule mrm.dam	1x	✓	
29	K1602748-007		033016\1035.wiff	PFC_090315 schedule mrm.dam	1x	✓	
30	K1602946-001		033016\1036.wiff	PFC_090315 schedule mrm.dam	1x	✓	
31	K1602946-002		033016\1037.wiff	PFC_090315 schedule mrm.dam	1x	✓	
32	K1602946-003		033016\1038.wiff	PFC_090315 schedule mrm.dam	1x	✓	
33	K1602946-004		033016\1039.wiff	PFC_090315 schedule mrm.dam	1x	✓	
34	K1602946-005		033016\1040.wiff	PFC_090315 schedule mrm.dam	1x	✓	
35	K1602745-001		033016\1041.wiff	PFC_090315 schedule mrm.dam	1x	✓	
36	K1602918-001		033016\1042.wiff	PFC_090315 schedule mrm.dam	1x	✓	
37	PFC 1.0ppb	15-OLC-02-35F	033016\1043.wiff	PFC_090315 schedule mrm.dam	1x	✓	
38	IB		033016\1044.wiff	PFC_090315 schedule mrm.dam	1x	✓	

Date:03/30/16

ALS Environmental

ICAL Date: 03/30/16

Cal. Std. xp: 4/14/16

1st Review: Wanda Nagel

Injection Log

ICAL ID: KC1600038

2nd Review: APR 0 1 2016

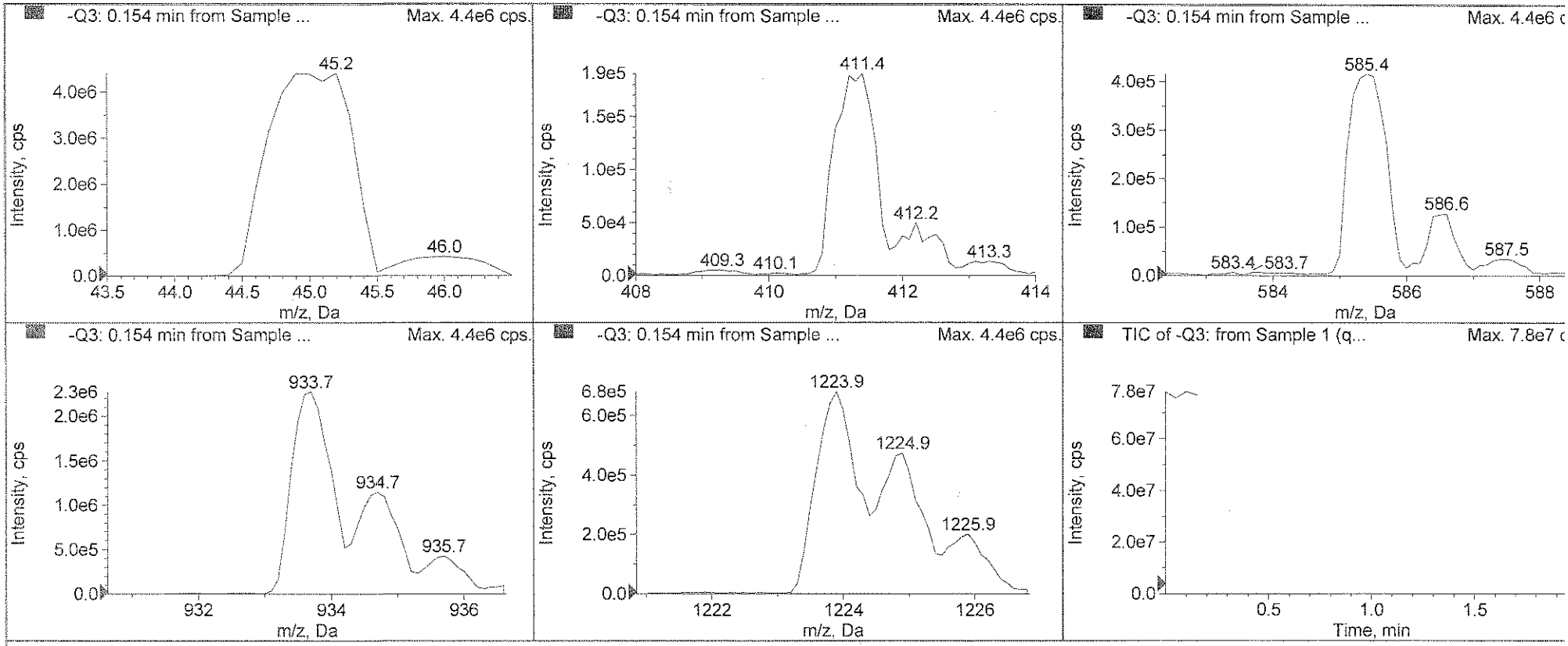
LCMS02 - API 5000

LIMS ID: 490080

Column: Kinetex EVO C18 100x4.6mm s/n: H15-022943

Mobile Phases A: 5mM Am.Ace. In water 15-OLC-01-32H B: 5mM Am.Ace. In MeOH 15-OLC-01-32I

	Sample Name	File Name	Acquisition Method	Dilution	R	Comments
39	K1602708-002 10X	033016\1045.wiff	PFC_090315 schedule mrm.dam	10x	✓	100ul→1mL MeOH:DN615 10ul 15-OLC-01-29L
40	K1602708-003 10X	033016\1046.wiff	PFC_090315 schedule mrm.dam	10x	✓	100ul→1mL MeOH:DN615 10ul 15-OLC-01-29L
41	K1602708-002	033016\1047.wiff	PFC_090315 schedule mrm.dam	1x	✓	
42	K1602708-003	033016\1048.wiff	PFC_090315 schedule mrm.dam	1x	✓	
43	PFC 1.0ppb 15-OLC-02-35F	033016\1049.wiff	PFC_090315 schedule mrm.dam	1x	✓	
44	IB	033016\1050.wiff	PFC_090315 schedule mrm.dam	1x	✓	



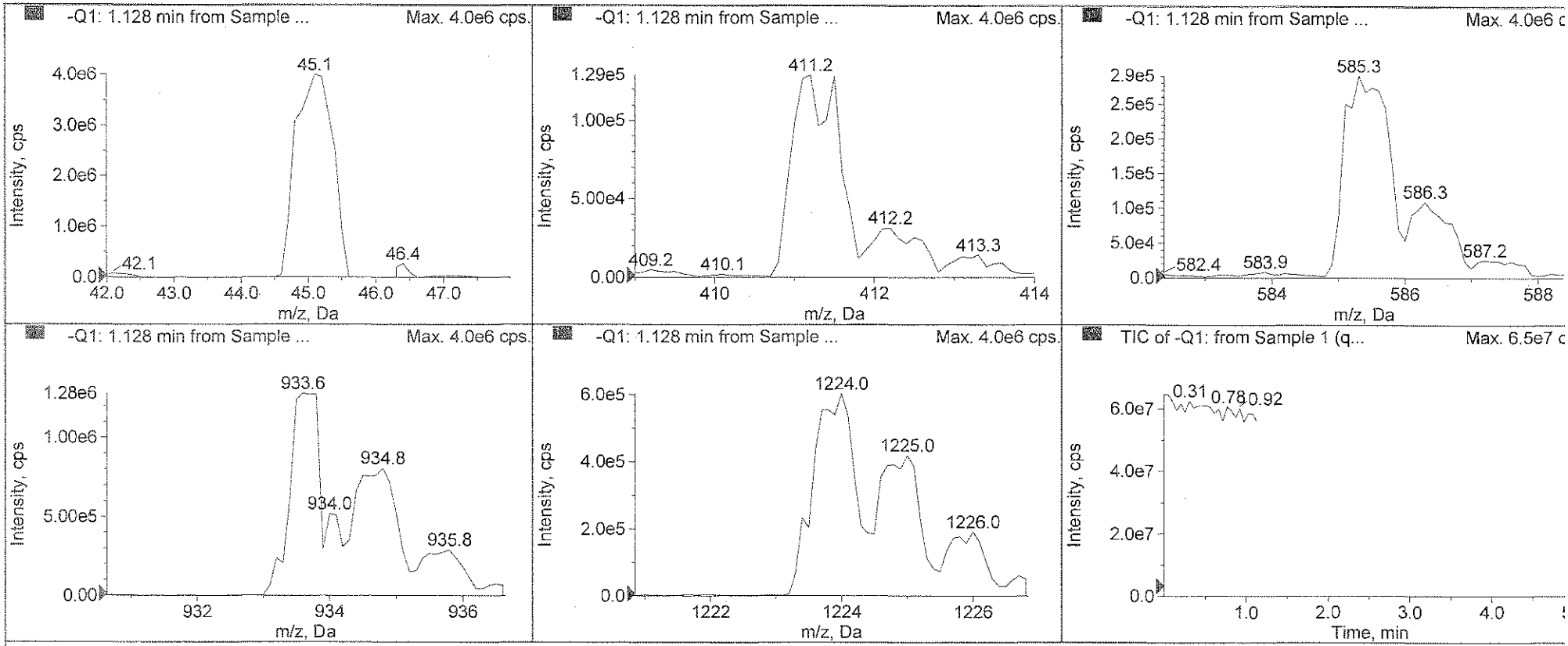
Peak List for " -Q3: 0.154 min from Sample 1 (q3 neg check 3-30-16) of q3 neg check 3-30-16.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	45.0131	4.4081e6	0.7395	-0.0151
2	411.2590	411.2924	1.9060e5	0.7398	-0.0334
3	585.3850	585.4014	4.1600e5	0.6657	-0.0164
4	933.6360	933.6870	2.2695e6	0.6969	-0.0510
5	1223.8450	1223.8768	6.7970e5	0.7450	-0.0318

All mass shift <0.5 Da.

MH 3/31/16

APR 0 1 2016



Peak List for " -Q1: 1.128 min from Sample 1 (q1 neg check 3-30-16) of q1 neg check 3-30-16.wiff (Turbo Spray)"

	Target Mass (Da)	Found At (Da)	Intensity (cps)	Width (Da)	Mass Shift (Da)
1	44.9980	45.0849	4.0000e6	0.6870	-0.0869
2	411.2590	411.2581	1.2884e5	0.6851	8.8439e-4
3	585.3850	585.4119	2.9060e5	0.7863	-0.0269
4	933.6360	933.6519	1.2801e6	0.4611	-0.0159
5	1223.8450	1223.8844	6.0330e5	0.6933	-0.0394

All Mass Shift < 0.5 a.m.
MM 3/31/16

APR 0 1 2016

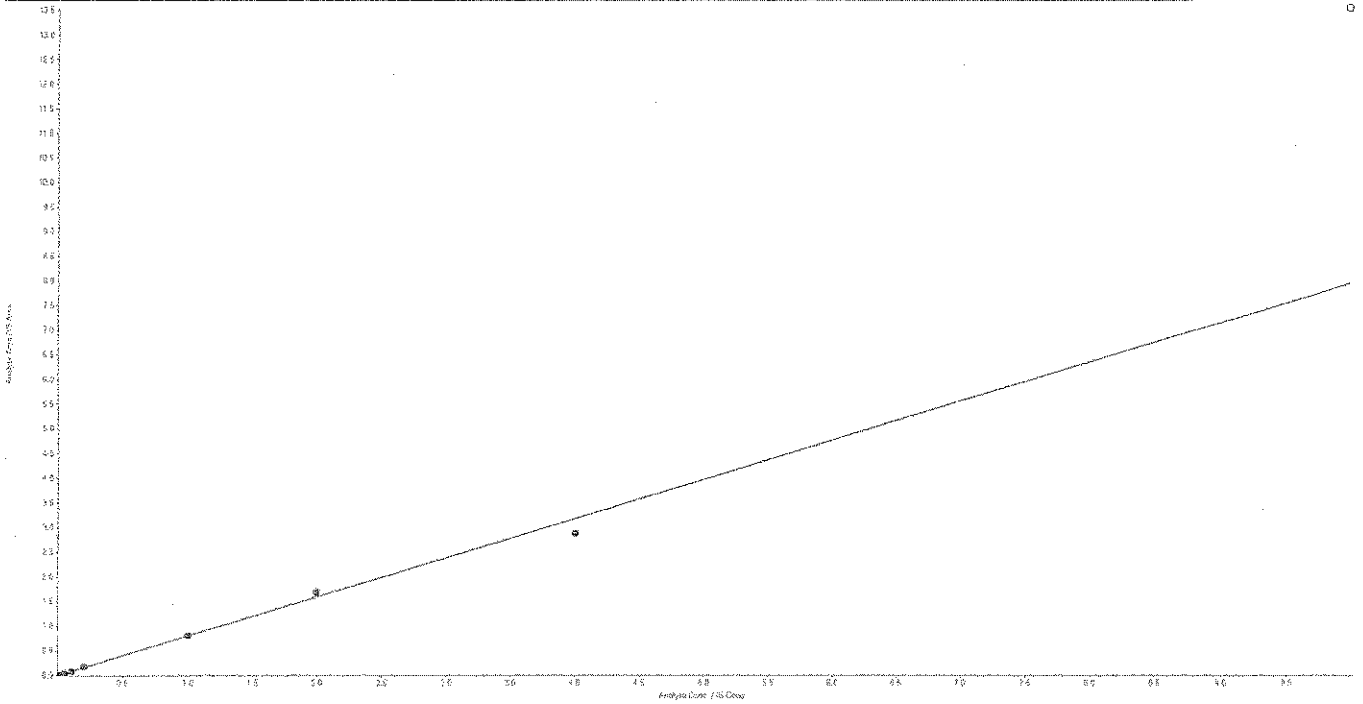
Created with Analyst Reporter
Printed: 3/31/2016 12:59 PM

Analyte Name: Pfba 1
Internal Standard: 13c_pfba

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 0.794 x (std. dev. = 0.0587)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.05	0.045	91	NaN	NaN
0.1	0.095	95	NaN	NaN
0.25	0.256	102	NaN	NaN
0.5	0.511	102	NaN	NaN
1	1.121	112	NaN	NaN
5	5.066	101	NaN	NaN
10	10.555	106	NaN	NaN
20	18.169	91	NaN	NaN



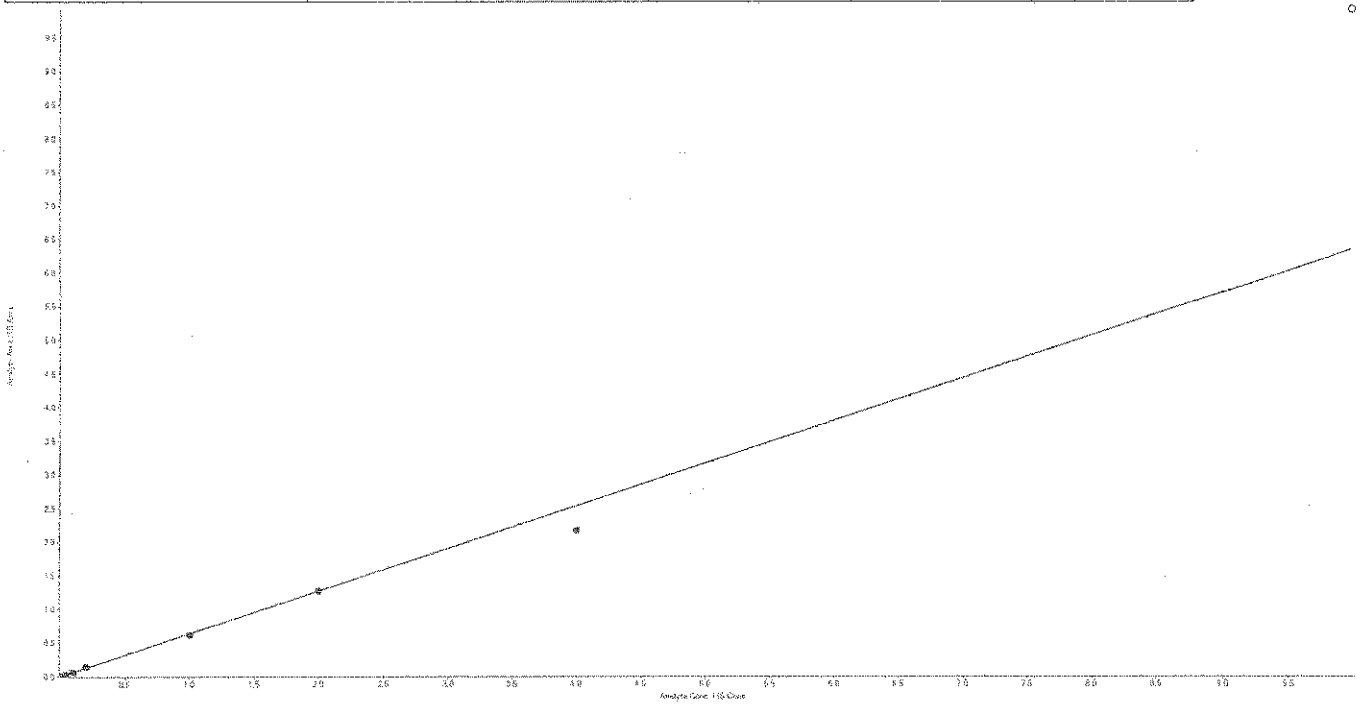
APR 01 2016

Analyte Name: Pfpea 1
Internal Standard: 13c_pfhxa

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 0.635 x (std. dev. = 0.0485)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.02	0.022	109	NaN	NaN
0.05	0.054	107	NaN	NaN
0.1	0.094	94	NaN	NaN
0.25	0.252	101	NaN	NaN
0.5	0.488	98	NaN	NaN
1	1.083	108	NaN	NaN
5	4.868	97	NaN	NaN
10	9.981	100	NaN	NaN
20	17.063	85	NaN	NaN



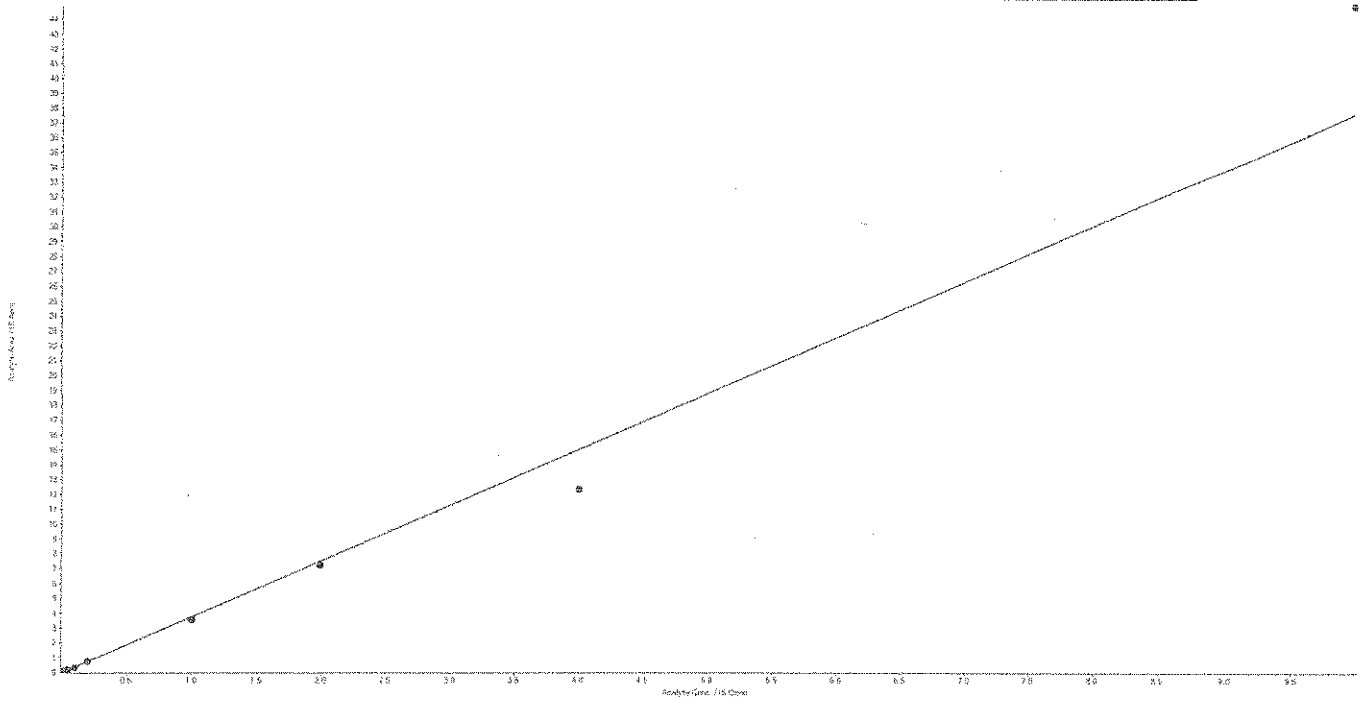
APR 01 2016

Analyte Name: Pfbs 1
Internal Standard: 18o-pfhs

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 3.76 x (std. dev. = 0.387)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.02	0.021	106	NaN	NaN
0.05	0.054	108	NaN	NaN
0.1	0.093	93	NaN	NaN
0.25	0.254	102	NaN	NaN
0.5	0.474	95	NaN	NaN
1	1.039	104	NaN	NaN
5	4.729	95	NaN	NaN
10	9.598	96	NaN	NaN
20	16.384	82	NaN	NaN
50	59.725	119	NaN	NaN



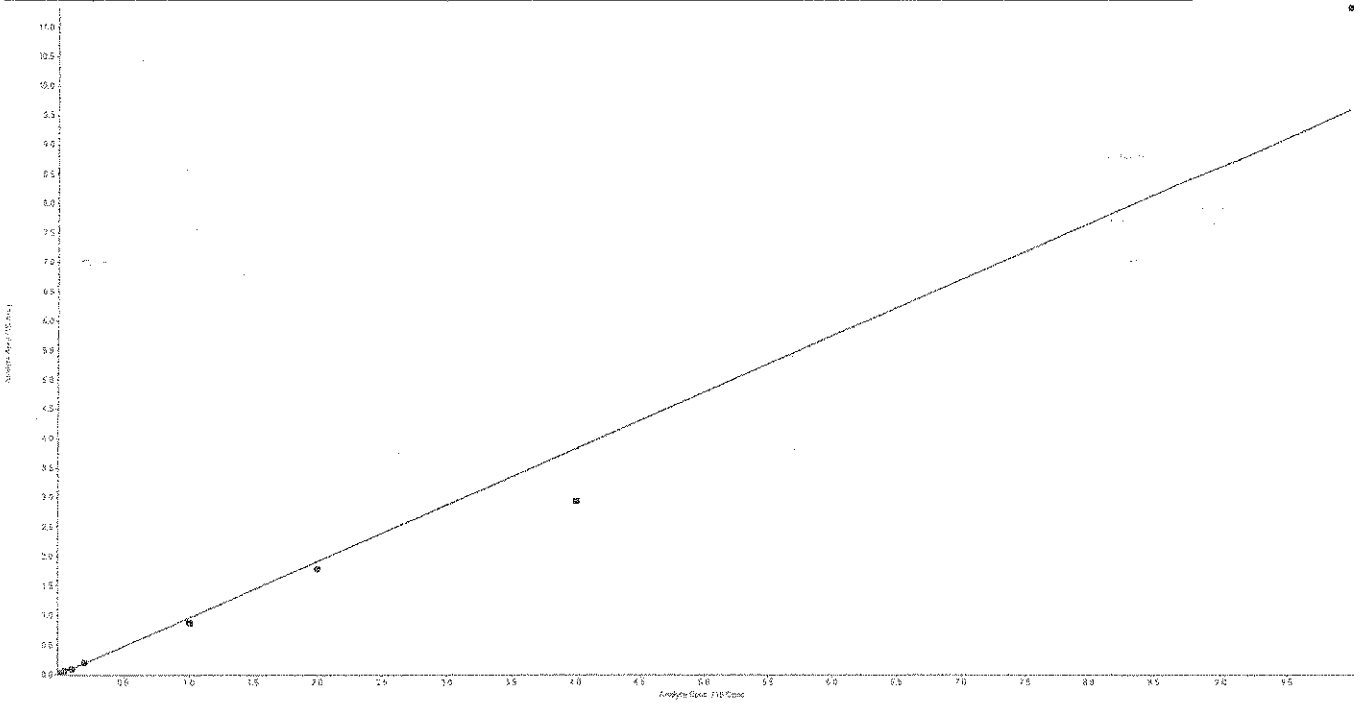
APR 0 4 2016

Analyte Name: Pfhxa 1
Internal Standard: 13c_pfhxa

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 0.96 x (std. dev. = 0.125)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.05	0.059	118	NaN	NaN
0.1	0.099	99	NaN	NaN
0.25	0.253	101	NaN	NaN
0.5	0.488	98	NaN	NaN
1	1.051	105	NaN	NaN
5	4.555	91	NaN	NaN
10	9.327	93	NaN	NaN
20	15.314	77	NaN	NaN
50	59.032	118	NaN	NaN



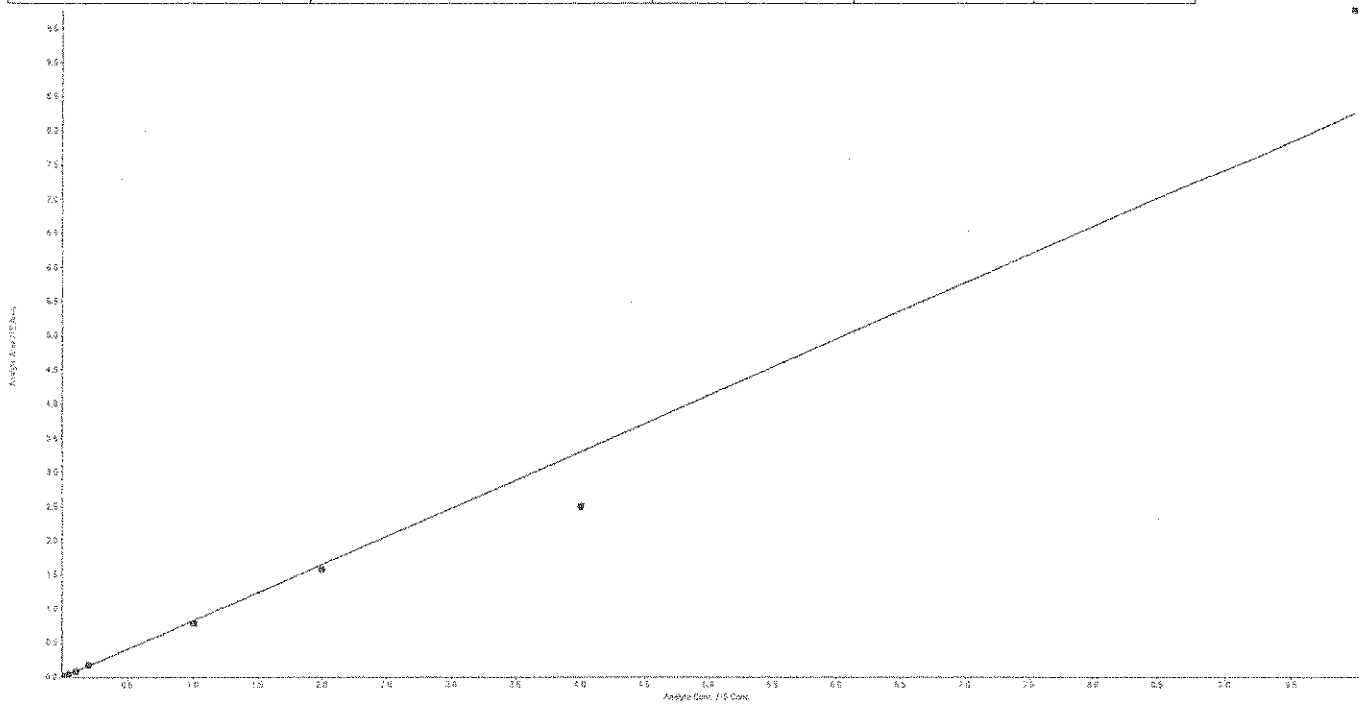
APR 01 2016

Analyte Name: Pfhpa 1
Internal Standard: 13c_pfhxa

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 0.825 x (std. dev. = 0.12)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.02	0.026	128	NaN	NaN
0.05	0.046	91	NaN	NaN
0.1	0.095	95	NaN	NaN
0.25	0.251	101	NaN	NaN
0.5	0.477	95	NaN	NaN
1	1.051	105	NaN	NaN
5	4.756	95	NaN	NaN
10	9.569	96	NaN	NaN
20	15.138	76	NaN	NaN
50	59.170	118	NaN	NaN



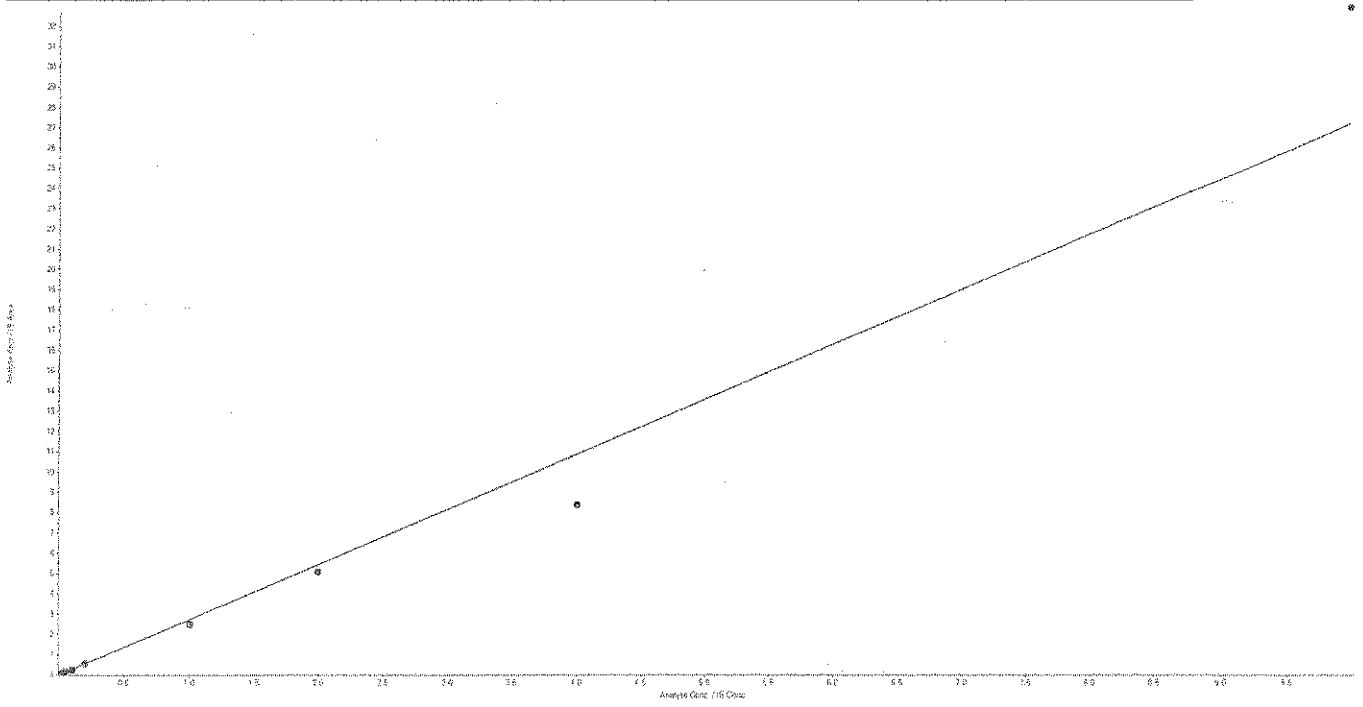
APR 01 2016

Analyte Name: Pfhxs 1
Internal Standard: 18o-pfhs

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 2.72 x (std. dev. = 0.37)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.1	0.112	112	NaN	NaN
0.25	0.262	105	NaN	NaN
0.5	0.476	95	NaN	NaN
1	1.046	105	NaN	NaN
5	4.580	92	NaN	NaN
10	9.327	93	NaN	NaN
20	15.448	77	NaN	NaN
50	60.537	121	NaN	NaN



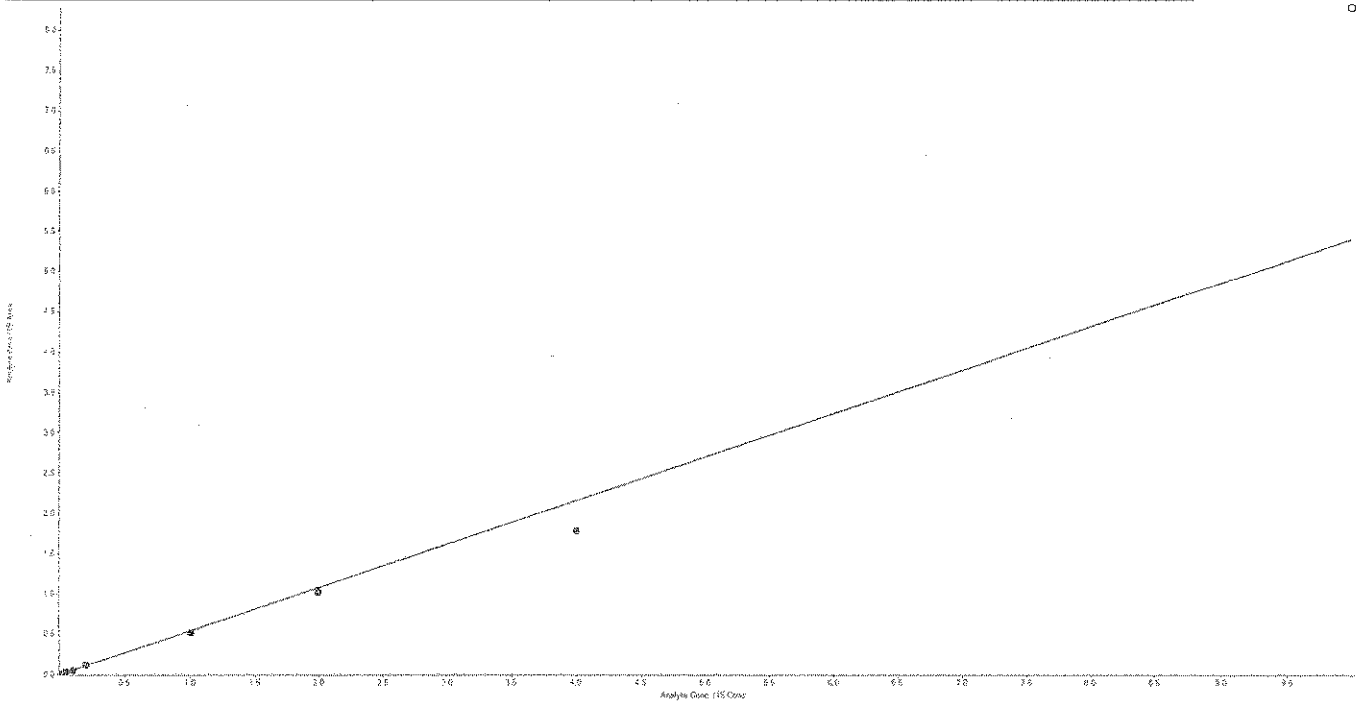
APR 0 1 2016

Analyte Name: Pfoa 1
Internal Standard: 13c-pfoa

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 0.54 x (std. dev. = 0.0514)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.05	0.057	113	NaN	NaN
0.1	0.102	102	NaN	NaN
0.25	0.258	103	NaN	NaN
0.5	0.494	99	NaN	NaN
1	1.102	110	NaN	NaN
5	4.765	95	NaN	NaN
10	9.485	95	NaN	NaN
20	16.564	83	NaN	NaN



APR 0 1 2016

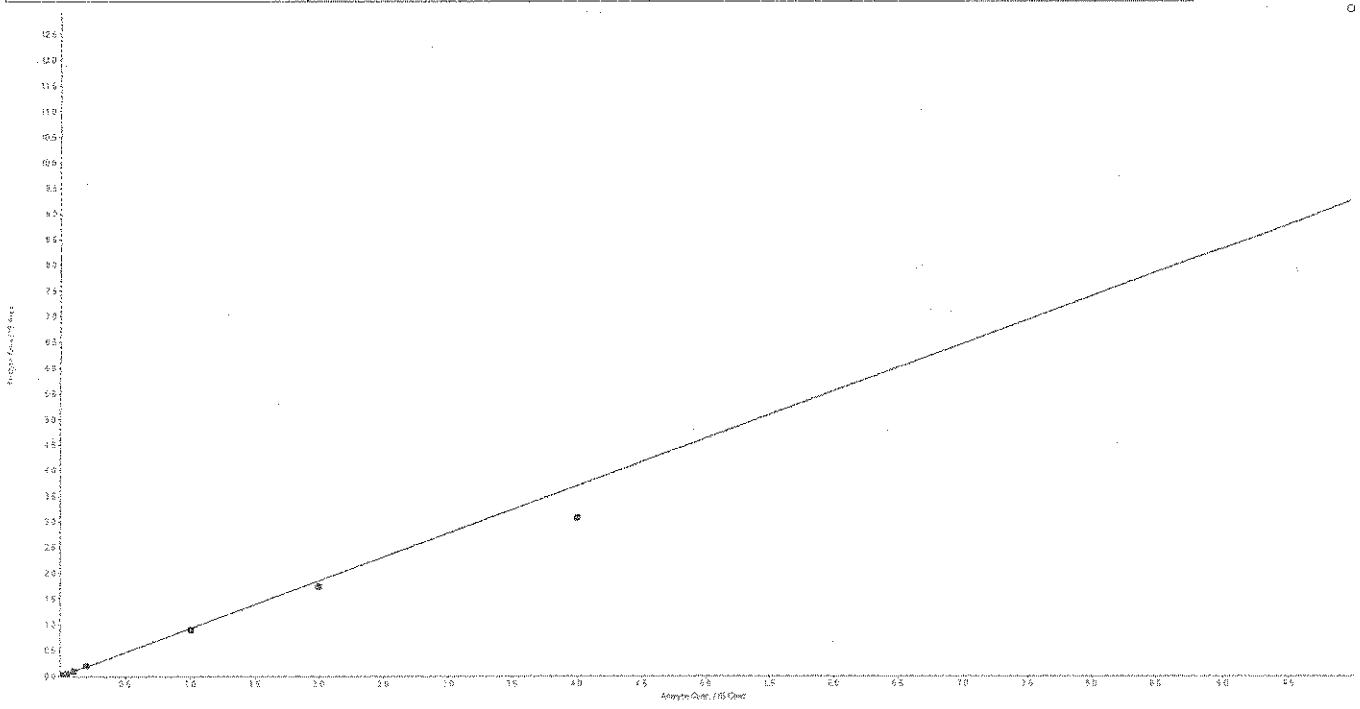
3/31/16

Analyte Name: Pfna 1
Internal Standard: 13c-pfna

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 0.925 x (std. dev. = 0.0914)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.05	0.058	115	NaN	NaN
0.1	0.097	97	NaN	NaN
0.25	0.252	101	NaN	NaN
0.5	0.523	105	NaN	NaN
1	1.089	109	NaN	NaN
5	4.834	97	NaN	NaN
10	9.388	94	NaN	NaN
20	16.588	83	NaN	NaN



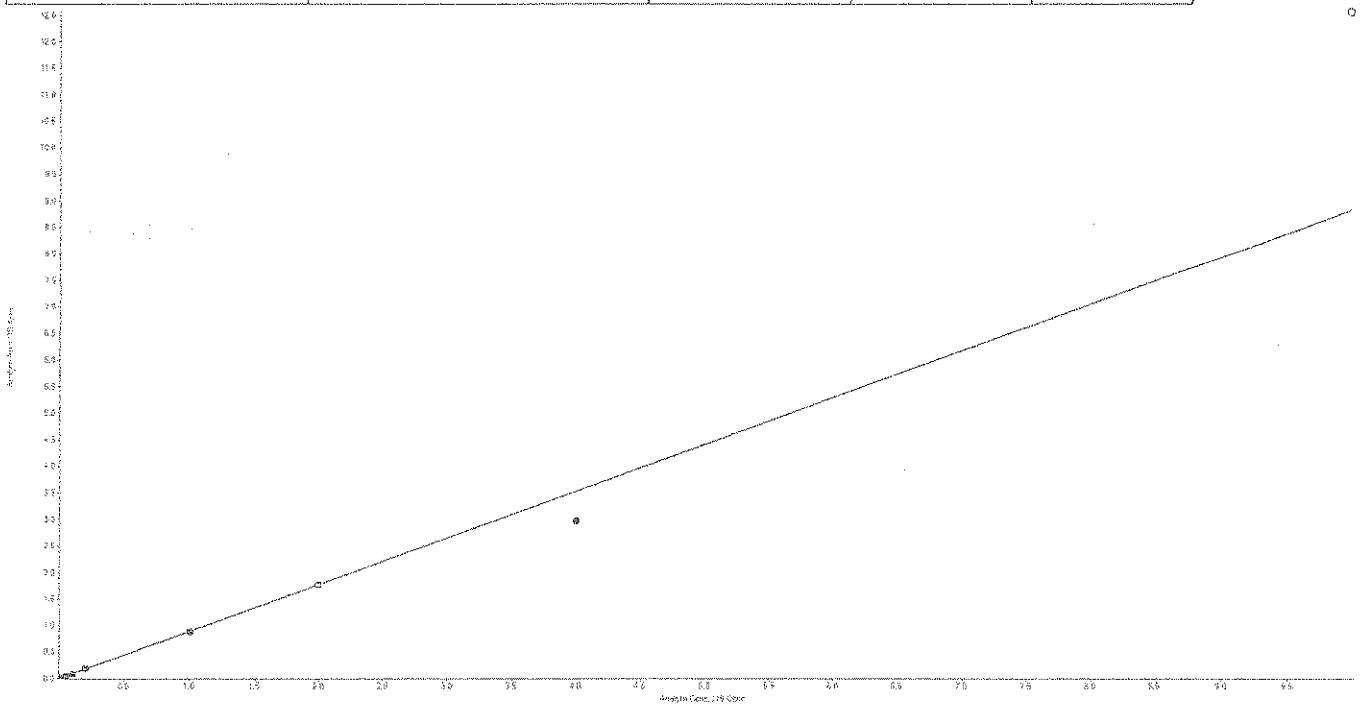
APR 01 2016

Analyte Name: Pfos 1
Internal Standard: 13c-pfos

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 0.882 x (std. dev. = 0.0737)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.02	0.023	113	NaN	NaN
0.05	0.053	106	NaN	NaN
0.1	0.099	99	NaN	NaN
0.25	0.243	97	NaN	NaN
0.5	0.472	94	NaN	NaN
1	1.077	108	NaN	NaN
5	4.937	99	NaN	NaN
10	9.963	100	NaN	NaN
20	16.832	84	NaN	NaN



APR 01 2016

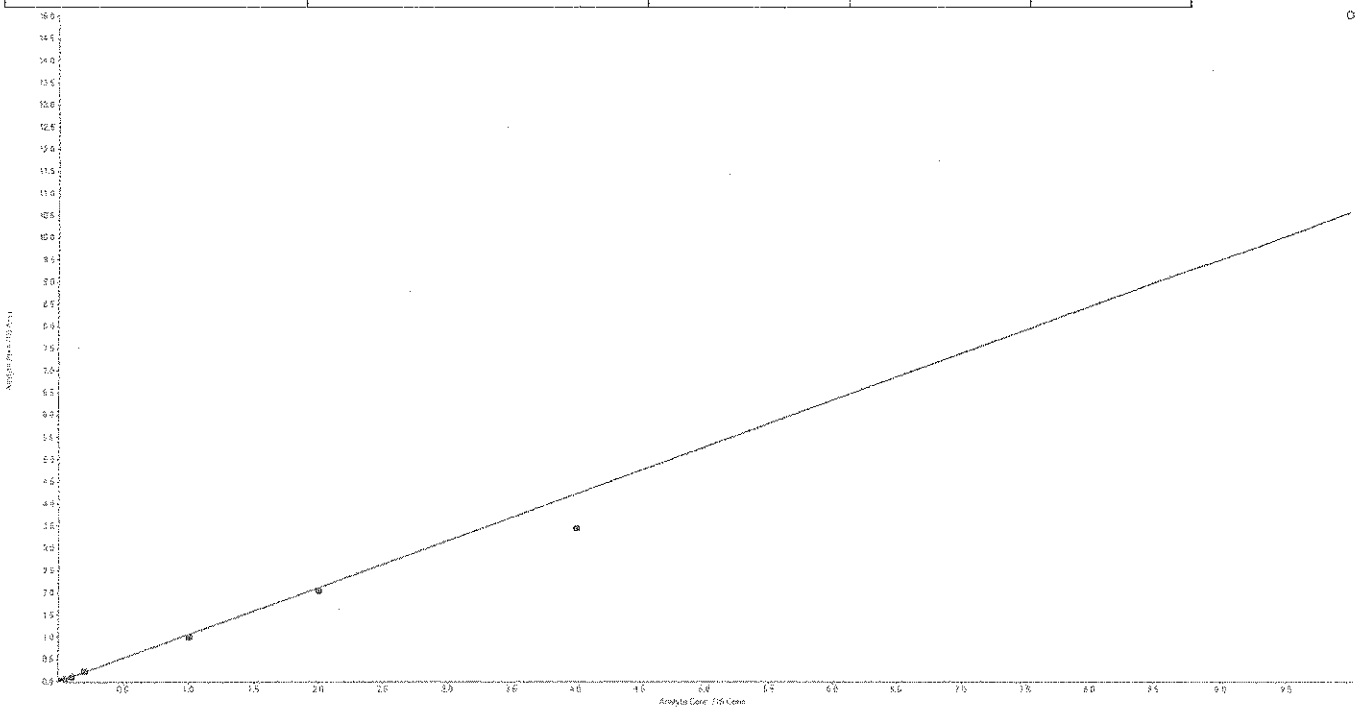
3/31/16

Analyte Name: Pfda 1
Internal Standard: 13c-pfda

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 1.06 x (std. dev. = 0.142)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.02	0.026	128	NaN	NaN
0.05	0.055	110	NaN	NaN
0.1	0.096	96	NaN	NaN
0.25	0.230	92	NaN	NaN
0.5	0.473	95	NaN	NaN
1	1.069	107	NaN	NaN
5	4.698	94	NaN	NaN
10	9.628	96	NaN	NaN
20	16.308	82	NaN	NaN



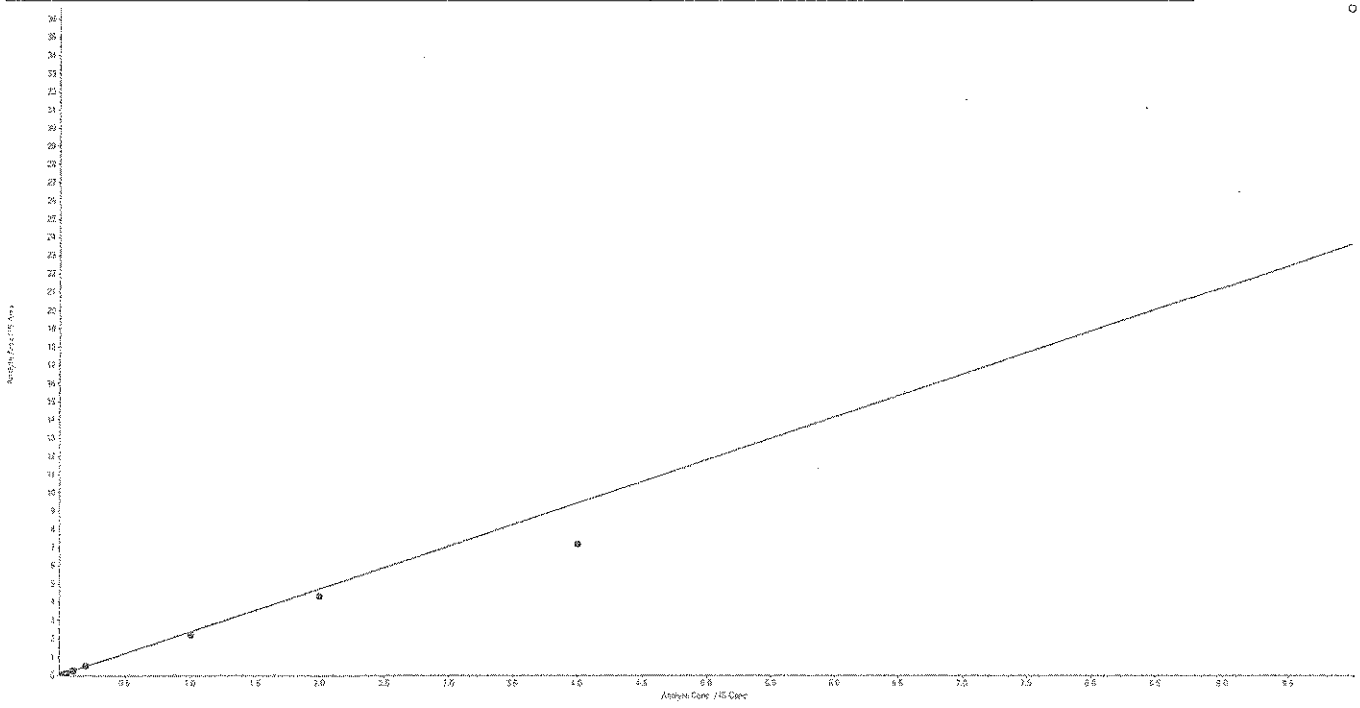
APR 01 2016

Analyte Name: Pfuna 1
Internal Standard: 13c-pfuna

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 2.36 x (std. dev. = 0.336)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.05	0.062	125	NaN	NaN
0.1	0.109	109	NaN	NaN
0.25	0.254	102	NaN	NaN
0.5	0.487	97	NaN	NaN
1	1.064	106	NaN	NaN
5	4.691	94	NaN	NaN
10	9.094	91	NaN	NaN
20	15.268	76	NaN	NaN



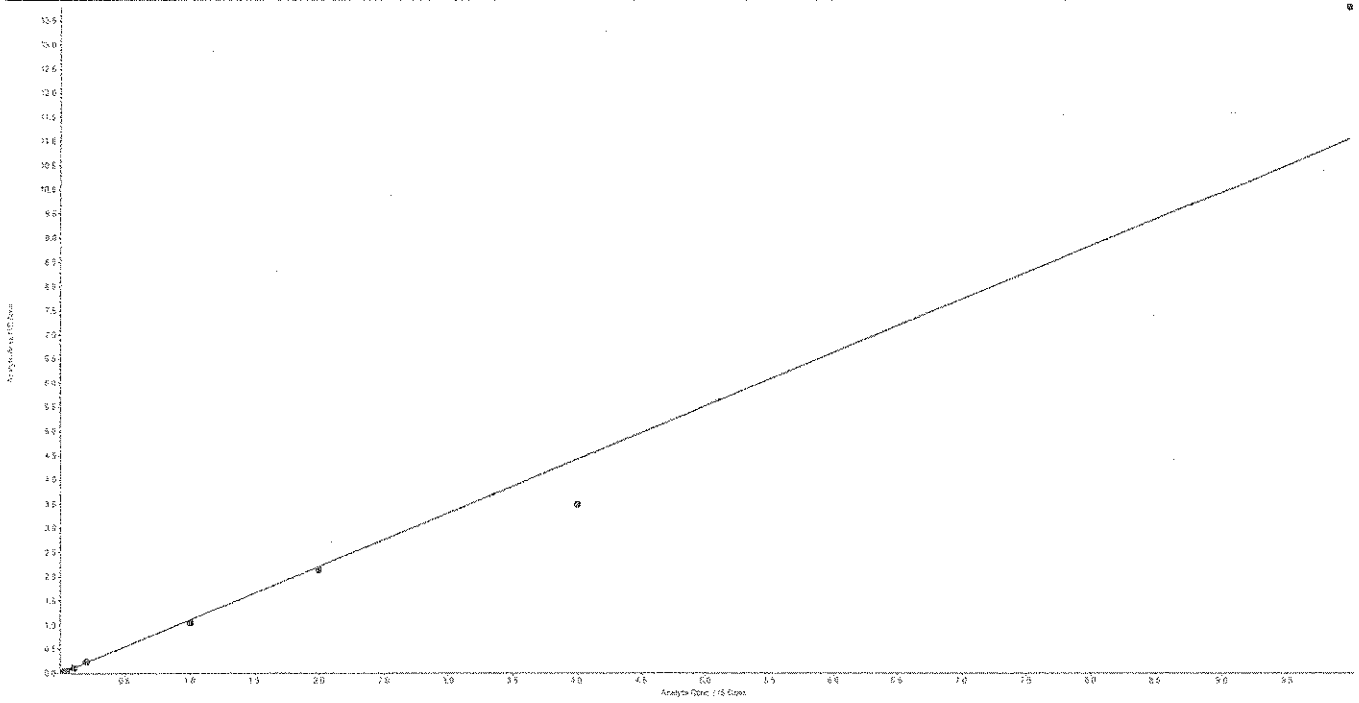
APR 01 2016

Analyte Name: Pfds 1
Internal Standard: 13c-pfos

Data File	033016\1007.wiff	Result Table	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	Algorithm Used	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	Instrument Name	LCMS02
Project			

Regression Equation: y = 1.11 x (std. dev. = 0.132)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.02	0.020	102	NaN	NaN
0.05	0.055	111	NaN	NaN
0.1	0.098	98	NaN	NaN
0.25	0.244	97	NaN	NaN
0.5	0.471	94	NaN	NaN
1	1.044	104	NaN	NaN
5	4.683	94	NaN	NaN
10	9.678	97	NaN	NaN
20	15.774	79	NaN	NaN
50	62.347	125	NaN	NaN



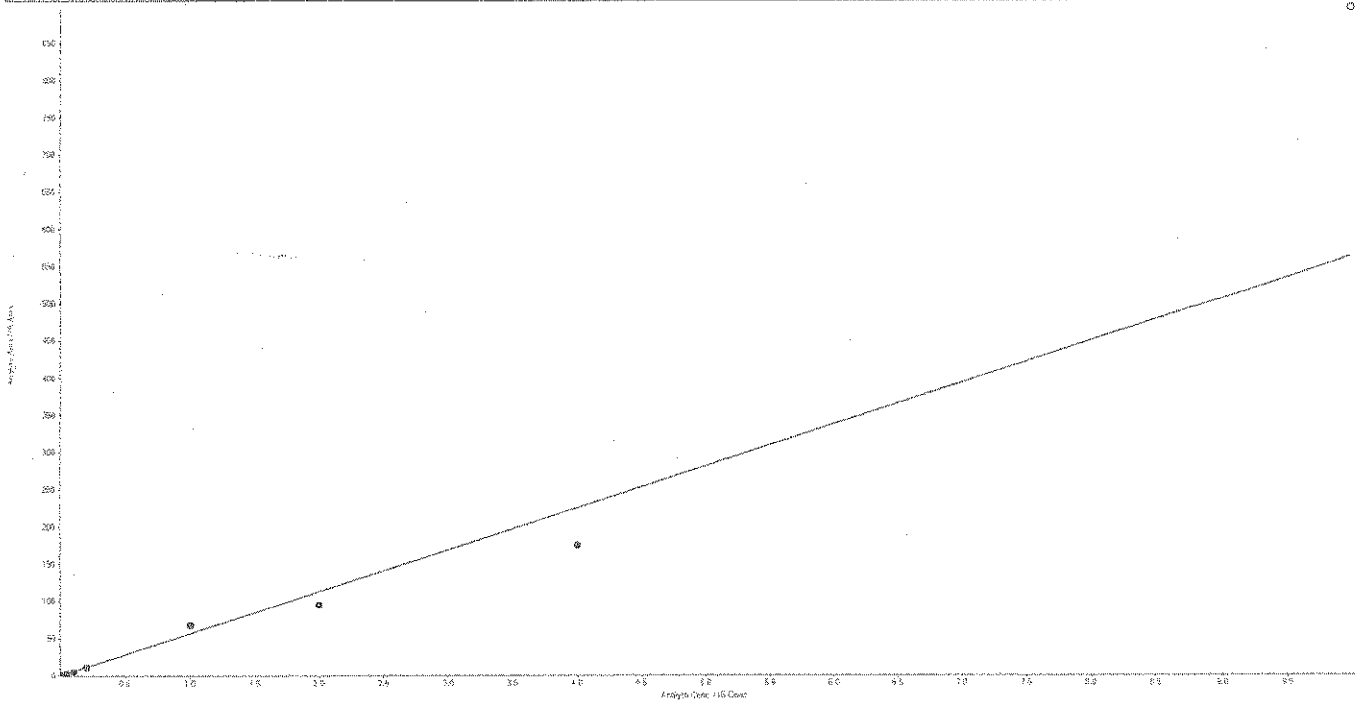
APR 01 2016

Analyte Name: Pfdoa 1
Internal Standard: 13c-pfdoda

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 56.2 x (std. dev. = 9.5)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.05	0.063	125	NaN	NaN
0.1	0.108	108	NaN	NaN
0.25	0.224	90	NaN	NaN
0.5	0.474	95	NaN	NaN
1	1.010	101	NaN	NaN
5	6.007	120	NaN	NaN
10	8.367	84	NaN	NaN
20	15.547	78	NaN	NaN



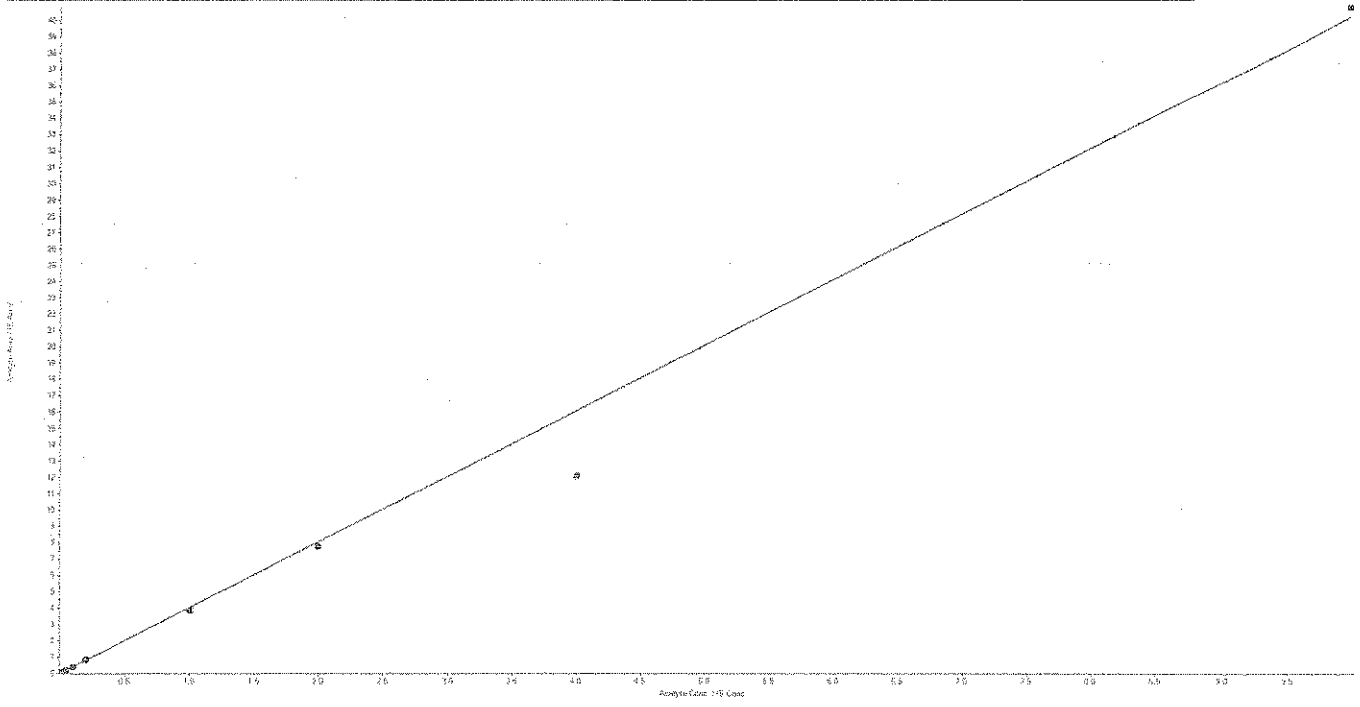
APR 01 2016

Analyte Name: Fosa 1
Internal Standard: d5-NEtFOSA

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 4.02 x (std. dev. = 0.48)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.02	0.024	121	NaN	NaN
0.05	0.055	110	NaN	NaN
0.1	0.098	98	NaN	NaN
0.25	0.252	101	NaN	NaN
0.5	0.476	95	NaN	NaN
1	1.072	107	NaN	NaN
5	4.764	95	NaN	NaN
10	9.624	96	NaN	NaN
20	15.017	75	NaN	NaN
50	50.733	101	NaN	NaN



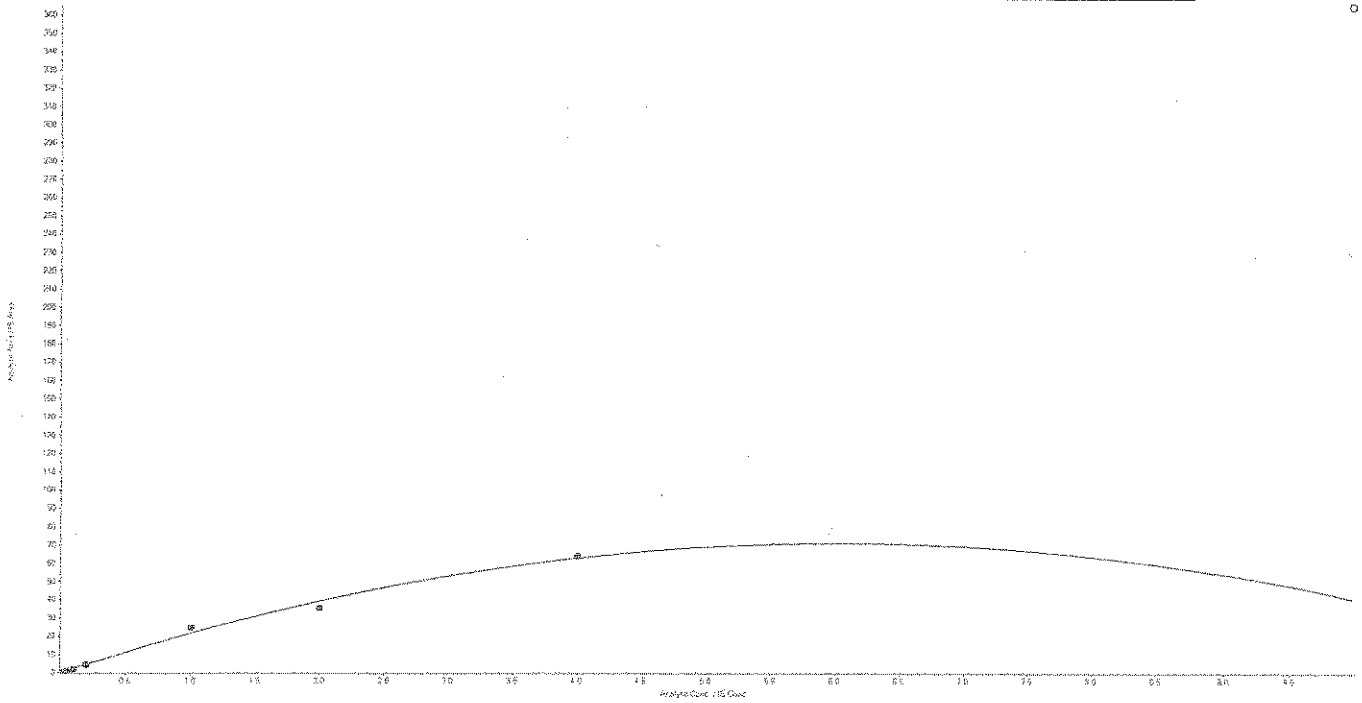
APR 01 2016

Analyte Name: Pfteda 1
Internal Standard: 13c-pfdoda

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = -1.95 x^2 + 23.5 x + -0.043 (r = 0.9959)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.05	0.062	125	NaN	NaN
0.1	0.095	95	NaN	NaN
0.25	0.223	89	NaN	NaN
0.5	0.432	86	NaN	NaN
1	0.979	98	NaN	NaN
5	5.808	116	NaN	NaN
10	8.857	89	NaN	NaN
20	20.706	104	NaN	NaN



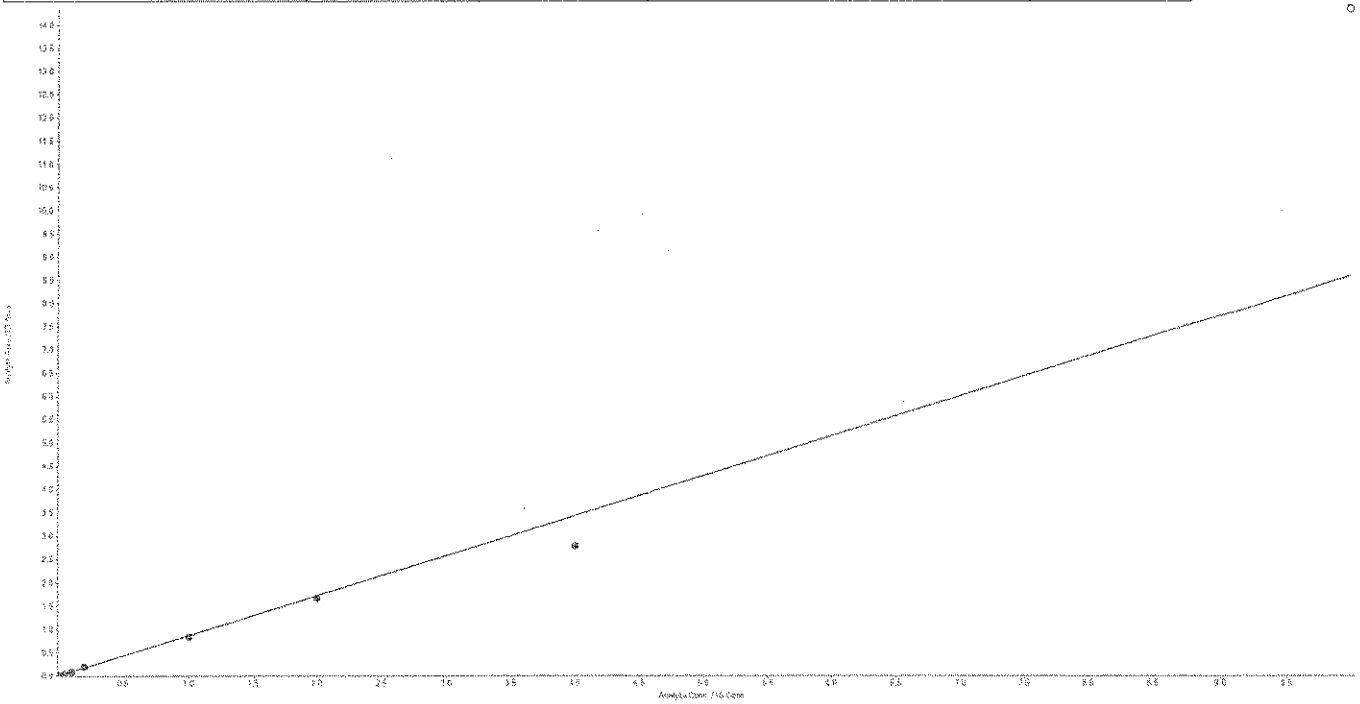
APR 01 2016

Analyte Name: PFHpS 1
Internal Standard: 18o-pfhs

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 0.86 x (std. dev. = 0.0805)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.02	0.022	110	NaN	NaN
0.05	0.055	111	NaN	NaN
0.1	0.098	98	NaN	NaN
0.25	0.247	99	NaN	NaN
0.5	0.495	99	NaN	NaN
1	1.091	109	NaN	NaN
5	4.808	96	NaN	NaN
10	9.681	97	NaN	NaN
20	16.157	81	NaN	NaN



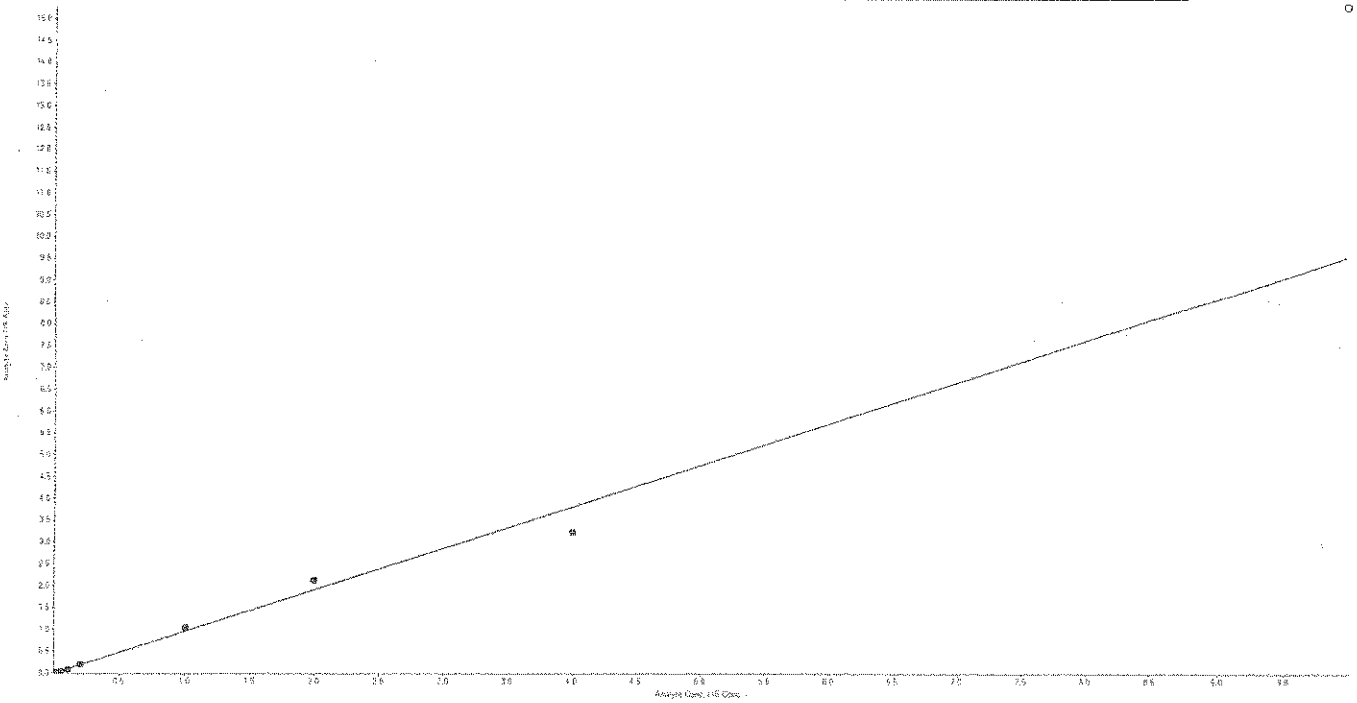
APR 01 2016

Analyte Name: NMeFOSE 1
Internal Standard: d7-NMeFOSE

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 0.954 x (std. dev. = 0.0954)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.05	0.049	99	NaN	NaN
0.1	0.086	86	NaN	NaN
0.25	0.262	105	NaN	NaN
0.5	0.489	98	NaN	NaN
1	1.069	107	NaN	NaN
5	5.455	109	NaN	NaN
10	11.134	111	NaN	NaN
20	16.993	85	NaN	NaN



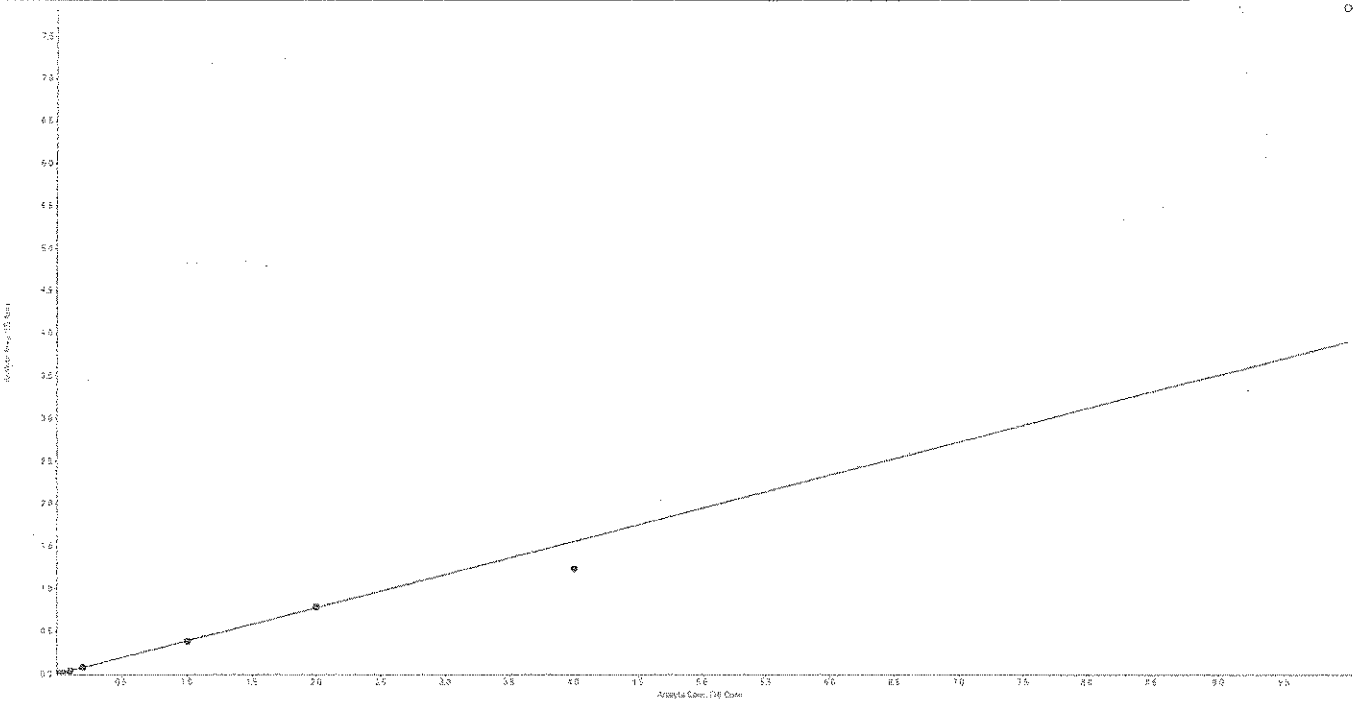
APR 01 2016

Analyte Name: NMeFOSA 1
Internal Standard: d7-NMeFOSE

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 0.39 x (std. dev. = 0.0491)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.02	0.024	118	NaN	NaN
0.05	0.059	118	NaN	NaN
0.1	0.102	102	NaN	NaN
0.25	0.233	93	NaN	NaN
0.5	0.448	90	NaN	NaN
1	1.004	100	NaN	NaN
5	4.894	98	NaN	NaN
10	10.095	101	NaN	NaN
20	15.870	79	NaN	NaN



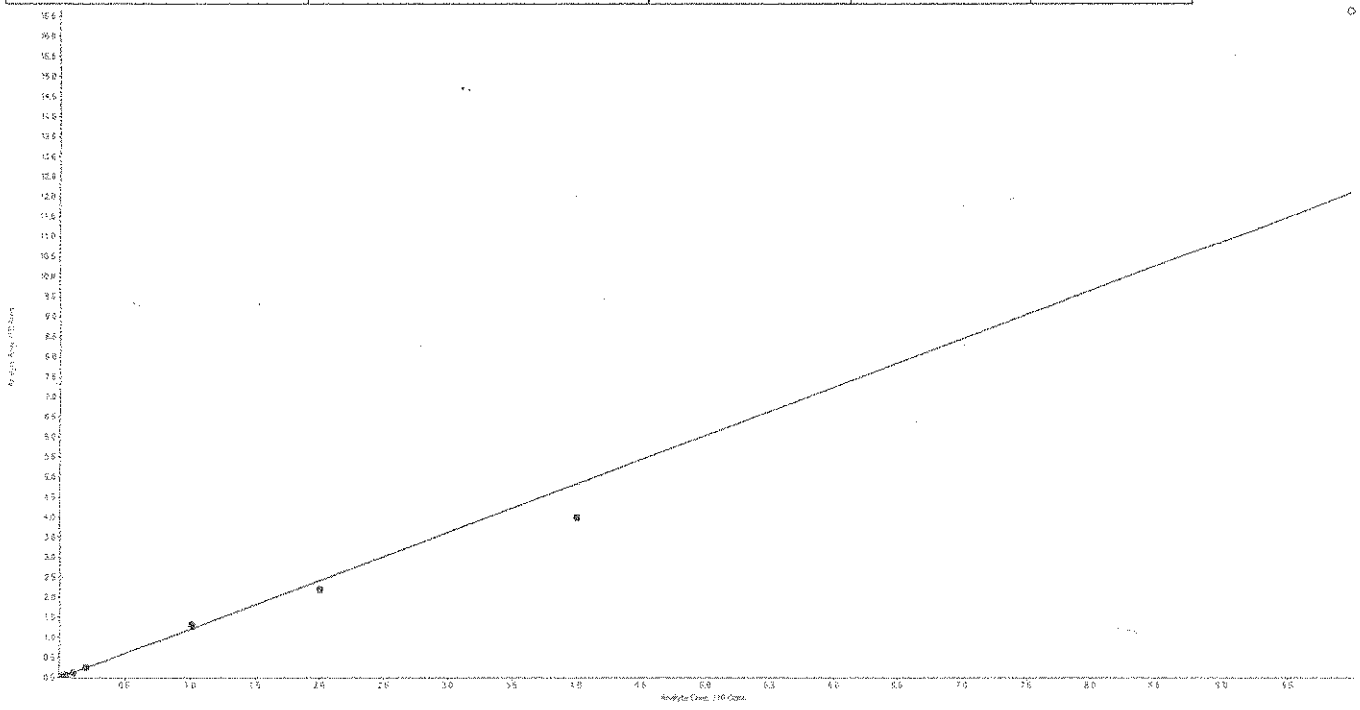
APR 01 2016

Analyte Name: NEtFOSE 1
Internal Standard: d9-EtFOSE

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 1.21 x (std. dev. = 0.128)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.1	0.105	105	NaN	NaN
0.25	0.284	113	NaN	NaN
0.5	0.486	97	NaN	NaN
1	1.032	103	NaN	NaN
5	5.415	108	NaN	NaN
10	9.076	91	NaN	NaN
20	16.515	83	NaN	NaN



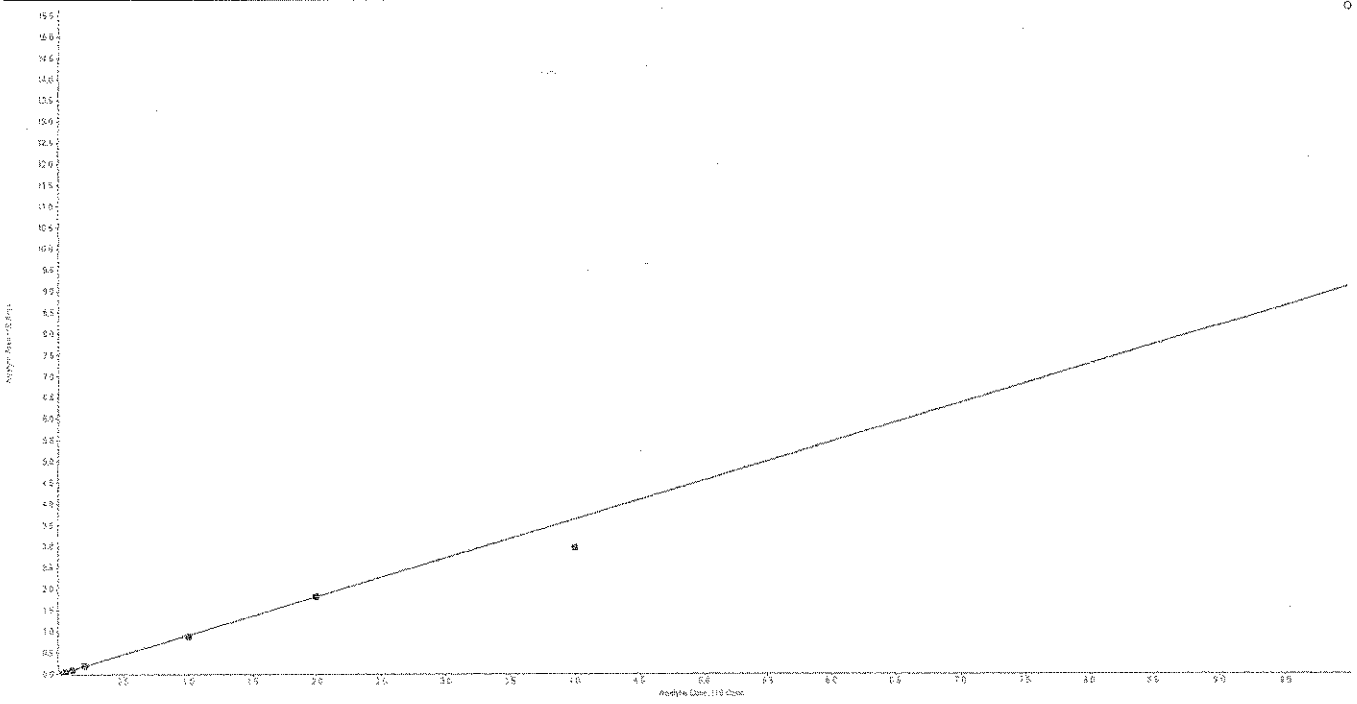
APR 01 2016

Analyte Name: NEtFOSA 1
Internal Standard: d5-NEtFOSA

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 0.909 x (std. dev. = 0.102)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.02	0.024	122	NaN	NaN
0.05	0.055	111	NaN	NaN
0.1	0.097	97	NaN	NaN
0.25	0.236	94	NaN	NaN
0.5	0.480	96	NaN	NaN
1	1.029	103	NaN	NaN
5	4.784	96	NaN	NaN
10	9.951	100	NaN	NaN
20	16.304	82	NaN	NaN



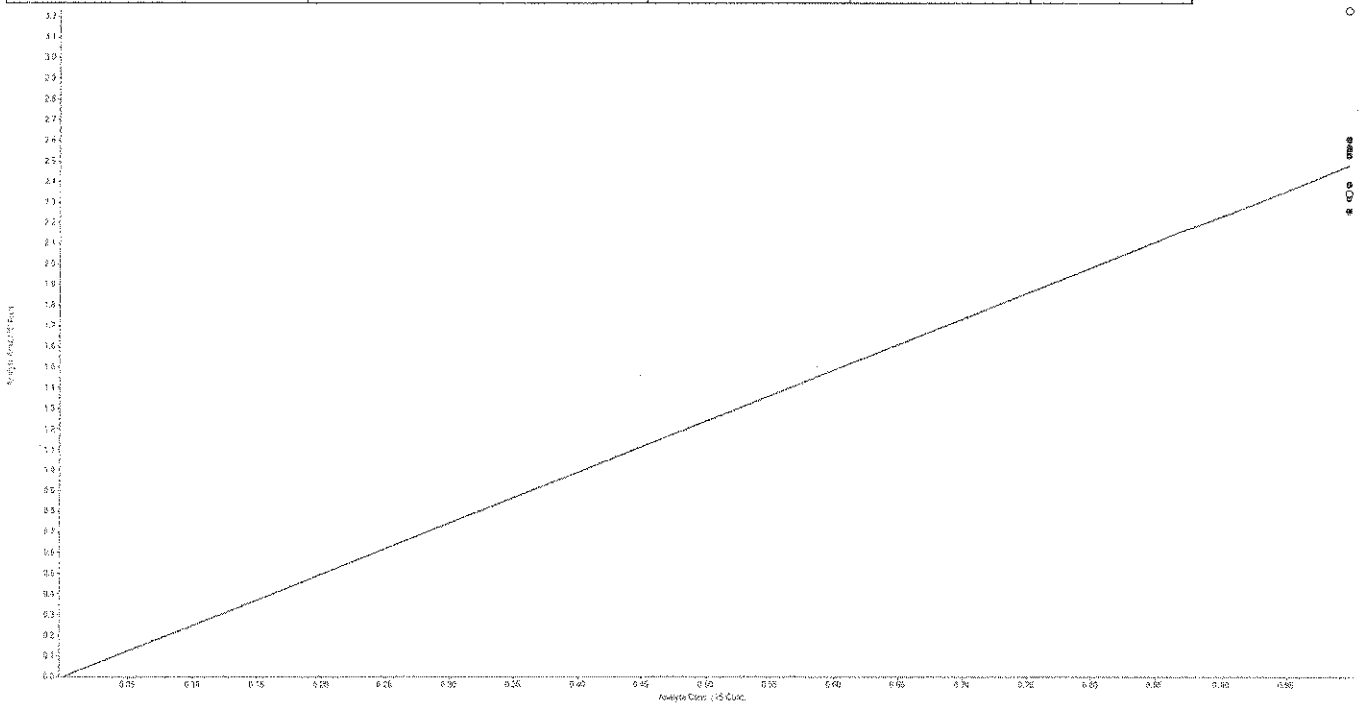
APR 01 2016

Analyte Name: d9-EtFOSE 1
Internal Standard: N_mefosa_d3

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 2.48 x (std. dev. = 0.136)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
5	5.000	100	0.27	5.5



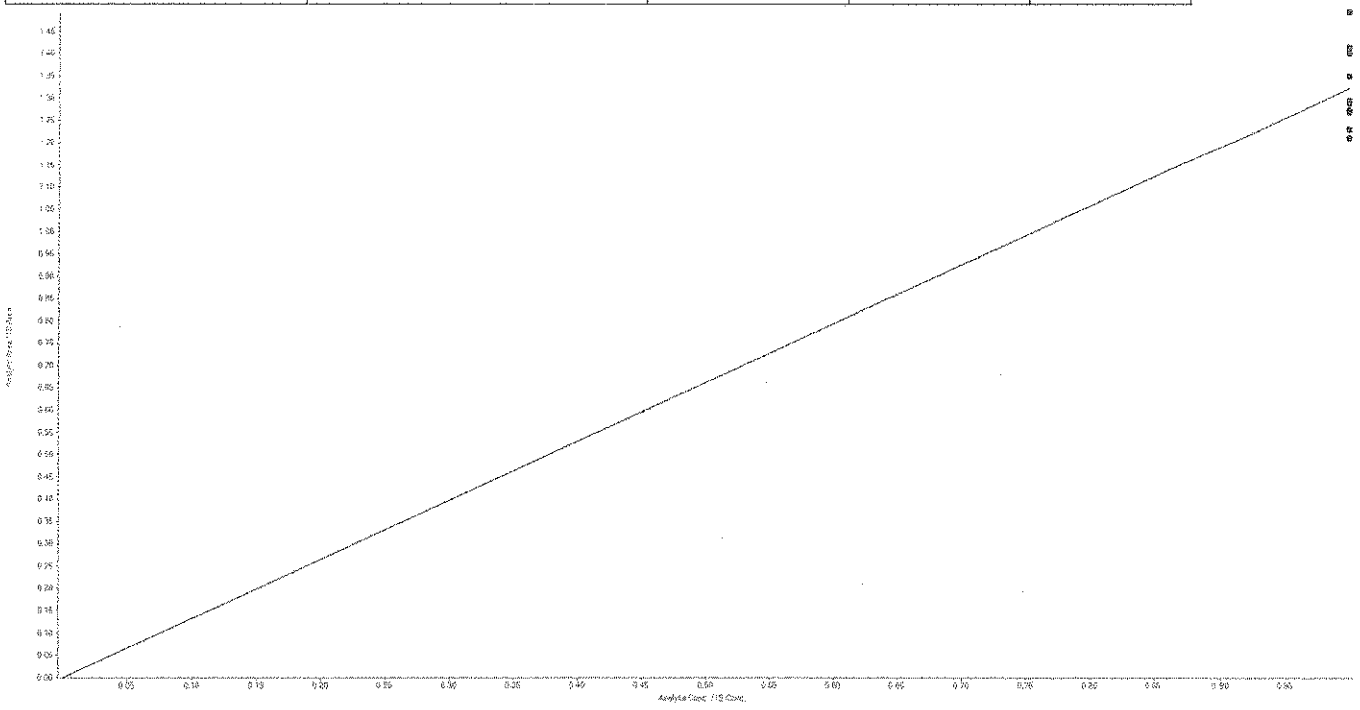
APR 01 2016

Analyte Name: d5-NEtFOSA 1
Internal Standard: N_mefosa_d3

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 1.32 x (std. dev. = 0.0902)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
5	5.000	100	0.34	6.8



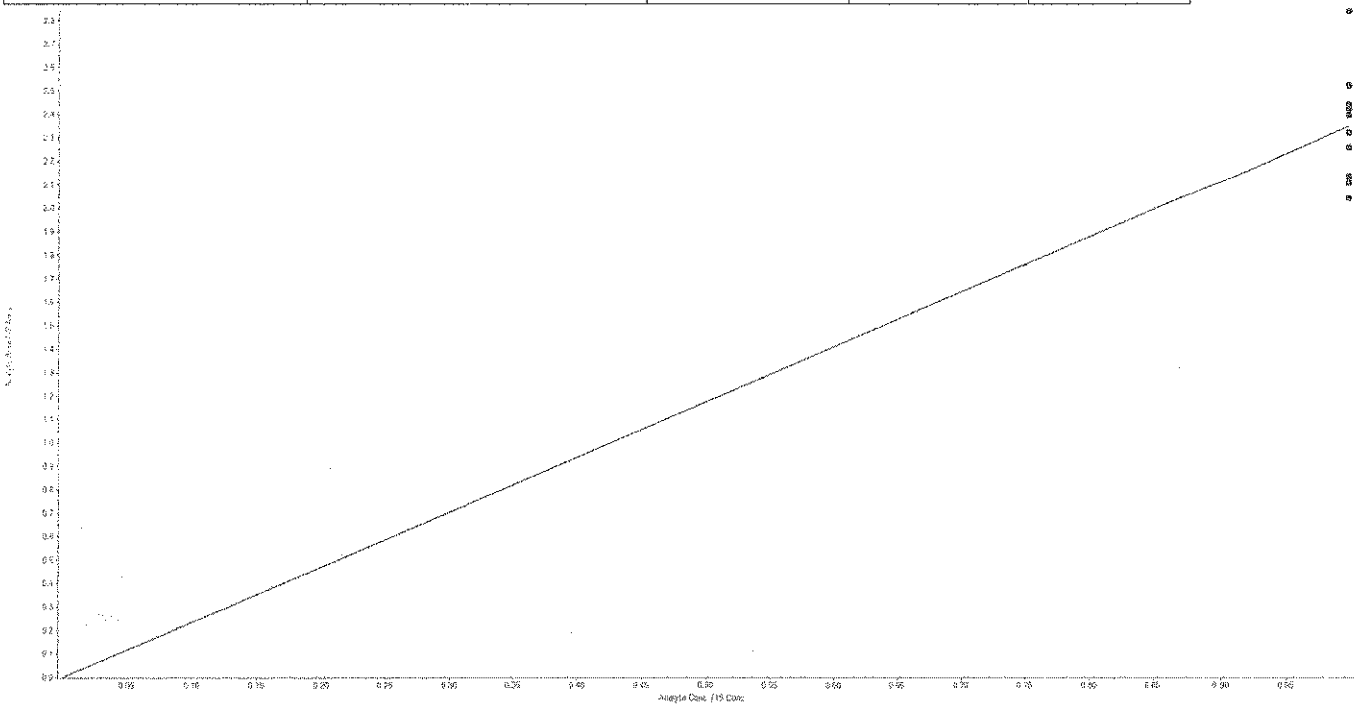
APR 01 2016

Analyte Name: d7-NMeFOSE 1
Internal Standard: N_mefosa_d3

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 2.35 x (std. dev. = 0.234)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
5	5.000	100	0.50	10.0



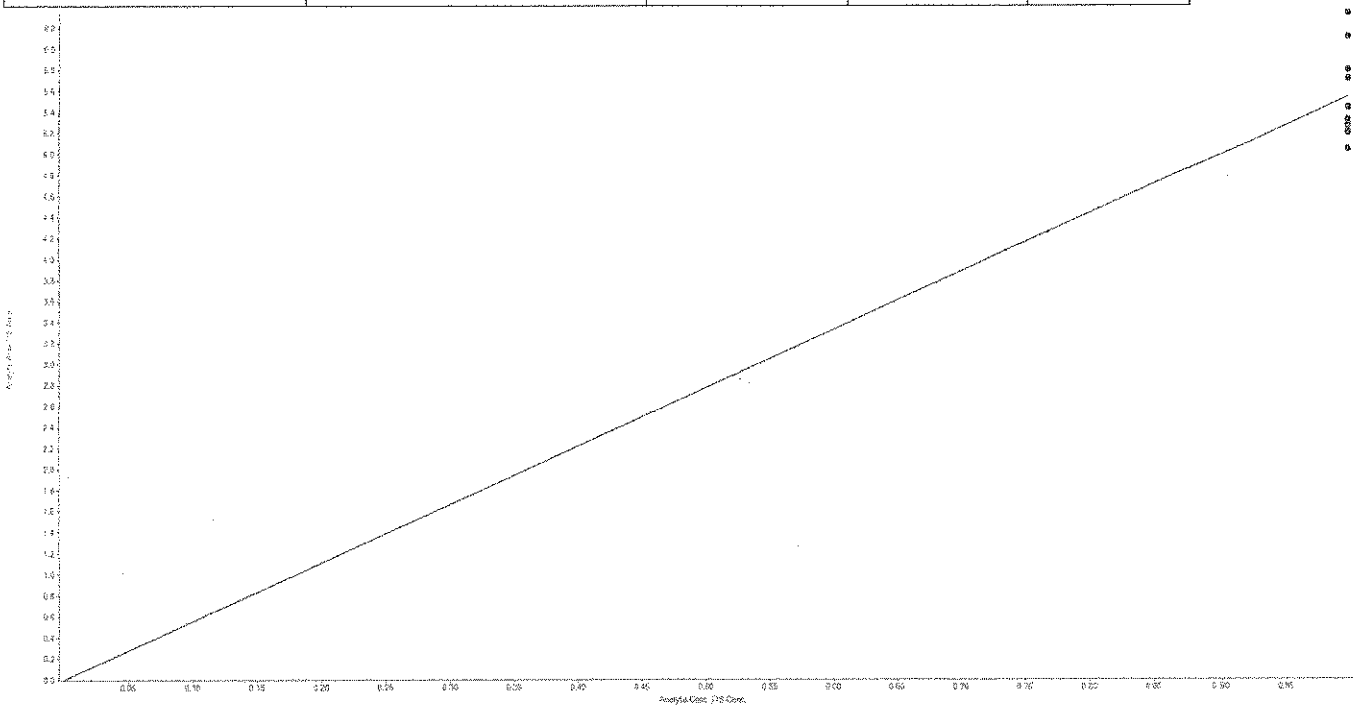
APR 01 2016

Analyte Name: 13C_PFBA 1
Internal Standard: N_mefosa_d3

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 5.54 x (std. dev. = 0.432)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
5	5.000	100	0.39	7.8



APR 01 2016

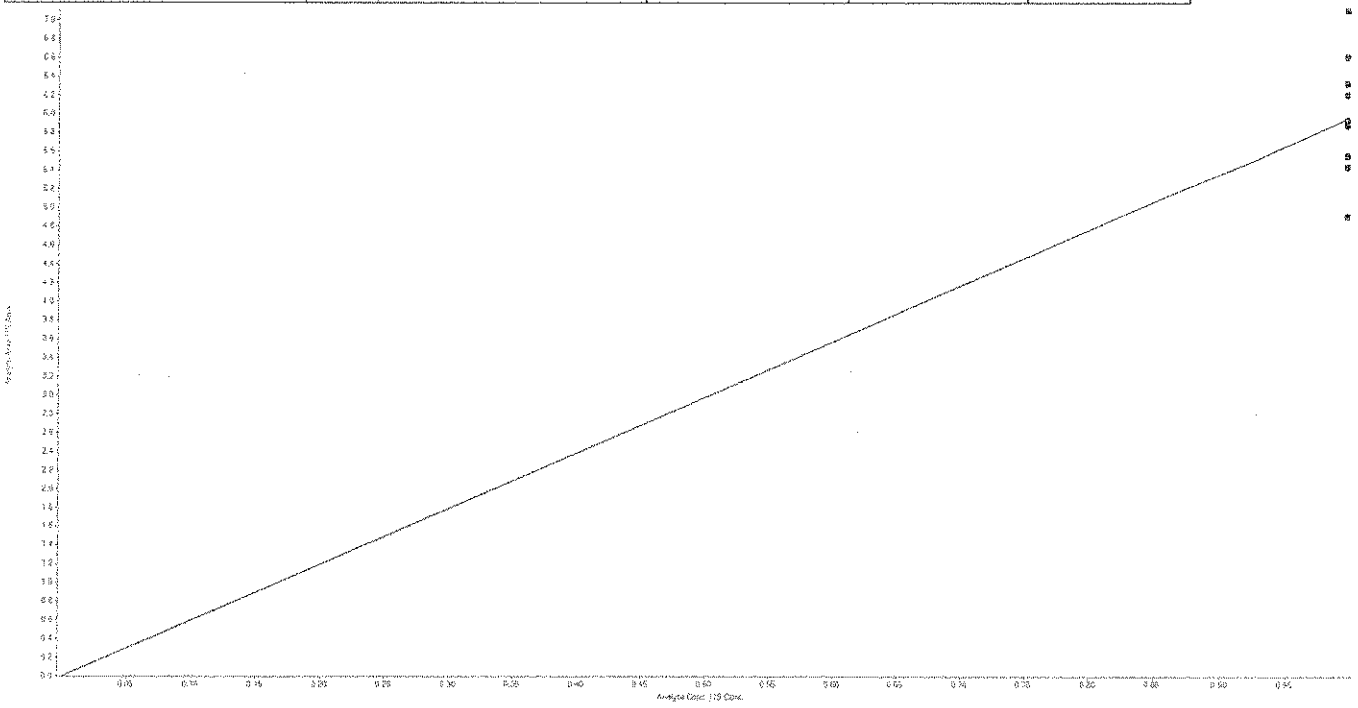
3/31/16

Analyte Name: 13C_PFHXA 1
Internal Standard: N_mefosa_d3

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 5.95 x (std. dev. = 0.638)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
5	5.000	100	0.54	10.7



APR 01 2016

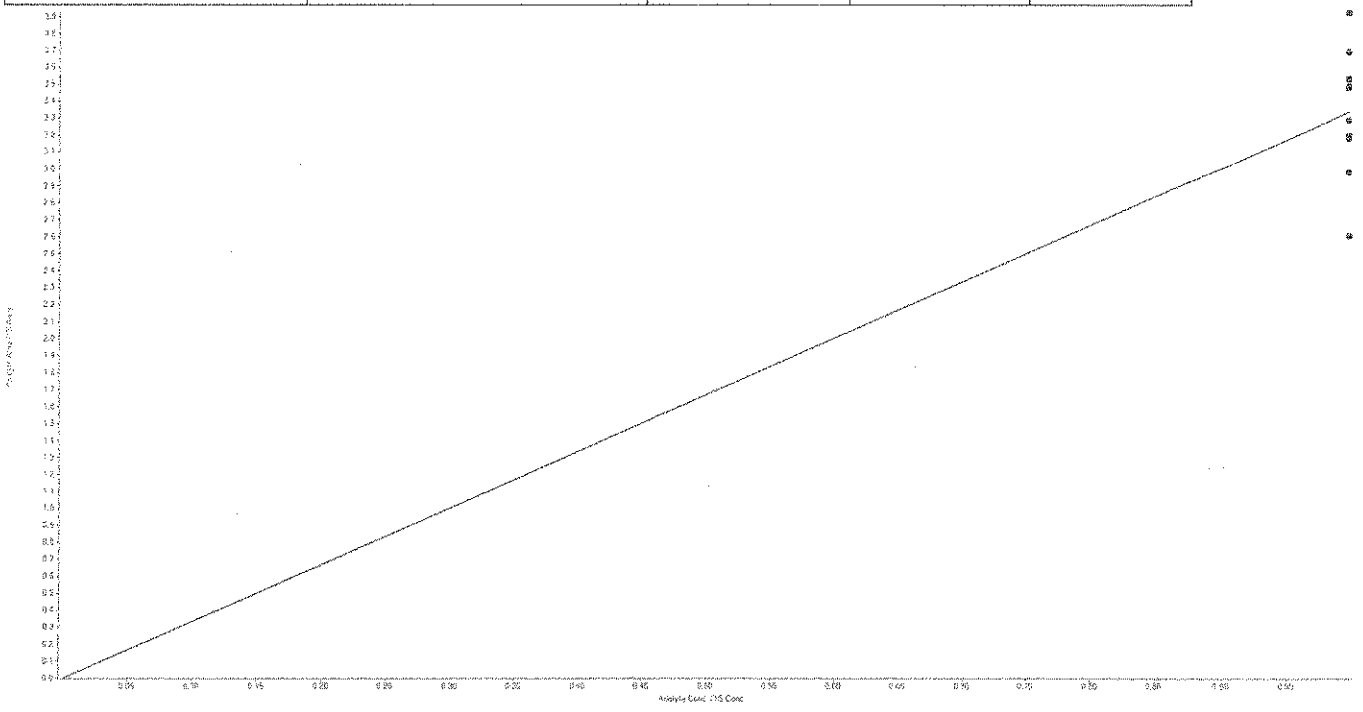
3/31/16

Analyte Name: 13C-PFOA 1
Internal Standard: N_mefosa_d3

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 3.34 x (std. dev. = 0.374)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
5	5.000	100	0.56	11.2



APR 6 2016

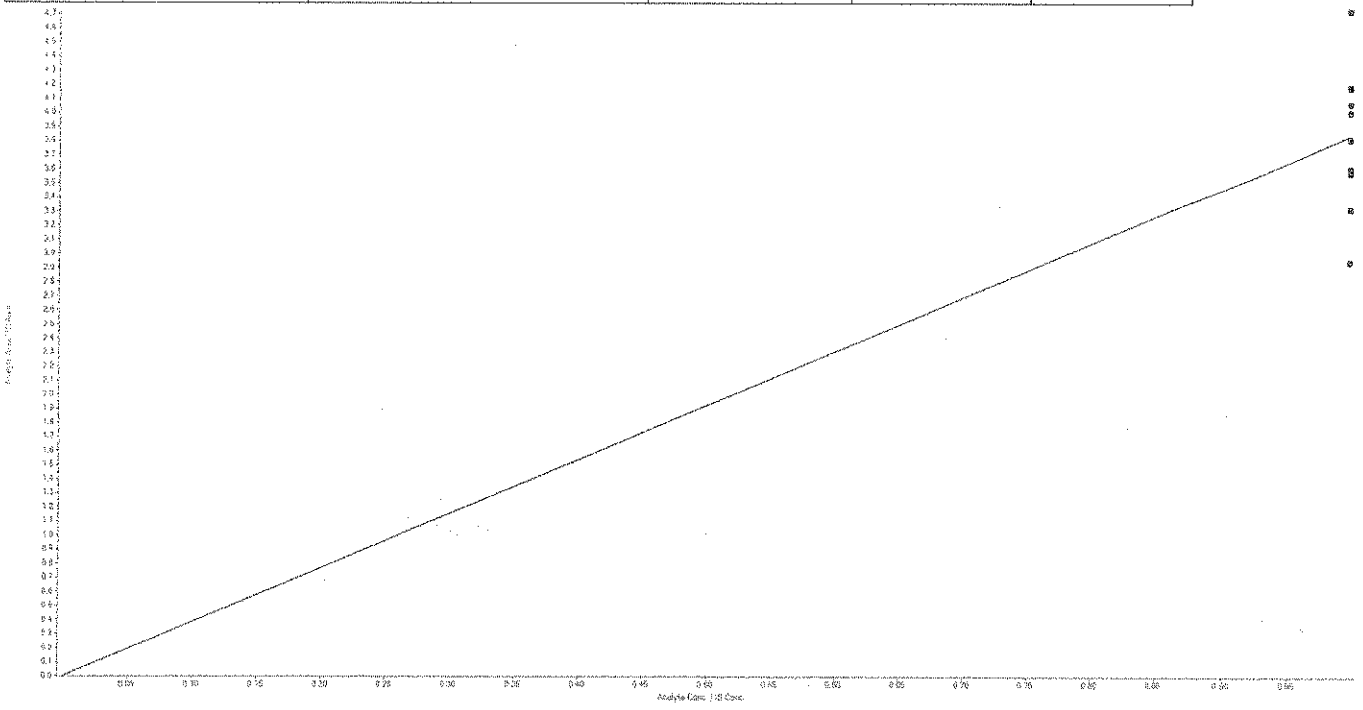
3/31/16

Analyte Name: 13C-PFNA 1
Internal Standard: N_mefosa_d3

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 3.84 x (std. dev. = 0.504)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
5	5.000	100	0.66	13.1



APR 01 2016

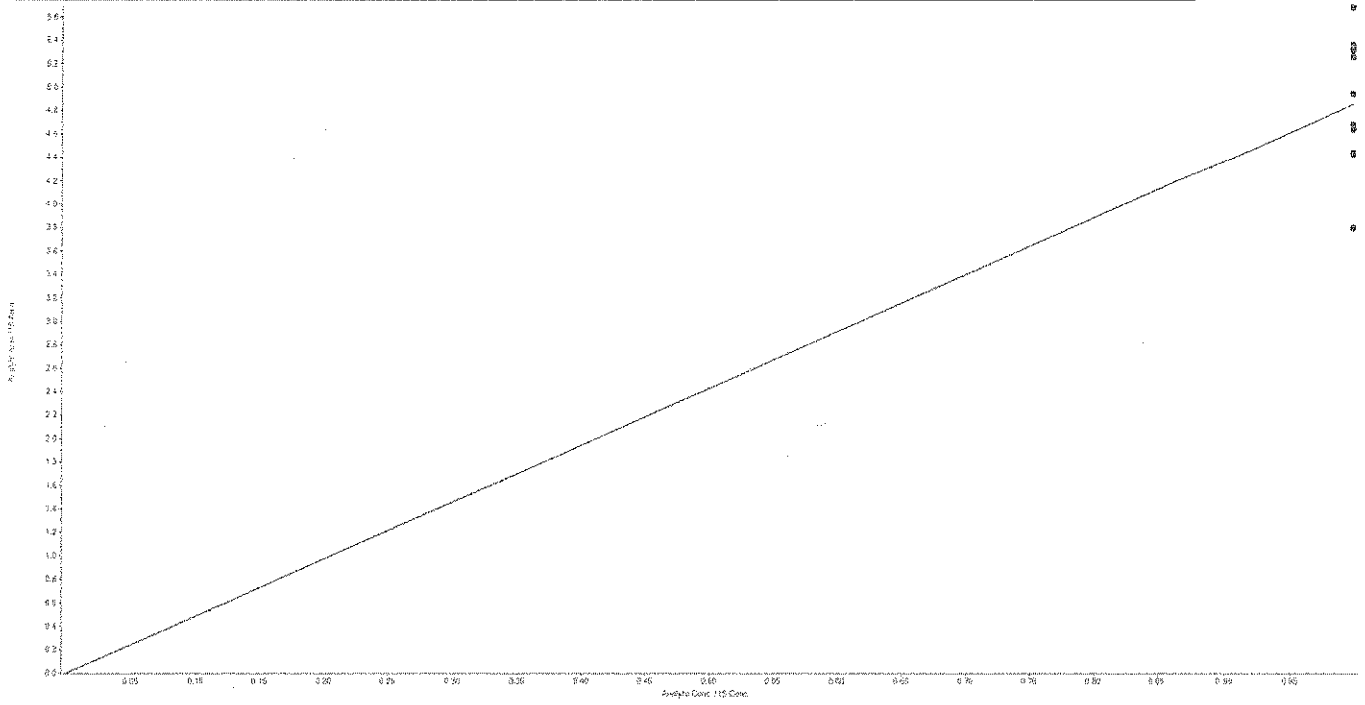
3/31/16

Analyte Name: 13C-PFOS 1
Internal Standard: N_mefosa_d3

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 4.86 x (std. dev. = 0.567)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
5	5.000	100	0.58	11.7



APR 01 2016

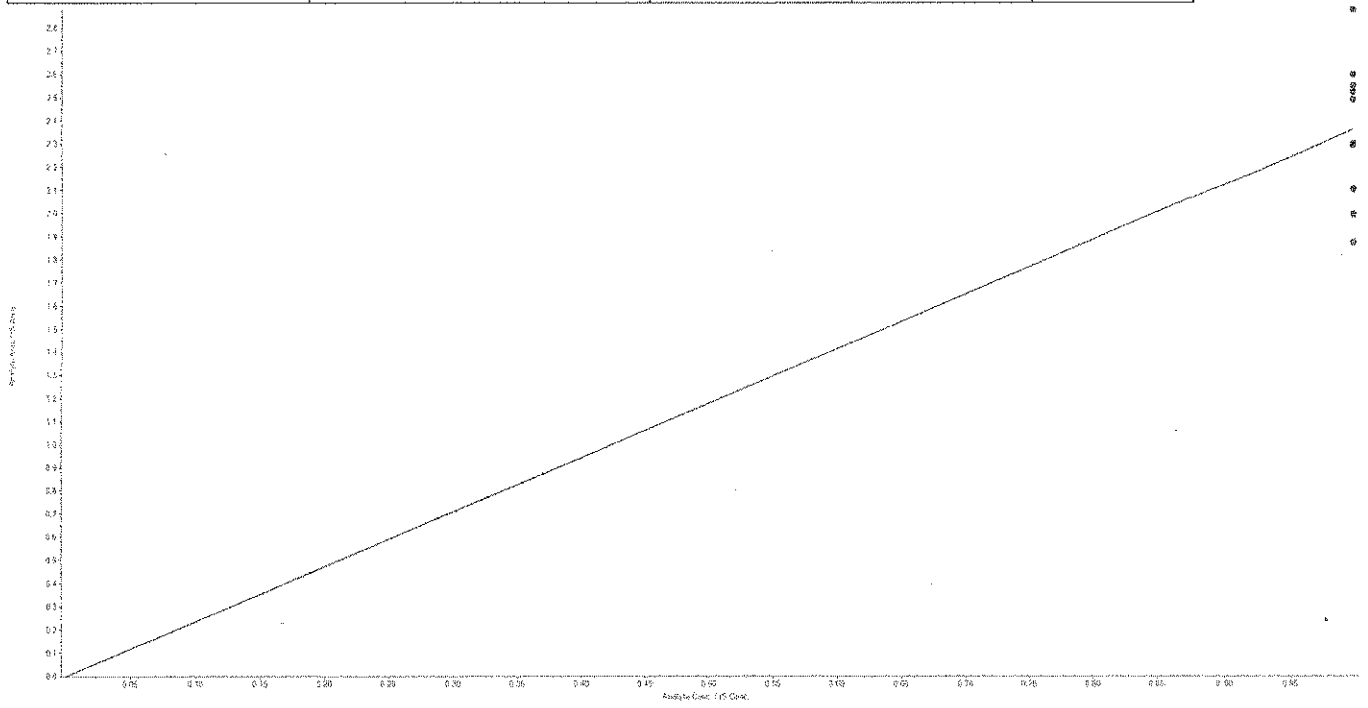
3/31/16

Analyte Name: 13C-PFDA 1
Internal Standard: N_mefosa_d3

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 2.36 x (std. dev. = 0.307)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
5	5.000	100	0.65	13.0



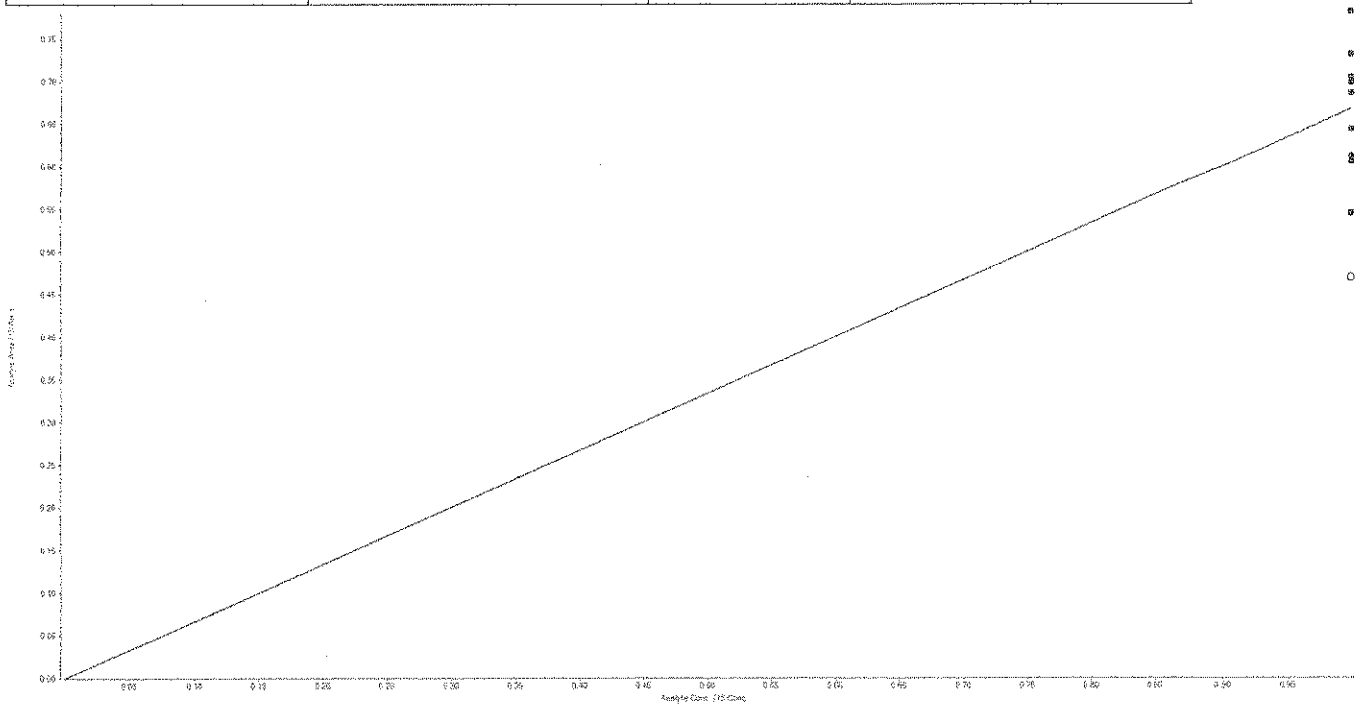
APR 06 2016

Analyte Name: 13C-PFUNA 1
Internal Standard: N_mefosa_d3

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 0.667 x (std. dev. = 0.073)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
5	5.000	100	0.55	10.9



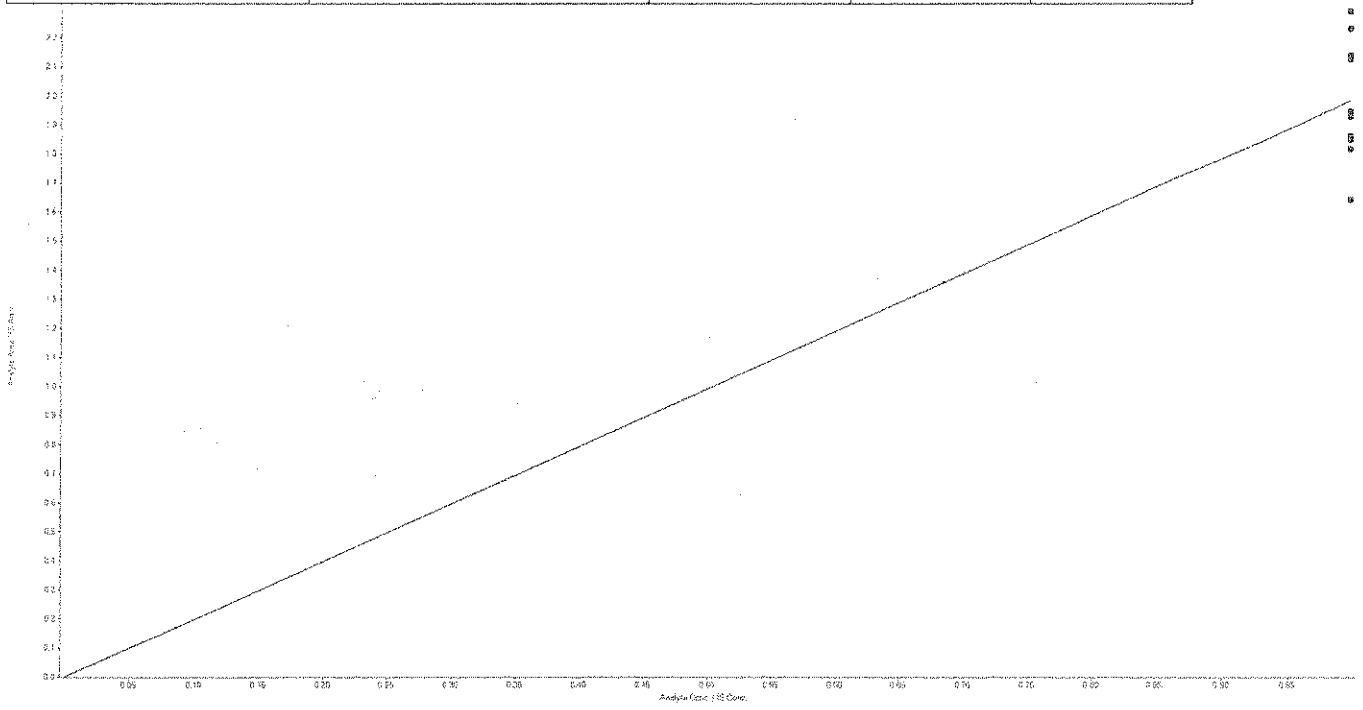
ARS 6455

Analyte Name: 18O-PFHxS 1
Internal Standard: N_mefosa_d3

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 1.98 x (std. dev. = 0.206)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
5	5.000	100	0.52	10.4



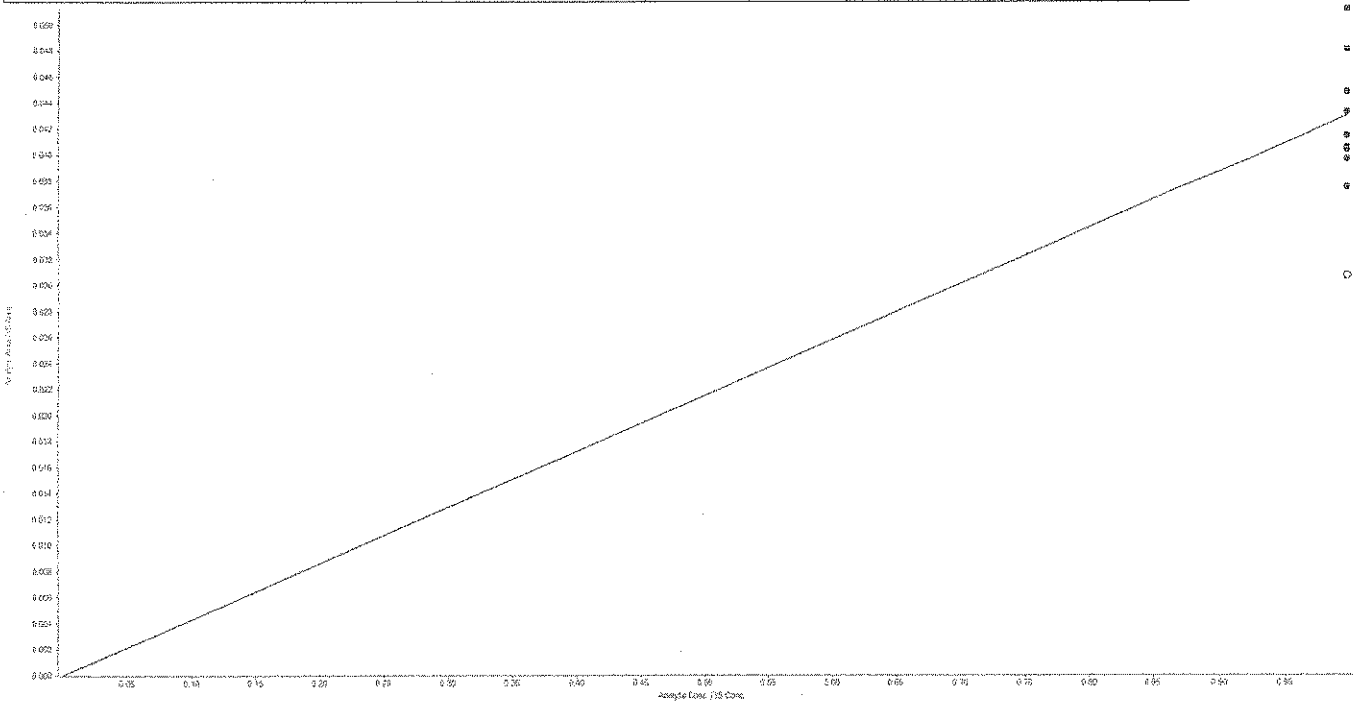
APR 6 - 2016

Analyte Name: 13C-PFDoA 1
Internal Standard: N_mefosa_d3

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 0.043 x (std. dev. = 0.00438)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
5	5.000	100	0.51	10.2



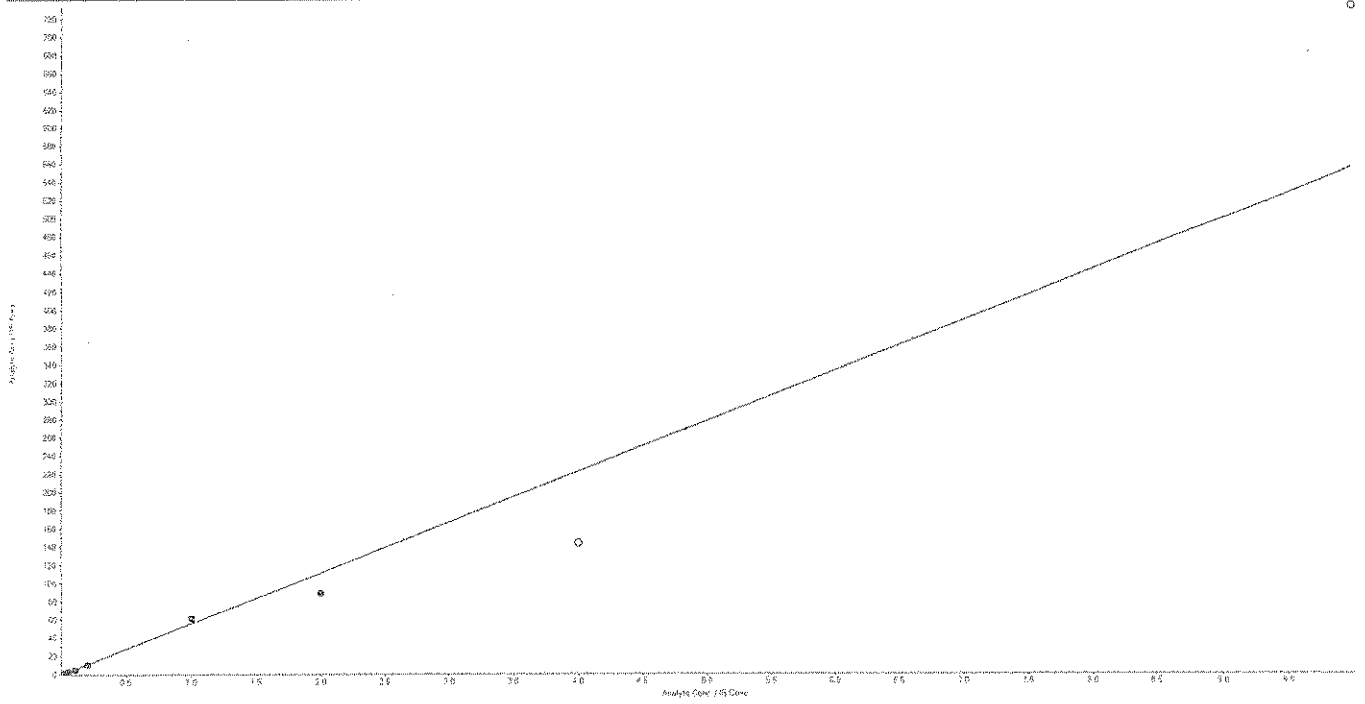
APR 0 5 2016

Analyte Name: PFTrDA 1
Internal Standard: 13c-pfdoda

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 55.5 x (std. dev. = 7.88)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.02	0.025	124	NaN	NaN
0.05	0.052	103	NaN	NaN
0.1	0.109	109	NaN	NaN
0.25	0.234	94	NaN	NaN
0.5	0.434	87	NaN	NaN
1	0.944	94	NaN	NaN
5	5.461	109	NaN	NaN
10	7.977	80	NaN	NaN



APR 1 2016

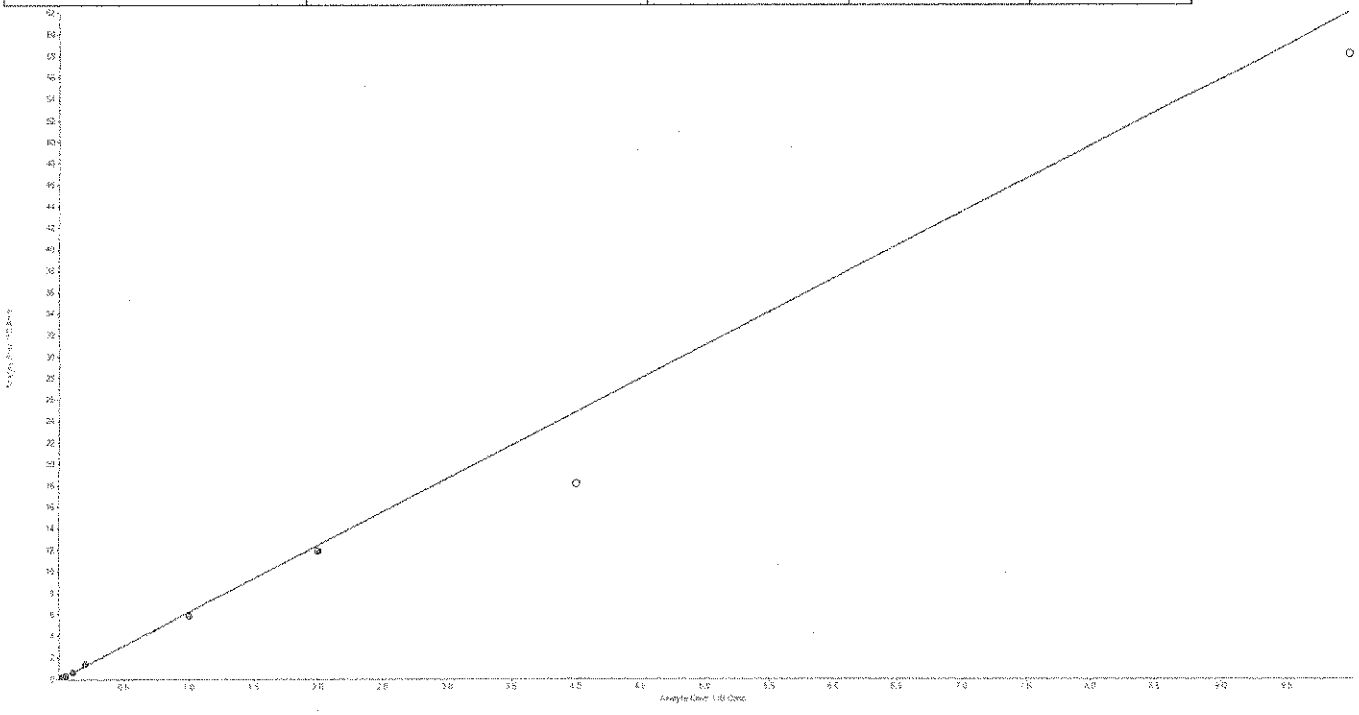
3/31/16

Analyte Name: 6_2-FTS 1
Internal Standard: 13C2-6_2-FTS

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 6.2 x (std. dev. = 0.473)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.05	0.052	104	NaN	NaN
0.1	0.092	92	NaN	NaN
0.25	0.241	96	NaN	NaN
0.5	0.525	105	NaN	NaN
1	1.132	113	NaN	NaN
5	4.688	94	NaN	NaN
10	9.554	96	NaN	NaN



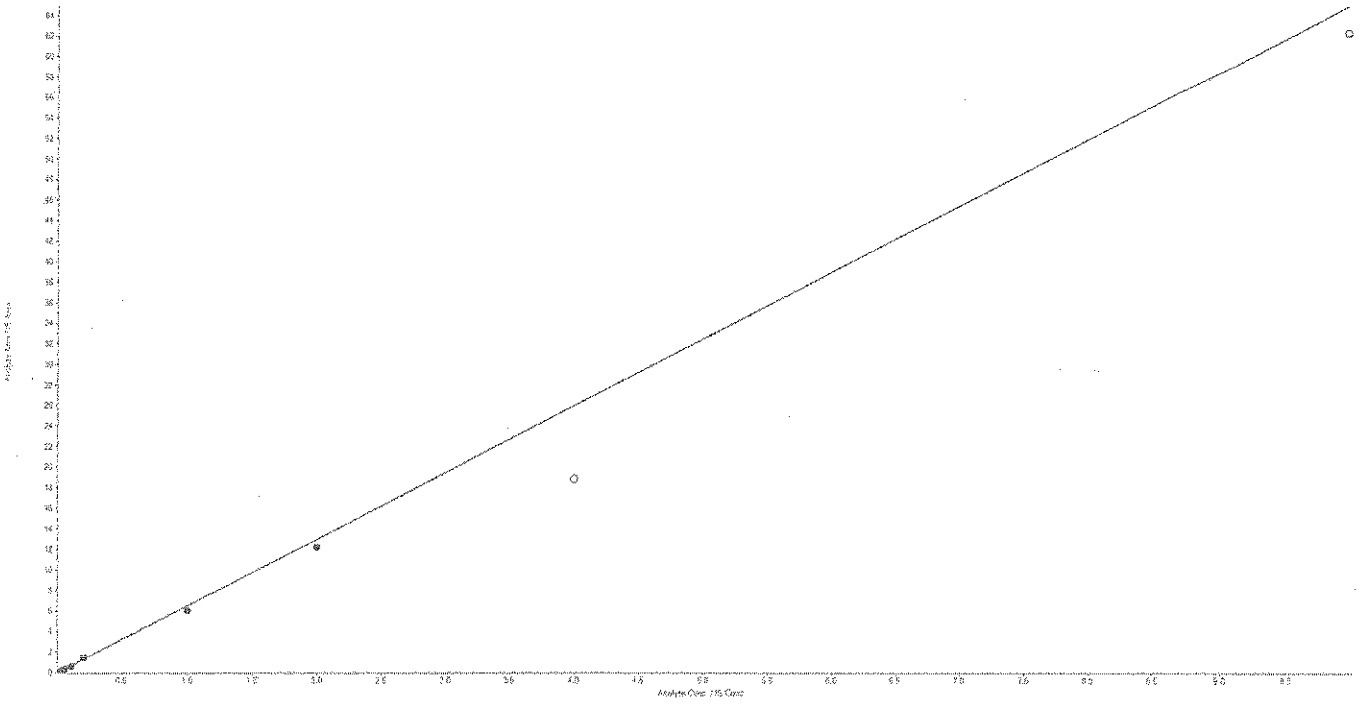
APR 01 2016

Analyte Name: 8_2-FTS 1
Internal Standard: 13C2-6_2-FTS

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 6.5 x (std. dev. = 0.707)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
0.02	0.018	88	NaN	NaN
0.05	0.059	118	NaN	NaN
0.1	0.095	95	NaN	NaN
0.25	0.249	100	NaN	NaN
0.5	0.490	98	NaN	NaN
1	1.152	115	NaN	NaN
5	4.627	93	NaN	NaN
10	9.393	94	NaN	NaN



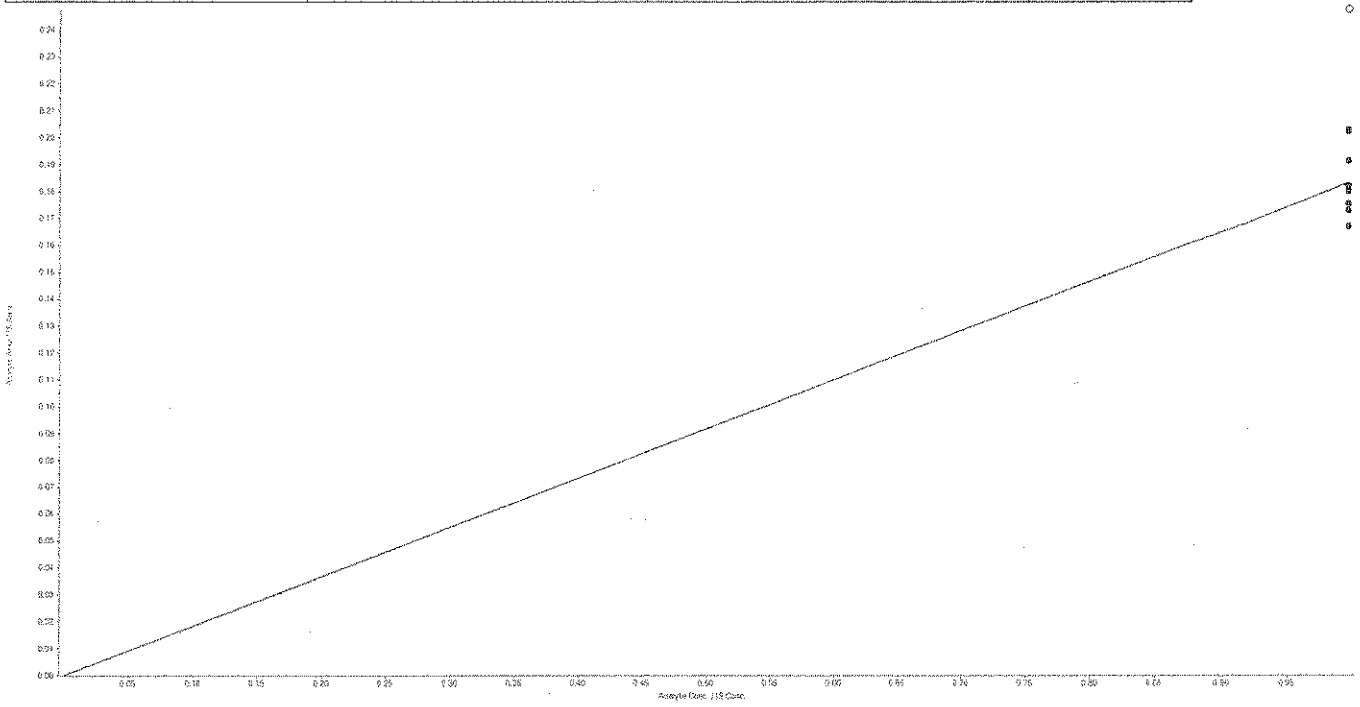
APR 01 2016

Analyte Name: 13C2-6_2-FTS 1
Internal Standard: N_mefosa_d3

Data File	033016\1007.wiff	**Result Table**	033016.rdb
Acquisition Date	3/30/2016 11:02:48 AM	**Algorithm Used**	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	**Instrument Name**	LCMS02
Project			

Regression Equation: y = 0.183 x (std. dev. = 0.0129)

Exp Conc (ng/mL)	Calc Conc (ng/mL)	% Accuracy	STD	%CV
5	5.000	100	0.35	7.0



APR 01 2016

Project	Ewan's Projects\PFCs
Data File	033016\1007.wiff
Result Table	033016.rdb
Instrument Name	LCMS02

Sample Name	IB	Injection Volume	10
Acquisition Date	3/30/2016 11:02:48 AM	Sample Type	Unknown
Acquisition Method	PFC_090315 schedule mrm.dam	Dilution Factor	1.00
Injection Vial	2	Weight to Volume	0.00

Results Summary

Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
Pfba 1	13c_pfba	3386138	0.00 (2.60)	0	N/A	Yes
Pfpea 1	13c_pfhxa	3738945	0.00 (5.06)	0	N/A	No
Pfbs 1	18o-pfhs	1254682	0.00 (5.53)	0	N/A	No
Pfhxa 1	13c_pfhxa	3738945	6.66 (6.63)	3507	0.0050	No
Pfhpa 1	13c_pfhxa	3738945	0.00 (7.64)	0	N/A	No
Pfhxs 1	18o-pfhs	1254682	7.74 (7.72)	11637	0.0170	No
Pfoa 1	13c-pfoa	2014748	8.38 (8.36)	3253	0.0150	No
Pfna 1	13c-pfna	2310206	0.00 (8.95)	0	N/A	No
Pfos 1	13c-pfos	3022741	0.00 (8.96)	0	N/A	No
Pfda 1	13c-pfda	1488080	0.00 (9.44)	0	N/A	No
Pfuna 1	13c-pfuna	392650	9.88 (9.86)	2954	0.0160	No
Pfds 1	13c-pfos	3022741	0.00 (9.84)	0	N/A	No
Pfdoa 1	13c-pfdoda	23756	0.00 (10.20)	0	N/A	No
Fosa 1	d5-NEtFOSA	808033	9.97 (9.94)	1811	0.0030	No
Pfteda 1	13c-pfdoda	23756	0.00 (10.80)	0	N/A	No
PFHpS 1	18o-pfhs	1254682	0.00 (8.39)	0	N/A	No
NMeFOSE 1	d7-NMeFOSE	1481243	0.00 (10.80)	0	N/A	No
NMeFOSA 1	d7-NMeFOSE	1481243	0.00 (10.80)	0	N/A	No
NEtFOSE 1	d9-EtFOSE	1700084	0.00 (11.00)	0	N/A	No
NEtFOSA 1	d5-NEtFOSA	808033	0.00 (11.00)	0	N/A	No

APR 01 2016

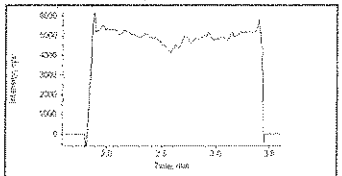
Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
d9-EtFOSE 1	N_mefosa_d3	695406	11.00 (11.00)	1700084	4.9340	No
d5-NEtFOSA 1	N_mefosa_d3	695406	11.00 (11.00)	808033	4.3910	No
d7-NMeFOSE 1	N_mefosa_d3	695406	10.80 (10.80)	1481243	4.5320	No
13C_PFBA 1	N_mefosa_d3	695406	2.60 (2.58)	3386138	4.3910	No
13C_PFHXA 1	N_mefosa_d3	695406	6.65 (6.63)	3738945	4.5170	No
13C-PFOA 1	N_mefosa_d3	695406	8.39 (8.35)	2014748	4.3380	No
13C-PFNA 1	N_mefosa_d3	695406	8.98 (8.96)	2310206	4.3200	No
13C-PFOS 1	N_mefosa_d3	695406	8.98 (8.95)	3022741	4.4730	No
13C-PFDA 1	N_mefosa_d3	695406	9.47 (9.45)	1488080	4.5380	No
13C-PFUNA 1	N_mefosa_d3	695406	9.88 (9.85)	392650	4.2310	No
18O-PFHxS 1	N_mefosa_d3	695406	7.74 (7.72)	1254682	4.5450	No
13C-PFDoA 1	N_mefosa_d3	695406	10.20 (10.20)	23756	3.9740	No
PFTrDA 1	13c-pfdoda	23756	0.00 (10.50)	0	N/A	No
6_2-FTS 1	13C2-6_2-FTS	104407	8.35 (8.31)	1643	0.0130	No
8_2-FTS 1	13C2-6_2-FTS	104407	0.00 (9.42)	0	N/A	No
13C2-6_2-FTS 1	N_mefosa_d3	695406	8.34 (8.31)	104407	4.0980	No

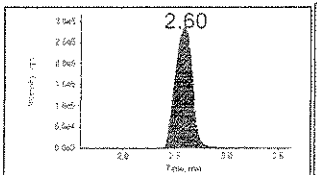
IRC Summary

Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfba 2	0.00 (2.58)	0	No	0.00 (0.98)	No
Pfpea 2	0.00 (5.07)	0	No	0.00 (1.01)	No
Pfbs 2	0.00 (5.52)	0	No	0.00 (0.48)	No
Pfhxa 2	0.00 (6.63)	0	No	0.00 (0.09)	No
Pfhpa 2	0.00 (7.63)	0	No	0.00 (0.44)	No
Pfhxs 2	7.74 (7.72)	4218	No	0.36 (0.40)	YES
Pfoa 2	8.39 (8.36)	2909	No	0.89 (1.81)	No
Pfna 2	0.00 (8.95)	0	No	0.00 (0.33)	No

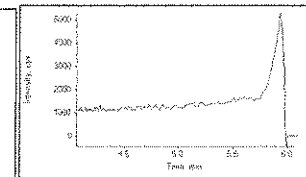
Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfos 2	0.00 (8.95)	0	No	0.00 (0.36)	No
Pfda 2	0.00 (9.44)	0	No	0.00 (0.26)	No
Pfuna 2	9.87 (9.85)	1861	No	0.63 (0.50)	No
Pfds 2	0.00 (9.84)	0	No	0.00 (0.36)	No
Pfdoa 2	0.00 (10.20)	0	No	0.00 (0.37)	No
Fosa 2	9.90 (9.94)	14183	No	7.83 (0.03)	No
Pfteda 2	0.00 (10.80)	0	No	0.00 (0.42)	No
PFHpS 2	0.00 (8.39)	0	No	0.00 (0.39)	No
NMeFOSE 2	0.00 (10.80)	0	No	0.00 (0.00)	No
NMeFOSA 2	0.00 (10.80)	0	No	0.00 (0.93)	No
NEtFOSE 2	0.00 (11.00)	0	No	0.00 (0.00)	No
NEtFOSA 2	0.00 (11.00)	0	No	0.00 (0.70)	No
PFTrDA 2	0.00 (10.50)	0	No	0.00 (0.32)	No
6_2-FTS 2	8.33 (8.30)	2872	No	1.75 (1.35)	No
8_2-FTS 2	0.00 (9.41)	0	No	0.00 (0.12)	No

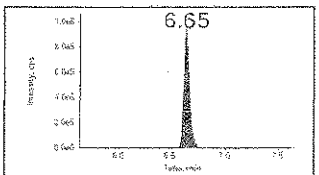
Quantitative Peak Review IB *No data for Sample ID*


Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

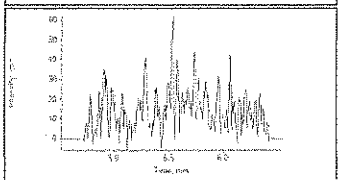


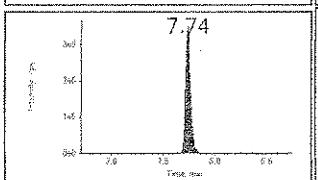
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak

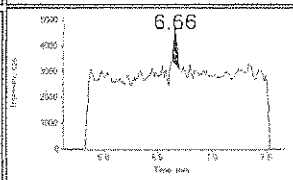


13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak

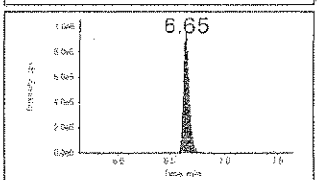

Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



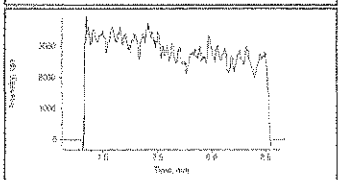
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak

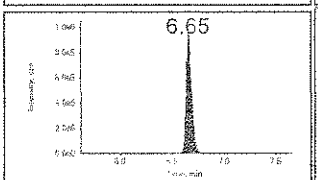


Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak

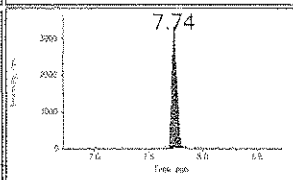


13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak

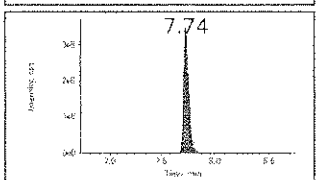

Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



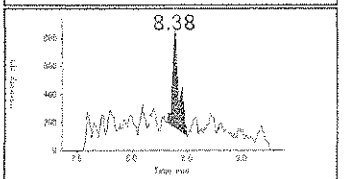
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



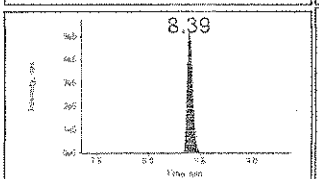
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



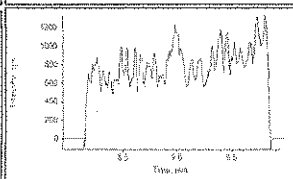
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak

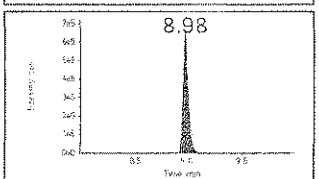


Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

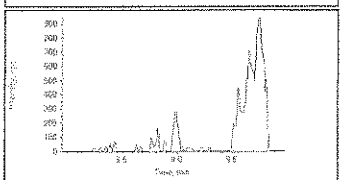


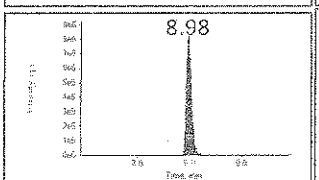
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak

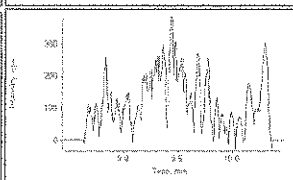


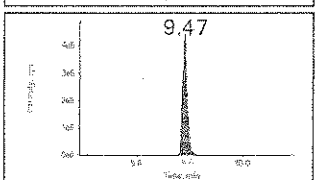
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak

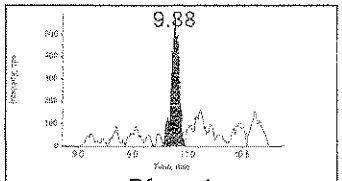


13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak

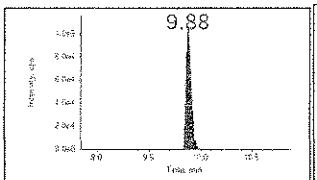

Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



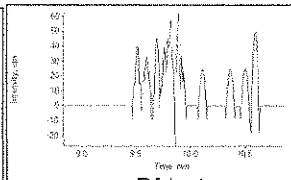
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



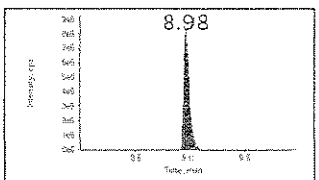
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



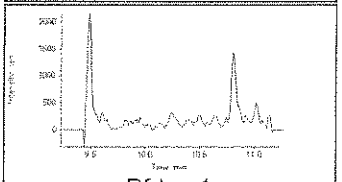
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



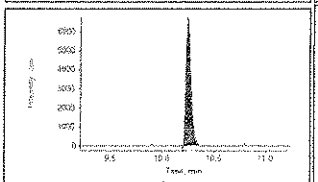
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



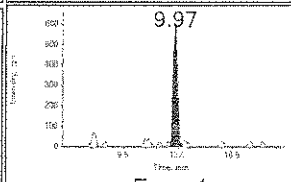
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



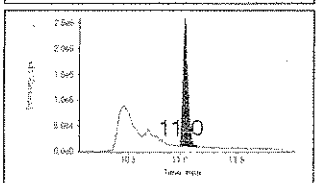
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



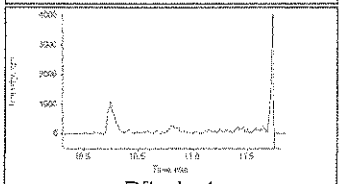
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



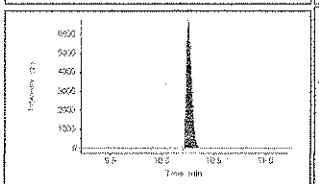
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



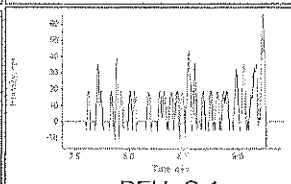
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



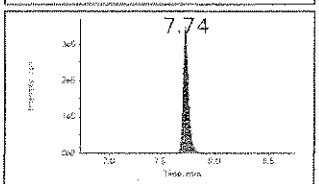
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



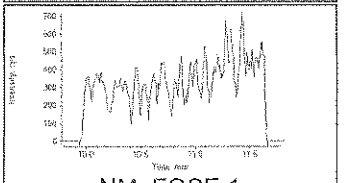
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



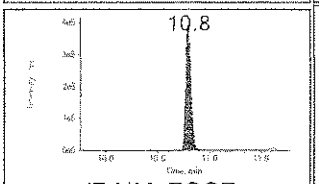
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



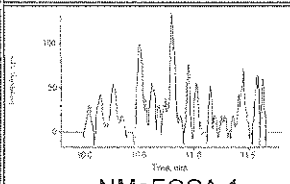
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



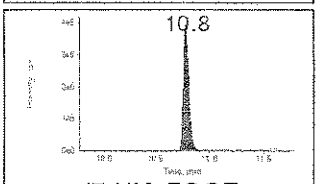
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



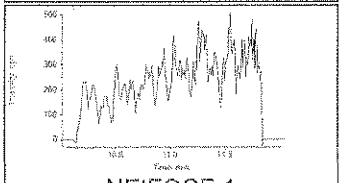
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



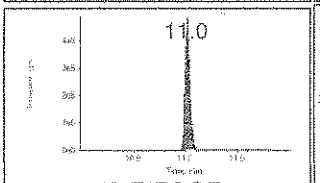
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



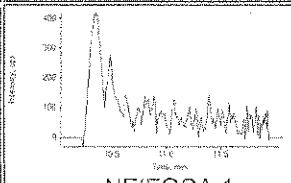
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



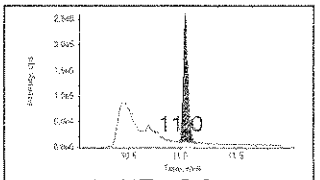
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



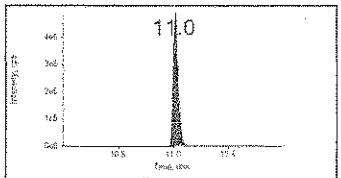
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



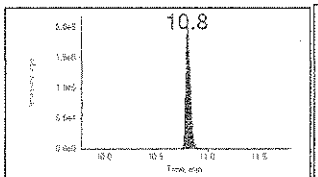
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



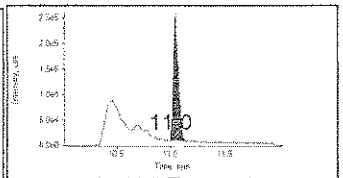
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



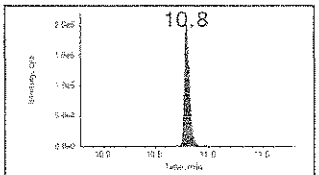
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



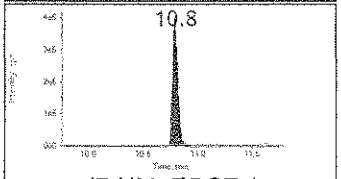
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



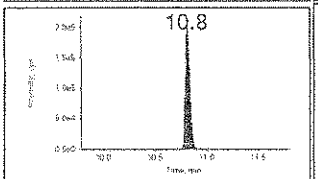
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



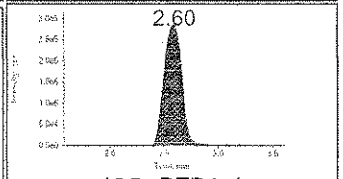
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



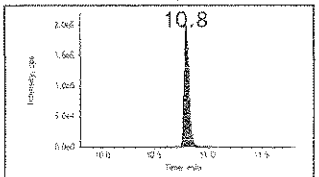
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



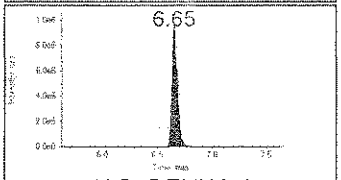
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



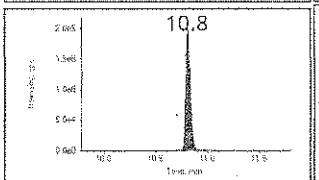
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



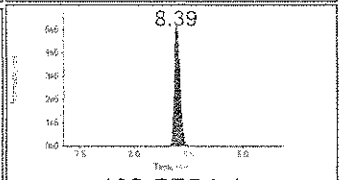
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



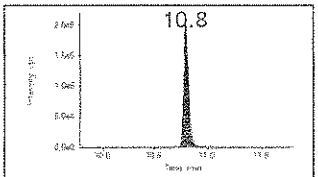
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



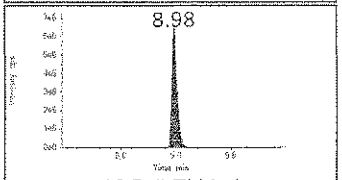
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



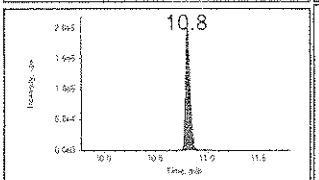
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



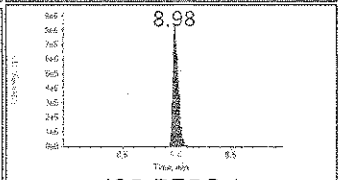
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



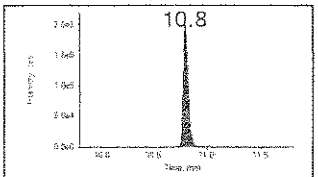
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



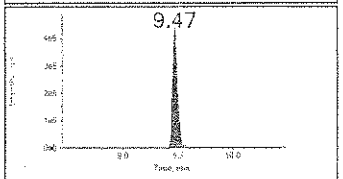
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



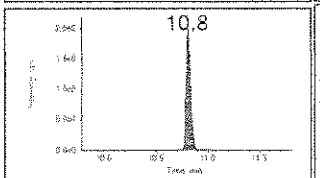
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



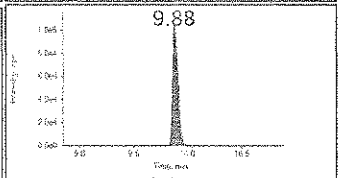
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



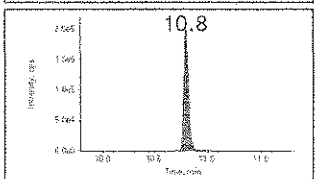
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



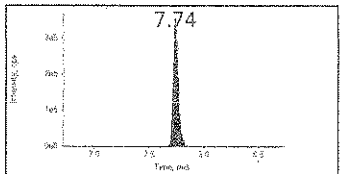
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



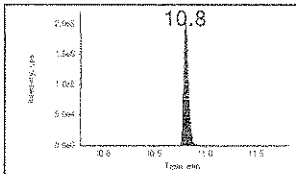
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



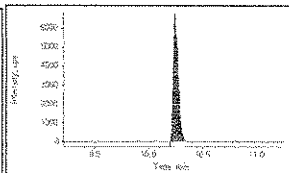
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



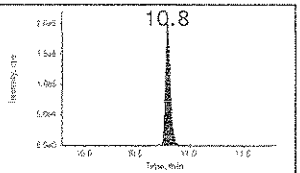
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



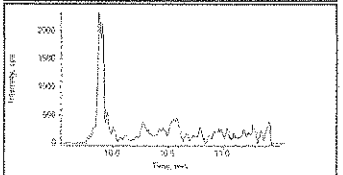
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



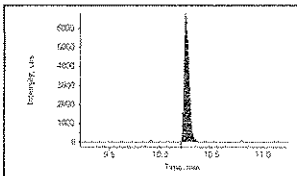
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



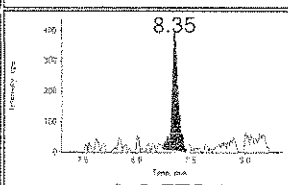
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



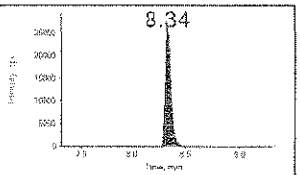
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



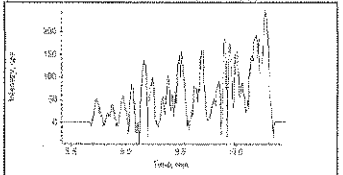
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



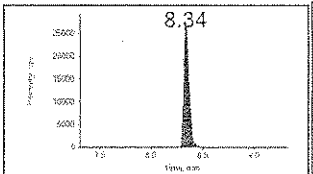
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



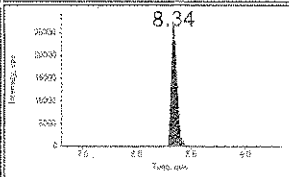
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



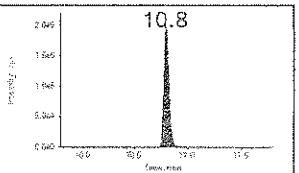
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

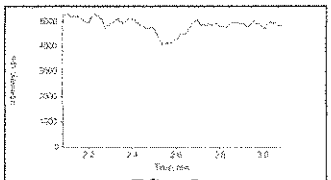


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

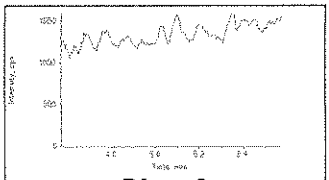


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

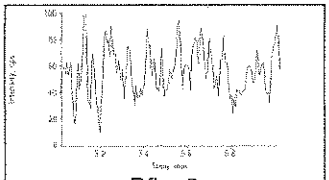
Ion Ratio Confirmation



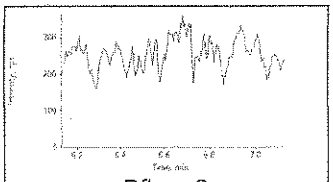
Pfba 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



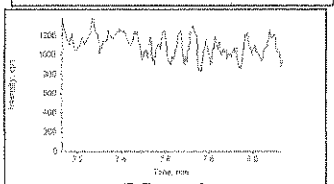
Pfpea 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



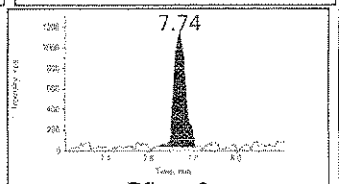
Pfbs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



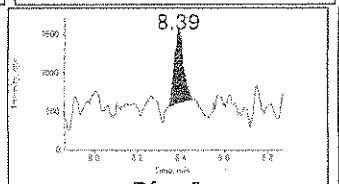
Pfhxa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



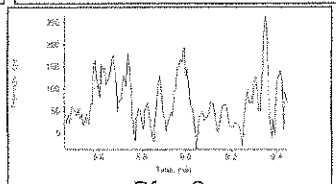
Pfhpa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



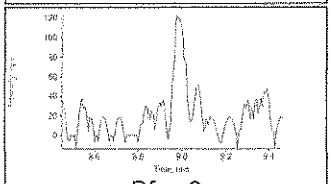
Pfhxs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



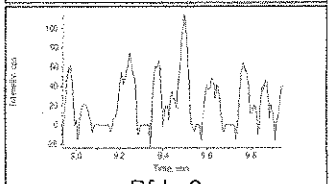
Pfoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



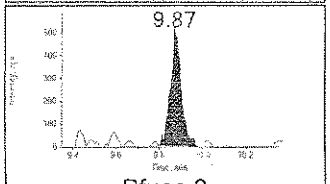
Pfna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



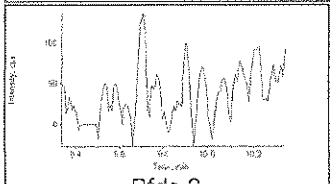
Pfos 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



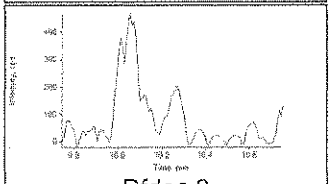
Pfda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



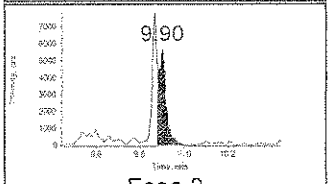
Pfuna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



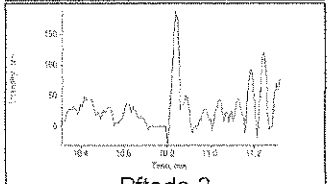
Pfds 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



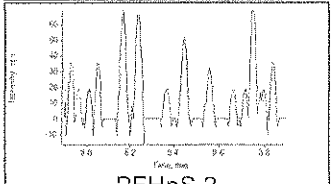
Pfdoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



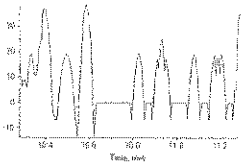
Fosa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



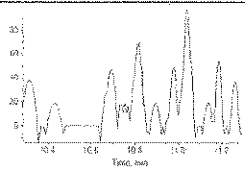
Pfteda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



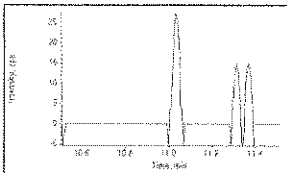
PFHpS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



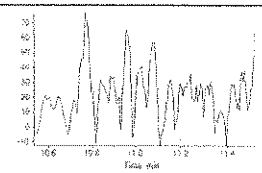
NMeFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



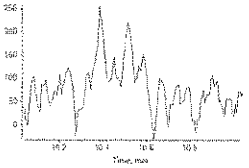
NMeFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



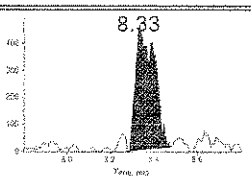
NEtFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



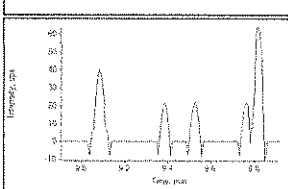
NEtFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

Project	Ewan's Projects\PFCs	Result Table	033016.rdb
Data File	033016\1008.wiff	Algorithm Used	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	Instrument Name	LCMS02

Sample Name	PFC 0.02ppb	Injection Vial	3
Acquisition Date	3/30/2016 11:22:07 AM	Injection Volume	10
Acquisition Method	PFC_090315 schedule mrm.dam	Sample Type	Standard
Sample ID	15-OLC-02-35A	Dilution Factor	1.00

Results Summary

Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
Pfba 1	2.69 (2.60)	13c_pfba	3641149	9690	0.02	0.0170	84	No
Pfpea 1	5.11 (5.06)	13c_pfhxa	4008840	11095	0.02	0.0220	109	No
Pfbs 1	5.56 (5.53)	18o-pfhs	1336567	21334	0.02	0.0210	106	No
Pfhxa 1	6.66 (6.63)	13c_pfhxa	4008840	23091	0.02	0.0300	150	No
Pfhpa 1	7.65 (7.64)	13c_pfhxa	4008840	16936	0.02	0.0260	128	No
Pfhxs 1	7.73 (7.72)	18o-pfhs	1336567	26429	0.02	0.0360	182	No
Pfoa 1	8.39 (8.36)	13c-pfoa	2297997	8447	0.02	0.0340	170	No
Pfna 1	8.97 (8.95)	13c-pfna	2584033	15926	0.02	0.0330	167	No
Pfos 1	8.98 (8.96)	13c-pfos	3382183	13490	0.02	0.0230	113	No
Pfda 1	9.45 (9.44)	13c-pfda	1653271	8950	0.02	0.0260	128	No
Pfuna 1	9.87 (9.86)	13c-pfuna	464289	7374	0.02	0.0340	168	No
Pfds 1	9.86 (9.84)	13c-pfos	3382183	15211	0.02	0.0200	102	No
Pfdoa 1	10.20 (10.20)	13c-pfdoda	29261	8719	0.02	0.0260	132	No
Fosa 1	9.96 (9.94)	d5-NEtFOSA	888202	17316	0.02	0.0240	121	No
Pfteda 1	10.80 (10.80)	13c-pfdoda	29261	3449	0.02	0.0340	171	No
PFHpS 1	8.42 (8.39)	18o-pfhs	1336567	5059	0.02	0.0220	110	No
NMeFOSE 1	10.80 (10.80)	d7-NMeFOSE	1542725	8903	0.02	0.0300	151	No

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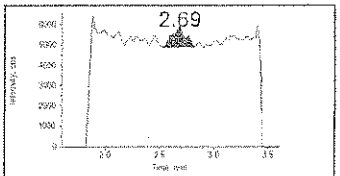
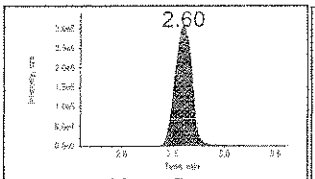
Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
NMeFOSA 1	10.80 (10.80)	d7-NMeFOSE	1542725	2850	0.02	0.0240	118	No
NEtFOSE 1	11.00 (11.00)	d9-EtFOSE	1691701	8742	0.02	0.0210	107	No
NEtFOSA 1	11.00 (11.00)	d5-NEtFOSA	888202	3933	0.02	0.0240	122	No
d9-EtFOSE 1	11.00 (11.00)	N_mefosa_d3	722086	1691701	5.00	4.7280	95	No
d5-NEtFOSA 1	11.00 (11.00)	N_mefosa_d3	722086	888202	5.00	4.6480	93	No
d7-NMeFOSE 1	10.80 (10.80)	N_mefosa_d3	722086	1542725	5.00	4.5460	91	No
13C_PFBA 1	2.60 (2.58)	N_mefosa_d3	722086	3641149	5.00	4.5480	91	No
13C_PFHXA 1	6.65 (6.63)	N_mefosa_d3	722086	4008840	5.00	4.6640	93	No
13C-PFOA 1	8.38 (8.35)	N_mefosa_d3	722086	2297997	5.00	4.7650	95	No
13C-PFNA 1	8.97 (8.96)	N_mefosa_d3	722086	2584033	5.00	4.6540	93	No
13C-PFOS 1	8.97 (8.95)	N_mefosa_d3	722086	3382183	5.00	4.8200	96	No
13C-PFDA 1	9.45 (9.45)	N_mefosa_d3	722086	1653271	5.00	4.8550	97	No
13C-PFUNA 1	9.87 (9.85)	N_mefosa_d3	722086	464289	5.00	4.8180	96	No
18O-PFHxS 1	7.73 (7.72)	N_mefosa_d3	722086	1336567	5.00	4.6630	93	No
13C-PFDoA 1	10.20 (10.20)	N_mefosa_d3	722086	29261	5.00	4.7140	94	No
PFTrDA 1	10.60 (10.50)	13c-pfdoda	29261	8065	0.02	0.0250	124	No
6_2-FTS 1	8.33 (8.31)	13C2-6_2-FTS	120609	3551	0.02	0.0240	119	No
8_2-FTS 1	9.43 (9.42)	13C2-6_2-FTS	120609	2755	0.02	0.0180	88	No
13C2-6_2-FTS 1	8.33 (8.31)	N_mefosa_d3	722086	120609	5.00	4.5590	91	No

IRC Summary

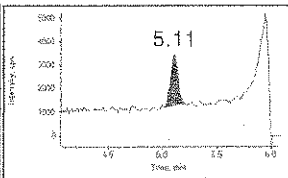
Analyte Peak Name	RT (Expected)	Area	Modified?	Calculated Ion Ratio (Expected Value)
Pfba 2	0.00 (2.58)	0	No	0.00
Pfpea 2	5.10 (5.07)	11545	No	1.04
Pfbs 2	5.56 (5.52)	9936	No	0.47
Pfhxa 2	6.65 (6.63)	2049	No	0.09
Pfhpa 2	7.65 (7.63)	6820	No	0.40
Pfhxs 2	7.74 (7.72)	10723	No	0.41
Pfoa 2	8.39 (8.36)	12436	No	1.47
Pfna 2	8.97 (8.95)	3738	No	0.23
Pfos 2	8.98 (8.95)	5458	No	0.40
Pfda 2	9.46 (9.44)	1784	No	0.20
Pfuna 2	9.88 (9.85)	5103	No	0.69
Pfds 2	9.85 (9.84)	6338	No	0.42
Pfdoa 2	10.20 (10.20)	3283	No	0.38
Fosa 2	9.94 (9.94)	1042	No	0.06
Pfteda 2	10.80 (10.80)	725	No	0.21
PFHpS 2	8.41 (8.39)	1630	No	0.32
NMeFOSE 2	0.00 (10.80)	0	No	0.00
NMeFOSA 2	10.80 (10.80)	2785	No	0.98
NEtFOSE 2	0.00 (11.00)	0	No	0.00
NEtFOSA 2	11.00 (11.00)	2341	No	0.60
PFTrDA 2	10.60 (10.50)	2206	No	0.27
6_2-FTS 2	8.33 (8.30)	5327	No	1.50
8_2-FTS 2	9.44 (9.41)	430	No	0.16



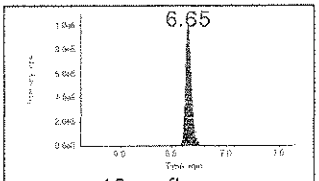
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



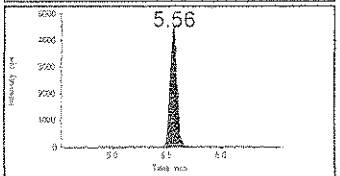
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



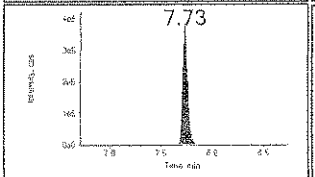
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



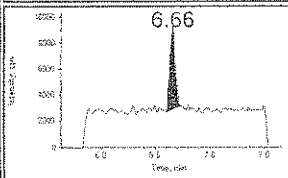
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



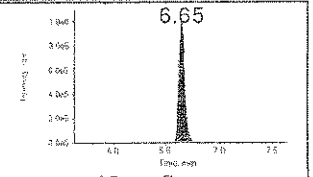
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



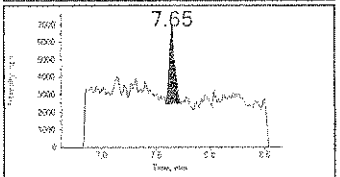
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



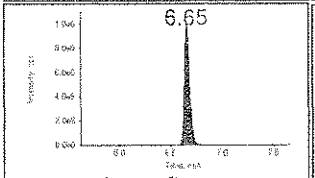
Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak



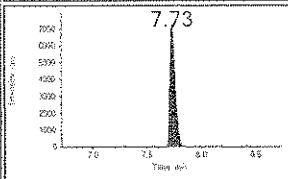
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



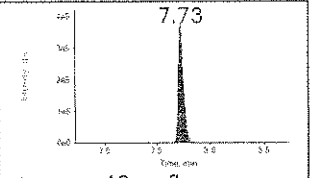
Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



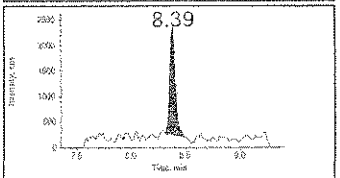
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



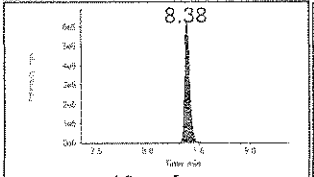
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



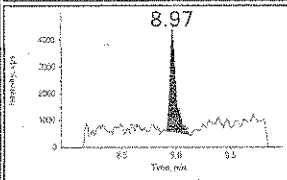
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



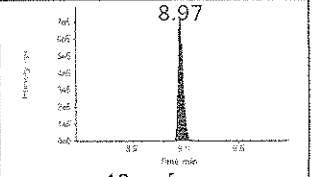
Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



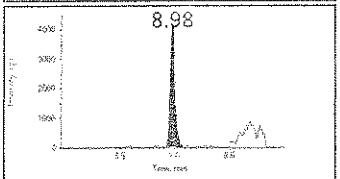
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



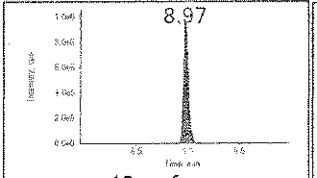
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



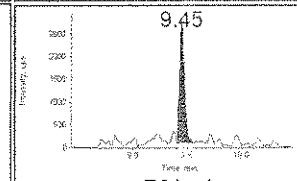
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



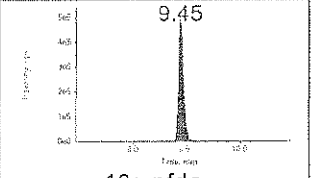
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



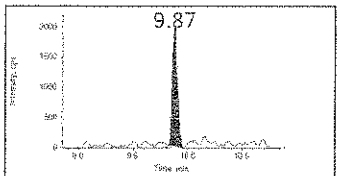
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



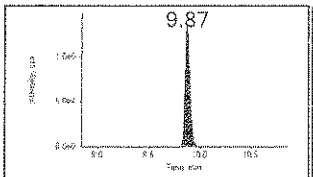
Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



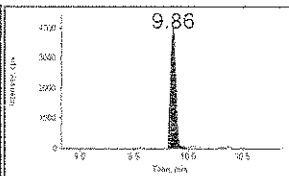
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



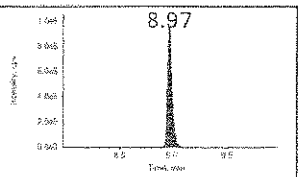
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



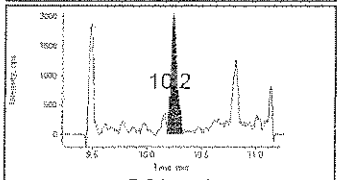
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



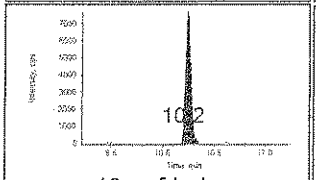
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



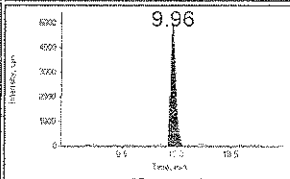
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



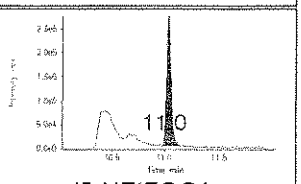
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



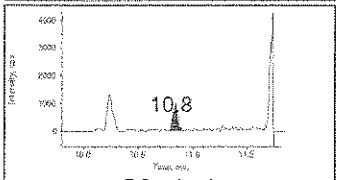
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



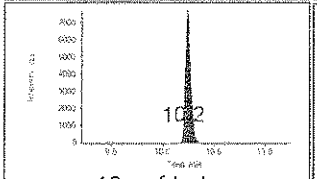
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



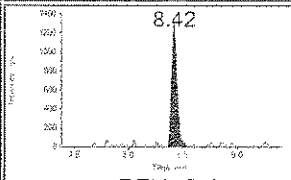
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



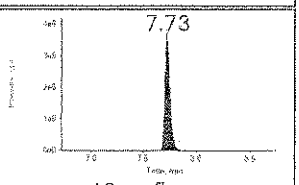
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



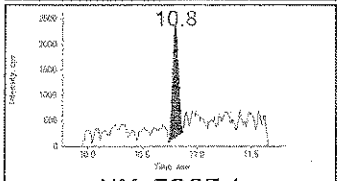
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



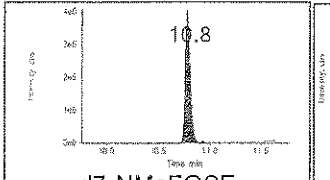
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



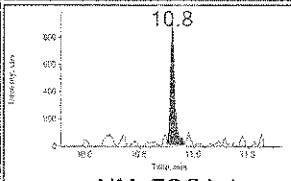
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



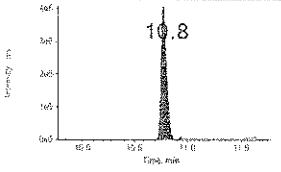
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



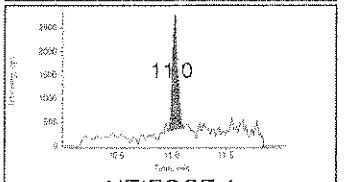
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



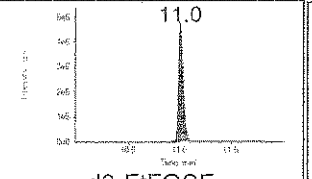
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



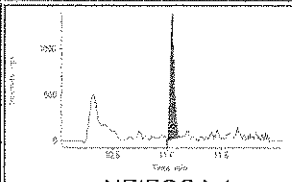
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



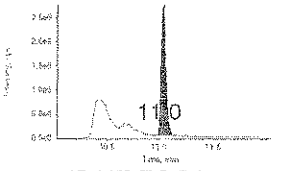
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



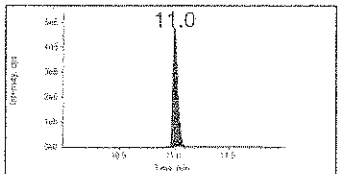
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



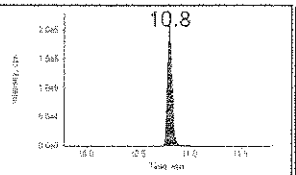
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



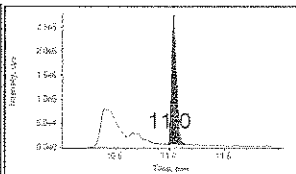
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



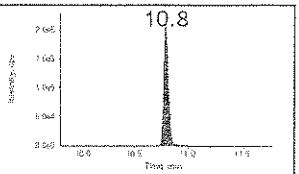
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



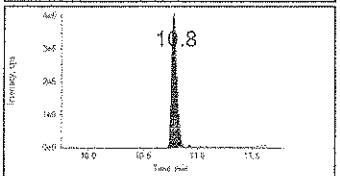
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



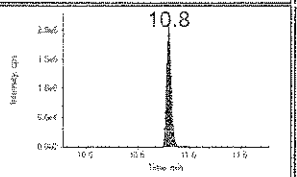
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



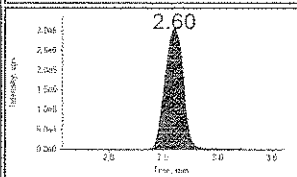
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



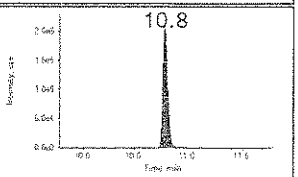
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



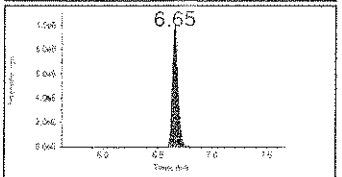
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



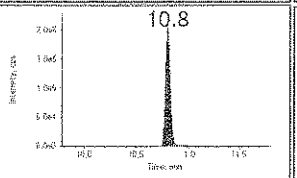
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



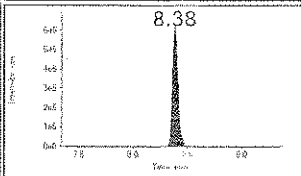
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



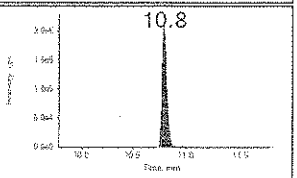
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



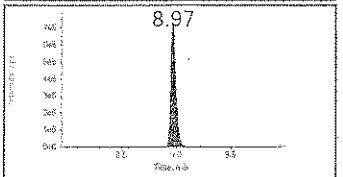
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



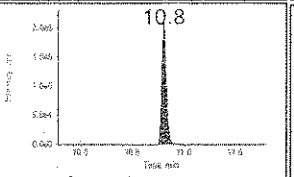
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



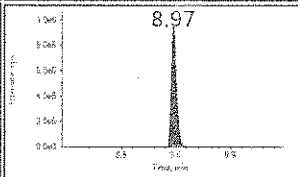
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



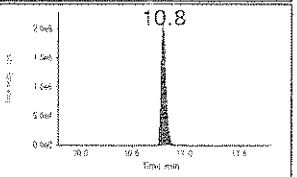
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



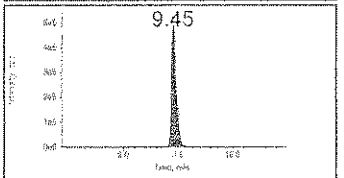
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



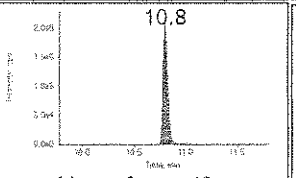
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



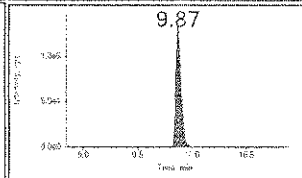
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



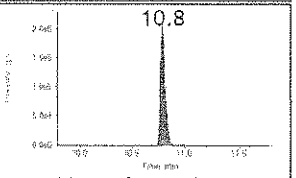
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



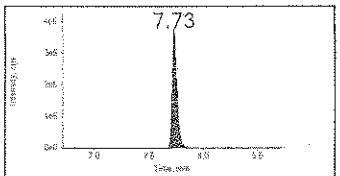
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



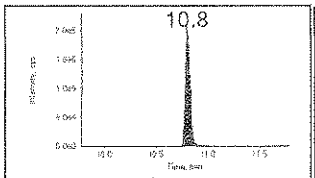
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



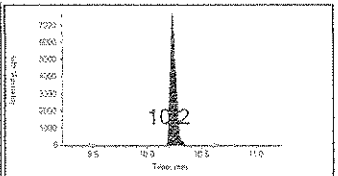
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



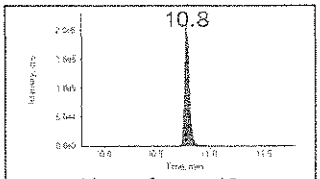
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



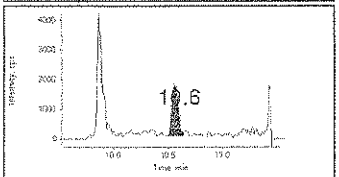
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



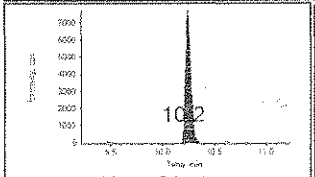
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



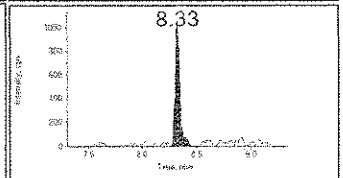
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



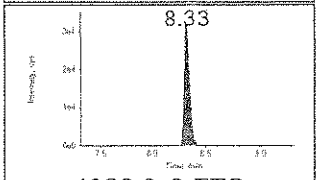
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



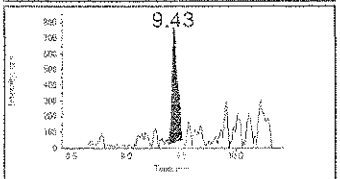
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



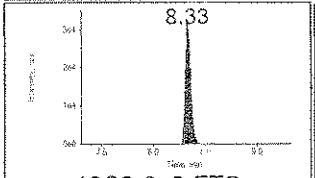
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



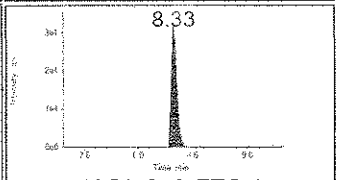
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



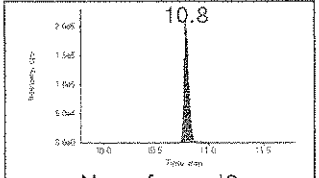
6_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

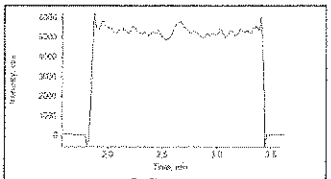


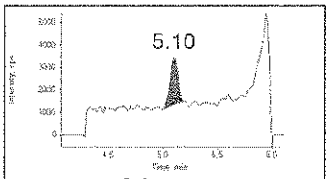
13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



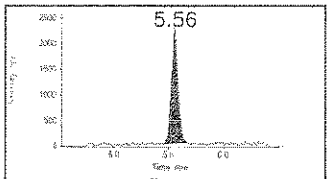
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

Ion Ratio Confirmation

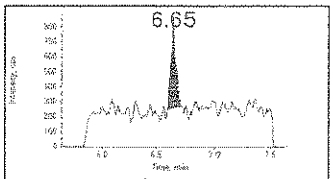

Pfba 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



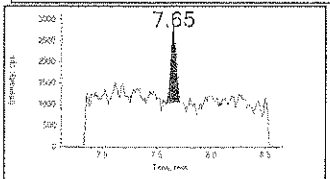
Pfpea 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



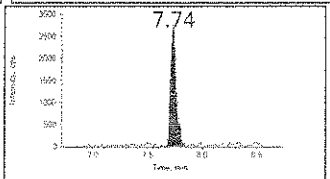
Pfbs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



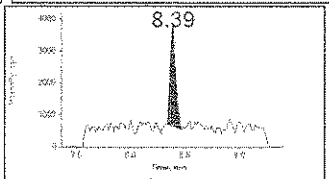
Pfhxa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



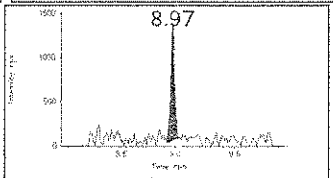
Pfhpa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



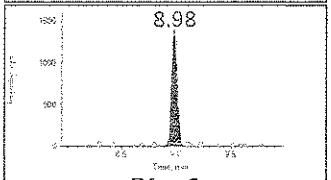
Pfhxs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



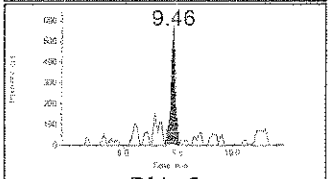
Pfoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



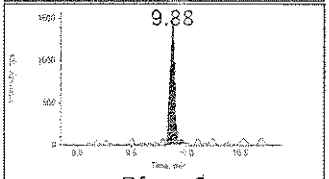
Pfna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



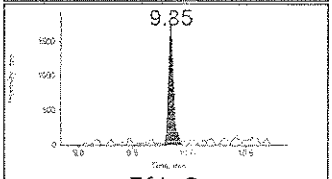
Pfos 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



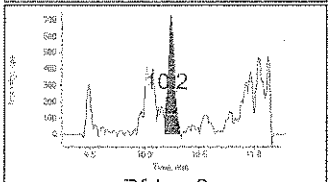
Pfda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



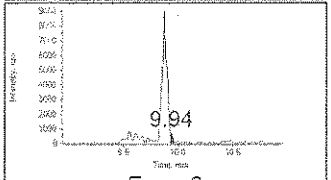
Pfuna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



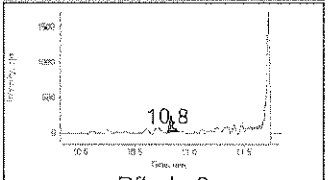
Pfds 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



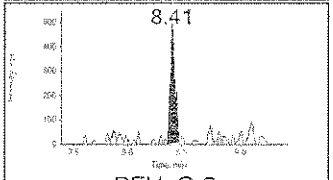
Pfdoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



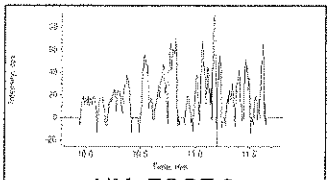
Fosa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



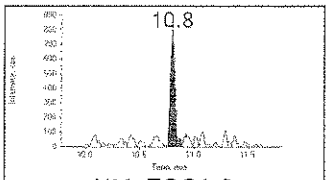
Pfteda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



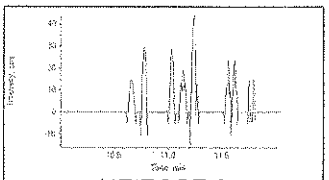
PFHpS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



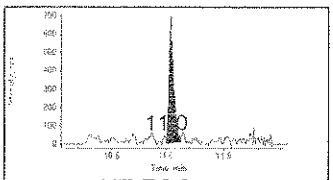
NMeFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



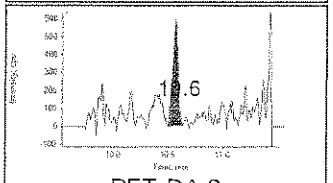
NMeFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



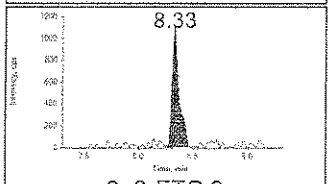
NEtFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



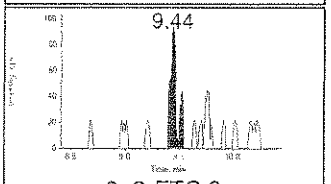
NEtFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak

Project	Ewan's Projects\PFCs	Result Table	033016.rdb
Data File	033016\1009.wiff	Algorithm Used	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	Instrument Name	LCMS02

Sample Name	PFC 0.05ppb	Injection Vial	4
Acquisition Date	3/30/2016 11:41:23 AM	Injection Volume	10
Acquisition Method	PFC_090315 schedule mrm.dam	Sample Type	Standard
Sample ID	15-OLC-02-35B	Dilution Factor	1.00

Results Summary

Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
Pfba 1	2.62 (2.60)	13c_pfba	3587278	25908	0.05	0.0450	91	No
Pfpea 1	5.09 (5.06)	13c_pfhxa	4021400	27388	0.05	0.0540	107	No
Pfbs 1	5.55 (5.53)	18o-pfhs	1297146	52893	0.05	0.0540	108	No
Pfhxa 1	6.66 (6.63)	13c_pfhxa	4021400	45613	0.05	0.0590	118	No
Pfhpa 1	7.66 (7.64)	13c_pfhxa	4021400	30316	0.05	0.0460	91	No
Pfhxs 1	7.74 (7.72)	18o-pfhs	1297146	49347	0.05	0.0700	140	No
Pfoa 1	8.40 (8.36)	13c-pfoa	2221180	13565	0.05	0.0570	113	No
Pfna 1	8.98 (8.95)	13c-pfna	2674215	28522	0.05	0.0580	115	No
Pfos 1	8.99 (8.96)	13c-pfos	3217041	30106	0.05	0.0530	106	No
Pfda 1	9.47 (9.44)	13c-pfda	1627790	18986	0.05	0.0550	110	No
Pfuna 1	9.88 (9.86)	13c-pfuna	442367	13020	0.05	0.0620	125	No
Pfds 1	9.86 (9.84)	13c-pfos	3217041	39374	0.05	0.0550	111	No
Pfdoa 1	10.20 (10.20)	13c-pfdoda	28973	20396	0.05	0.0630	125	No
Fosa 1	9.97 (9.94)	d5-NEtFOSA	845615	37333	0.05	0.0550	110	No
Pfteda 1	10.80 (10.80)	13c-pfdoda	28973	7256	0.05	0.0620	125	No
PFHpS 1	8.43 (8.39)	18o-pfhs	1297146	12360	0.05	0.0550	111	No
NMeFOSE 1	10.80 (10.80)	d7-NMeFOSE	1606901	15135	0.05	0.0490	99	No

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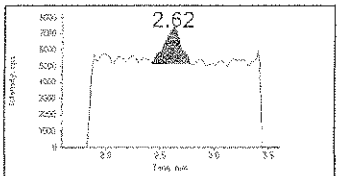
Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
NMeFOSA 1	10.80 (10.80)	d7-NMeFOSE	1606901	7429	0.05	0.0590	118	No
NEtFOSE 1	11.00 (11.00)	d9-EtFOSE	1826726	21831	0.05	0.0490	99	No
NEtFOSA 1	11.10 (11.00)	d5-NEtFOSA	845615	8515	0.05	0.0550	111	No
d9-EtFOSE 1	11.00 (11.00)	N_mefosa_d3	565665	1826726	5.00	6.5170	130	No
d5-NEtFOSA 1	11.00 (11.00)	N_mefosa_d3	565665	845615	5.00	5.6490	113	No
d7-NMeFOSE 1	10.80 (10.80)	N_mefosa_d3	565665	1606901	5.00	6.0450	121	No
13C_PFBA 1	2.60 (2.58)	N_mefosa_d3	565665	3587278	5.00	5.7190	114	No
13C_PFHXA 1	6.65 (6.63)	N_mefosa_d3	565665	4021400	5.00	5.9730	119	No
13C-PFOA 1	8.39 (8.35)	N_mefosa_d3	565665	2221180	5.00	5.8790	118	No
13C-PFNA 1	8.98 (8.96)	N_mefosa_d3	565665	2674215	5.00	6.1480	123	No
13C-PFOS 1	8.99 (8.95)	N_mefosa_d3	565665	3217041	5.00	5.8520	117	No
13C-PFDA 1	9.47 (9.45)	N_mefosa_d3	565665	1627790	5.00	6.1020	122	No
13C-PFUNA 1	9.88 (9.85)	N_mefosa_d3	565665	442367	5.00	5.8600	117	No
18O-PFHxS 1	7.74 (7.72)	N_mefosa_d3	565665	1297146	5.00	5.7770	116	No
13C-PFDoA 1	10.20 (10.20)	N_mefosa_d3	565665	28973	5.00	5.9590	119	No
PFTrDA 1	10.60 (10.50)	13c-pfdoda	28973	16602	0.05	0.0520	103	No
6_2-FTS 1	8.34 (8.31)	13C2-6_2-FTS	114720	7404	0.05	0.0520	104	No
8_2-FTS 1	9.45 (9.42)	13C2-6_2-FTS	114720	8802	0.05	0.0590	118	No
13C2-6_2-FTS 1	8.34 (8.31)	N_mefosa_d3	565665	114720	5.00	5.5350	111	No

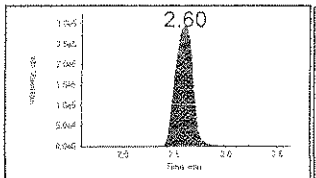
IRC Summary

Analyte Peak Name	RT (Expected)	Area	Modified?	Calculated Ion Ratio (Expected Value)
Pfba 2	0.00 (2.58)	0	No	0.00
Pfpea 2	5.09 (5.07)	26737	No	0.98
Pfbs 2	5.55 (5.52)	24386	No	0.46
Pfhxa 2	6.66 (6.63)	4043	No	0.09
Pfhpa 2	7.66 (7.63)	14502	No	0.48
Pfhxs 2	7.74 (7.72)	19138	No	0.39
Pfoa 2	8.39 (8.36)	26250	No	1.94
Pfna 2	8.99 (8.95)	10226	No	0.36
Pfos 2	8.99 (8.95)	10577	No	0.35
Pfda 2	9.46 (9.44)	4038	No	0.21
Pfuna 2	9.88 (9.85)	7742	No	0.59
Pfds 2	9.86 (9.84)	13134	No	0.33
Pfdoa 2	10.20 (10.20)	7228	No	0.35
Fosa 2	9.96 (9.94)	2615	No	0.07
Pfteda 2	10.80 (10.80)	2858	No	0.39
PFHpS 2	8.43 (8.39)	4791	No	0.39
NMeFOSE 2	0.00 (10.80)	0	No	0.00
NMeFOSA 2	10.80 (10.80)	5653	No	0.76
NEtFOSE 2	0.00 (11.00)	0	No	0.00
NEtFOSA 2	11.00 (11.00)	6198	No	0.73
PFTrDA 2	10.60 (10.50)	4373	No	0.26
6_2-FTS 2	8.34 (8.30)	11027	No	1.49
8_2-FTS 2	9.44 (9.41)	1197	No	0.14

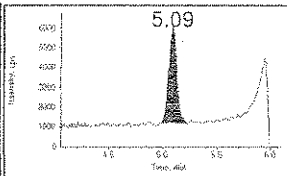
Quantitative Peak Review PFC 0.05ppb 15-OLC-02-35B



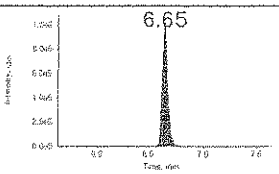
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



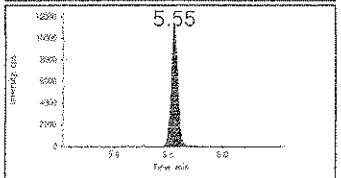
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



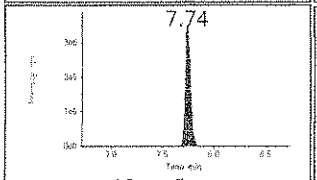
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



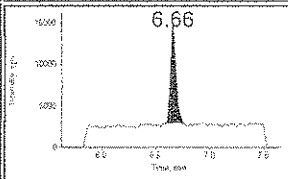
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



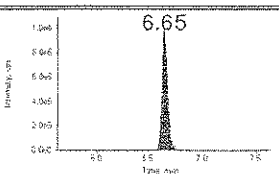
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



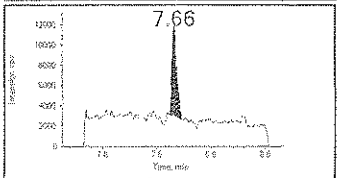
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



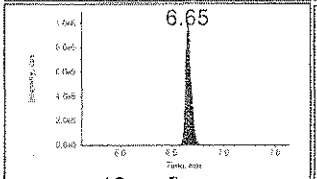
Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak



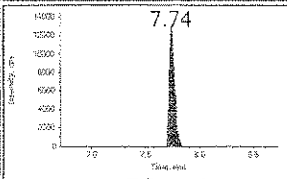
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



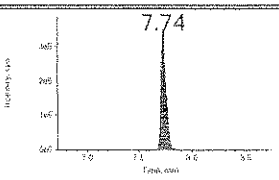
Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



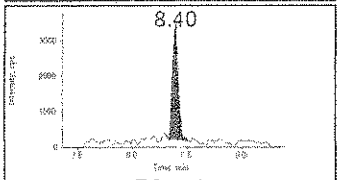
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



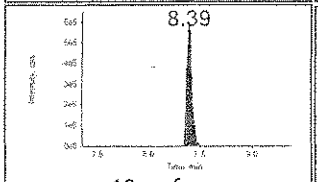
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



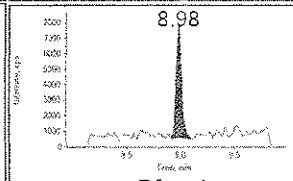
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



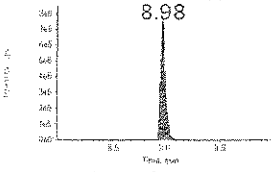
Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



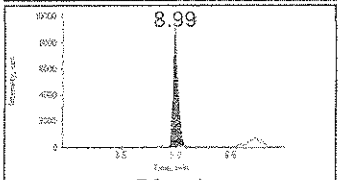
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



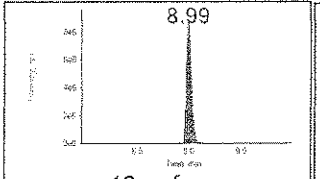
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



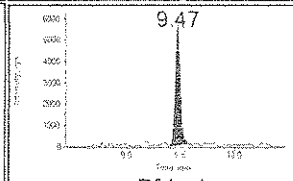
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



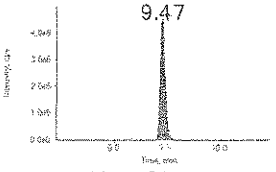
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



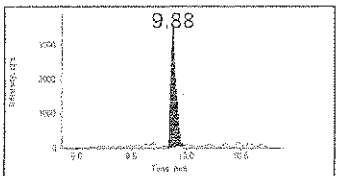
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



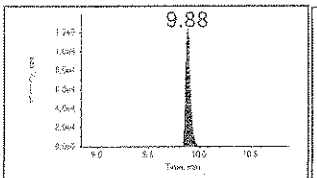
Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



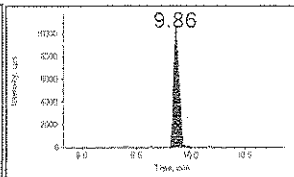
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



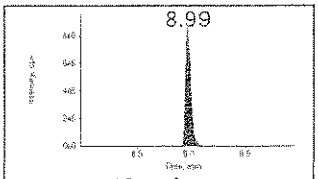
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



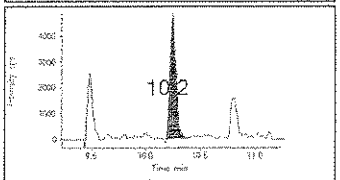
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



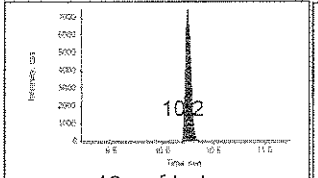
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



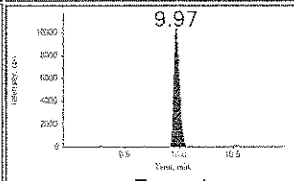
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



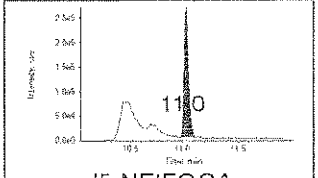
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



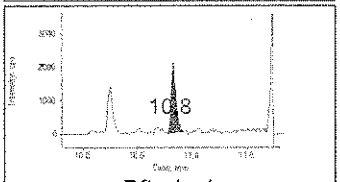
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



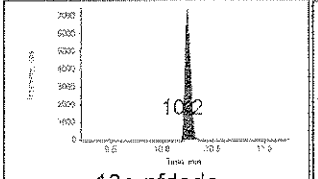
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



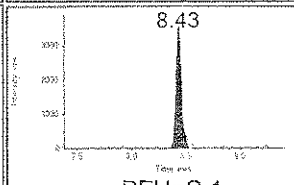
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



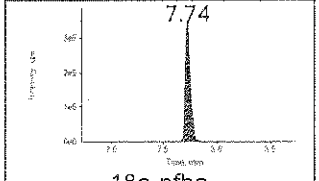
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



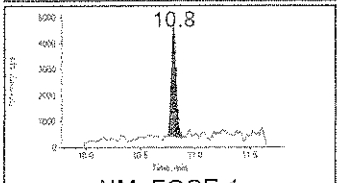
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



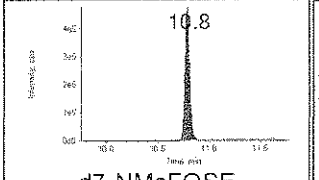
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



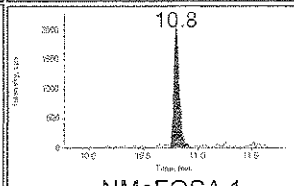
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



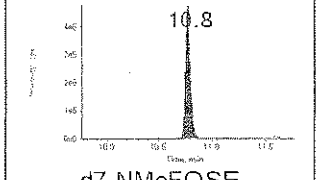
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



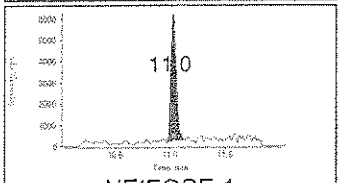
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



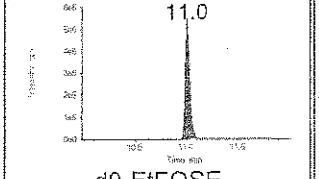
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



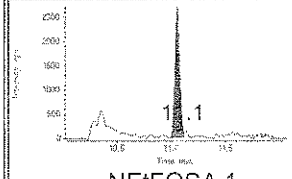
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



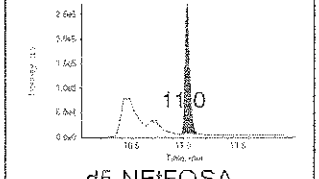
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



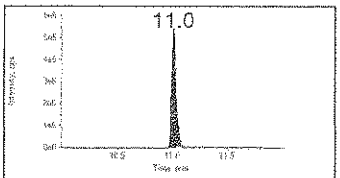
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



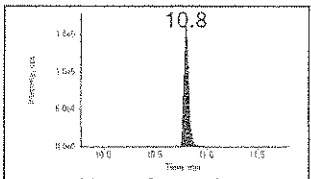
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



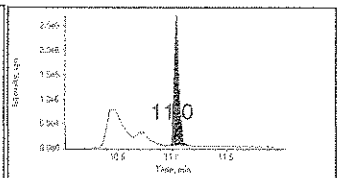
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



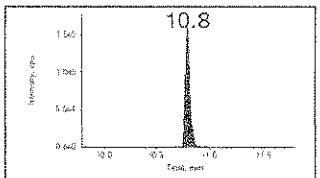
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



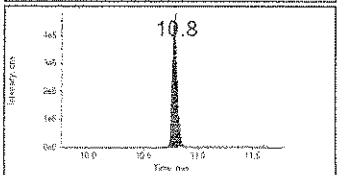
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



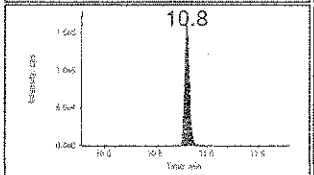
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



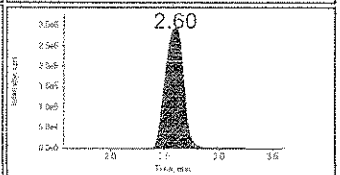
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



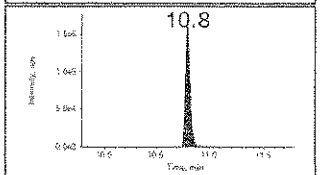
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



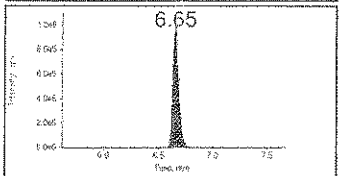
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



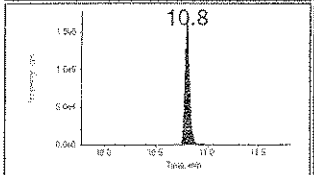
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



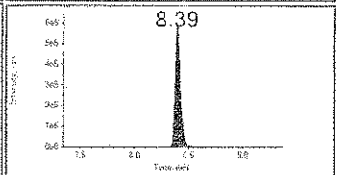
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



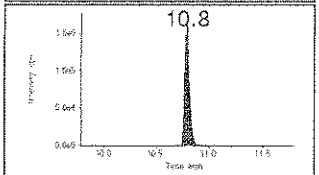
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



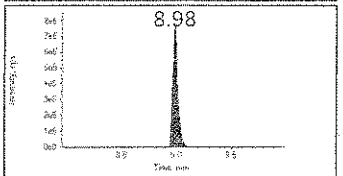
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



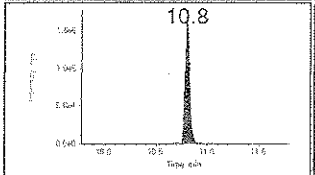
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



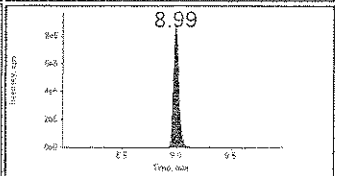
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



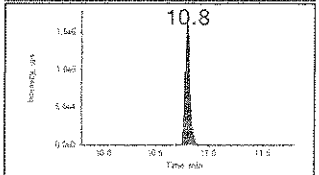
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



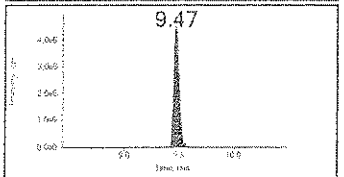
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



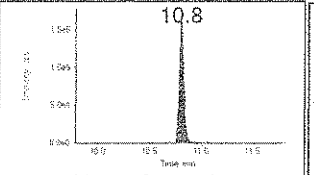
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



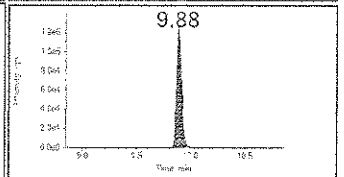
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



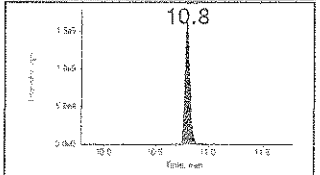
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



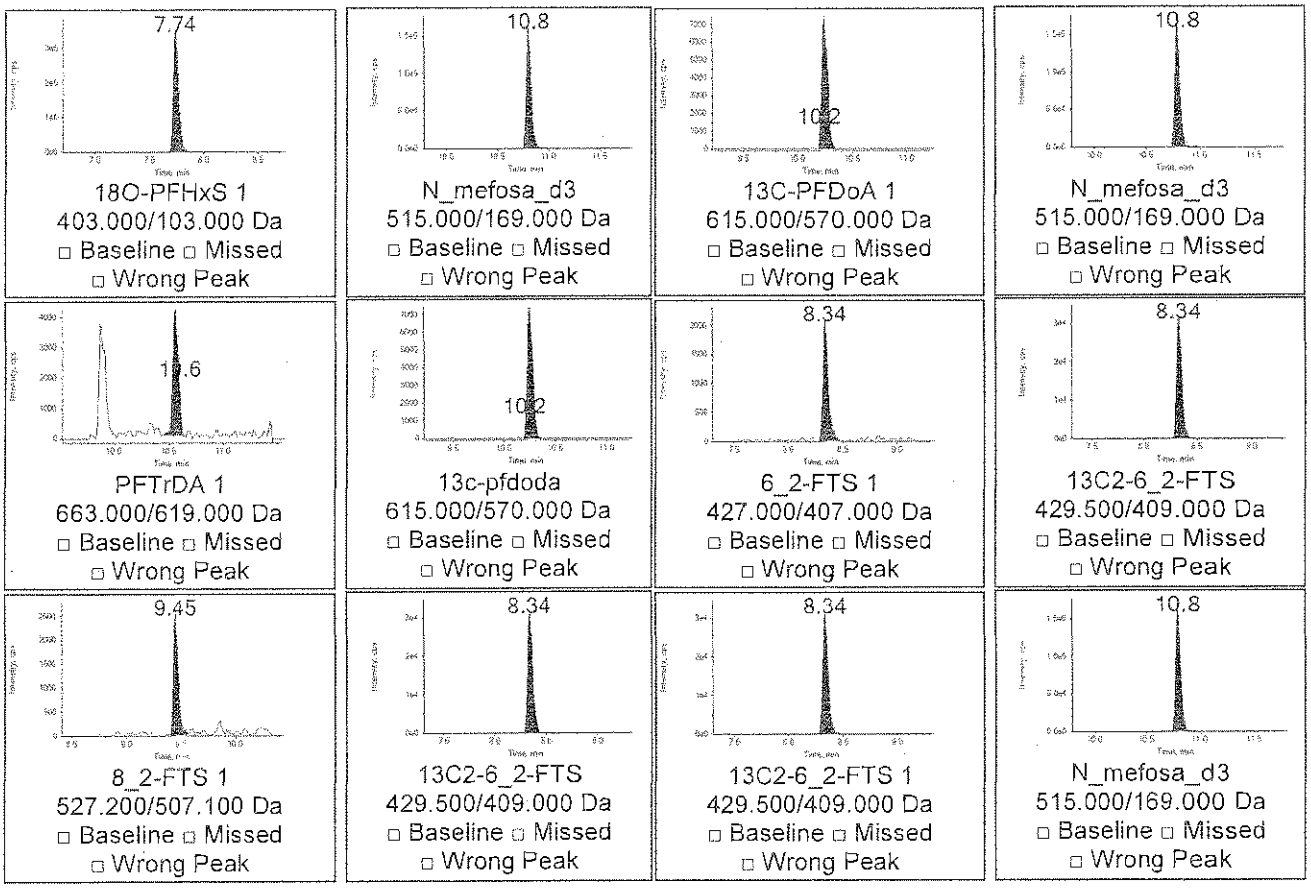
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



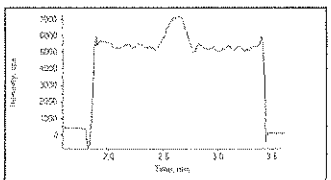
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



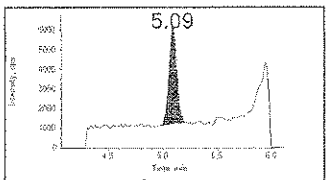
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



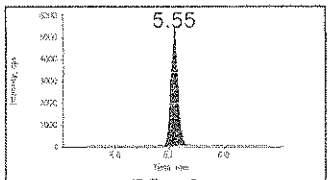
Ion Ratio Confirmation



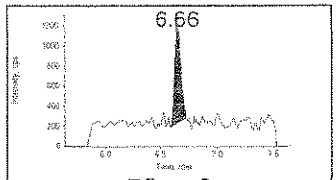
Pfba 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



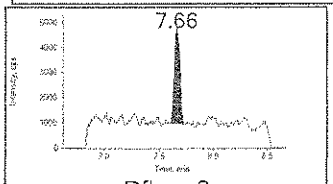
Pfpea 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



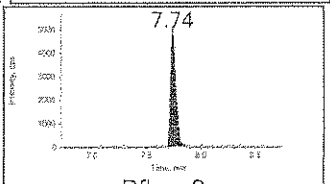
Pfbs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



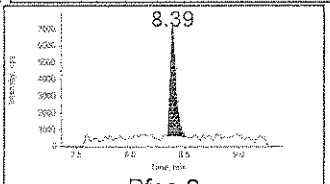
Pfhxa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



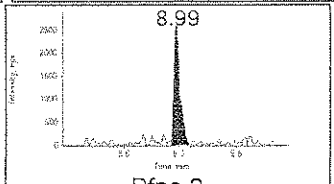
Pfhpa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



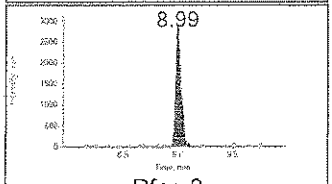
Pfhxs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



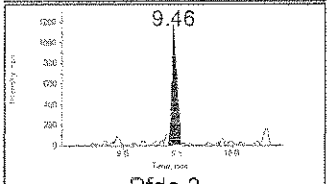
Pfoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



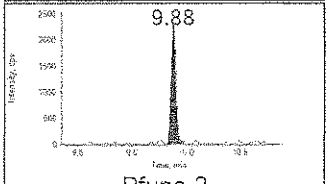
Pfna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



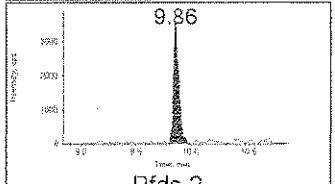
Pfos 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



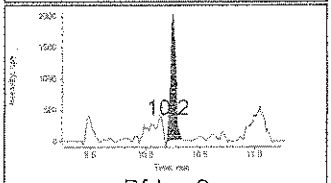
Pfda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



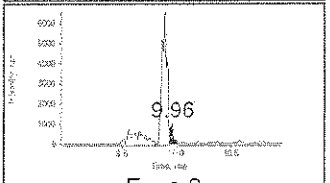
Pfuna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



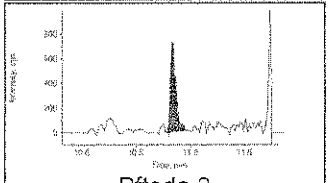
Pfds 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



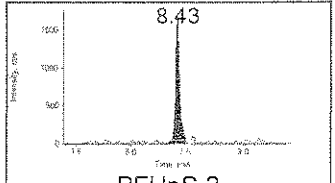
Pfdoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



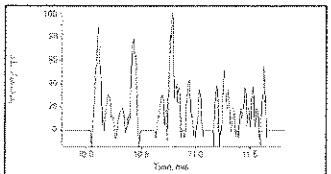
Fosa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



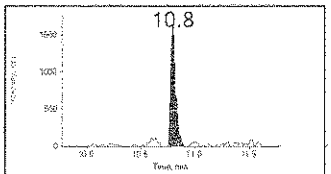
Pfteda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



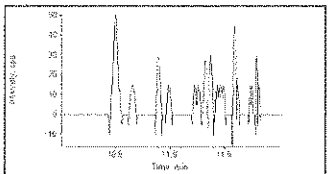
PFHpS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



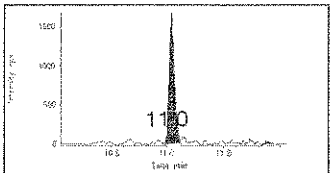
NMeFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



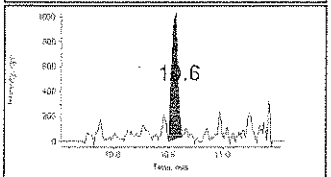
NMeFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



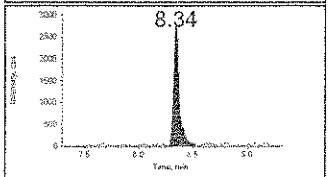
NEtFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



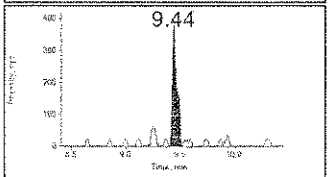
NEtFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak

Project	Ewan's Projects\PFCs	Result Table	033016.rdb
Data File	033016\1010.wiff	Algorithm Used	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	Instrument Name	LCMS02

Sample Name	PFC 0.10ppb	Injection Vial	5
Acquisition Date	3/30/2016 12:00:44 PM	Injection Volume	10
Acquisition Method	PFC_090315 schedule mrm.dam	Sample Type	Standard
Sample ID	15-OLC-02-35C	Dilution Factor	1.00

Results Summary

Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
Pfba 1	2.57 (2.60)	13c_pfba	3592430	54124	0.10	0.0950	95	No
Pfpea 1	5.08 (5.06)	13c_pfhxa	3965361	47419	0.10	0.0940	94	No
Pfbs 1	5.53 (5.53)	18o-pfhs	1314524	91973	0.10	0.0930	93	No
Pfhxa 1	6.63 (6.63)	13c_pfhxa	3965361	75330	0.10	0.0990	99	No
Pfhpa 1	7.63 (7.64)	13c_pfhxa	3965361	62075	0.10	0.0950	95	No
Pfhxs 1	7.71 (7.72)	18o-pfhs	1314524	80211	0.10	0.1120	112	No
Pfoa 1	8.37 (8.36)	13c-pfoa	2220413	24369	0.10	0.1020	102	No
Pfna 1	8.96 (8.95)	13c-pfna	2573598	46182	0.10	0.0970	97	No
Pfos 1	8.96 (8.96)	13c-pfos	3134851	54737	0.10	0.0990	99	No
Pfda 1	9.45 (9.44)	13c-pfda	1550290	31446	0.10	0.0960	96	No
Pfuna 1	9.86 (9.86)	13c-pfuna	412445	21172	0.10	0.1090	109	No
Pfds 1	9.84 (9.84)	13c-pfos	3134851	67646	0.10	0.0980	98	No
Pfdoa 1	10.20 (10.20)	13c-pfdoda	27210	32978	0.10	0.1080	108	No
Fosa 1	9.95 (9.94)	d5-NEtFOSA	873583	68957	0.10	0.0980	98	No
Pfteda 1	10.80 (10.80)	13c-pfdoda	27210	10923	0.10	0.0950	95	No
PFHpS 1	8.40 (8.39)	18o-pfhs	1314524	22226	0.10	0.0980	98	No
NMeFOSE 1	10.80 (10.80)	d7-NMeFOSE	1635191	26940	0.10	0.0860	86	No

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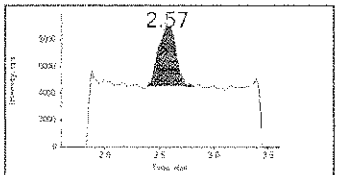
Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
NMeFOSA 1	10.80 (10.80)	d7-NMeFOSE	1635191	12978	0.10	0.1020	102	No
NEtFOSE 1	11.00 (11.00)	d9-EtFOSE	1756043	44351	0.10	0.1050	105	No
NEtFOSA 1	11.00 (11.00)	d5-NEtFOSA	873583	15479	0.10	0.0970	98	No
d9-EtFOSE 1	11.00 (11.00)	N_mefosa_d3	674742	1756043	5.00	5.2520	105	No
d5-NEtFOSA 1	11.00 (11.00)	N_mefosa_d3	674742	873583	5.00	4.8920	98	No
d7-NMeFOSE 1	10.80 (10.80)	N_mefosa_d3	674742	1635191	5.00	5.1570	103	No
13C_PFBA 1	2.57 (2.58)	N_mefosa_d3	674742	3592430	5.00	4.8020	96	No
13C_PFHXA 1	6.63 (6.63)	N_mefosa_d3	674742	3965361	5.00	4.9370	99	No
13C-PFOA 1	8.36 (8.35)	N_mefosa_d3	674742	2220413	5.00	4.9270	99	No
13C-PFNA 1	8.95 (8.96)	N_mefosa_d3	674742	2573598	5.00	4.9600	99	No
13C-PFOS 1	8.97 (8.95)	N_mefosa_d3	674742	3134851	5.00	4.7810	96	No
13C-PFDA 1	9.44 (9.45)	N_mefosa_d3	674742	1550290	5.00	4.8720	97	No
13C-PFUNA 1	9.86 (9.85)	N_mefosa_d3	674742	412445	5.00	4.5800	92	No
18O-PFHxS 1	7.71 (7.72)	N_mefosa_d3	674742	1314524	5.00	4.9080	98	No
13C-PFDoA 1	10.20 (10.20)	N_mefosa_d3	674742	27210	5.00	4.6920	94	No
PFTrDA 1	10.50 (10.50)	13c-pfdoda	27210	32786	0.10	0.1090	109	No
6_2-FTS 1	8.32 (8.31)	13C2-6_2-FTS	118255	13517	0.10	0.0920	92	No
8_2-FTS 1	9.43 (9.42)	13C2-6_2-FTS	118255	14552	0.10	0.0950	95	No
13C2-6_2-FTS 1	8.31 (8.31)	N_mefosa_d3	674742	118255	5.00	4.7830	96	No

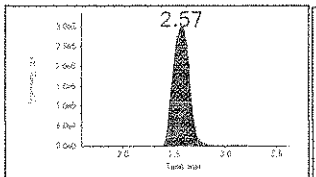
IRC Summary

Analyte Peak Name	RT (Expected)	Area	Modified?	Calculated Ion Ratio (Expected Value)
Pfba 2	2.57 (2.58)	48458	No	0.90
Pfpea 2	5.07 (5.07)	45860	No	0.97
Pfbs 2	5.53 (5.52)	43543	No	0.47
Pfhxa 2	6.63 (6.63)	6185	No	0.08
Pfhpa 2	7.62 (7.63)	26664	No	0.43
Pfhxs 2	7.71 (7.72)	31531	No	0.39
Pfoa 2	8.37 (8.36)	45224	No	1.86
Pfna 2	8.95 (8.95)	15422	No	0.33
Pfos 2	8.96 (8.95)	19816	No	0.36
Pfda 2	9.44 (9.44)	9079	No	0.29
Pfuna 2	9.87 (9.85)	9891	No	0.47
Pfds 2	9.84 (9.84)	22130	No	0.33
Pfdoa 2	10.20 (10.20)	13135	No	0.40
Fosa 2	0.00 (9.94)	0	No	0.00
Pfteda 2	10.80 (10.80)	5571	No	0.51
PFHpS 2	8.40 (8.39)	8629	No	0.39
NMeFOSE 2	0.00 (10.80)	0	No	0.00
NMeFOSA 2	10.80 (10.80)	11732	No	0.90
NEtFOSE 2	0.00 (11.00)	0	No	0.00
NEtFOSA 2	11.00 (11.00)	11297	No	0.73
PFTrDA 2	10.50 (10.50)	9721	No	0.30
6_2-FTS 2	8.31 (8.30)	17582	No	1.30
8_2-FTS 2	9.43 (9.41)	1991	No	0.14

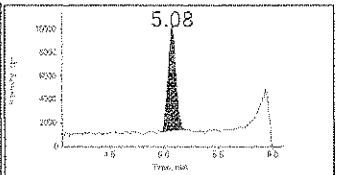
Quantitative Peak Review PFC 0.10ppb 15-OLC-02-35C



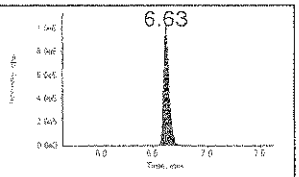
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



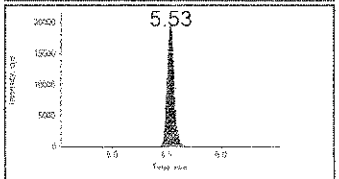
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



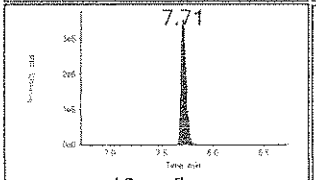
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



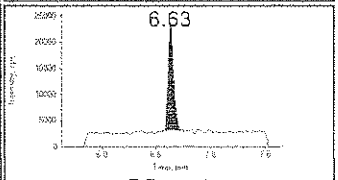
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



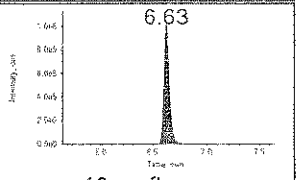
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



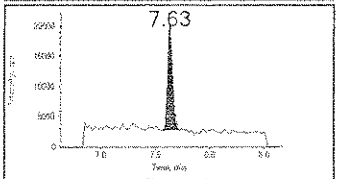
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



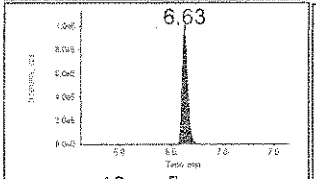
Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak



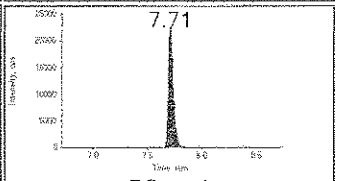
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



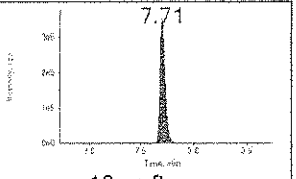
Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



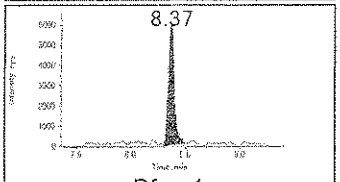
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



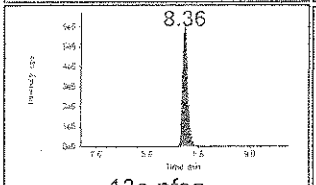
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



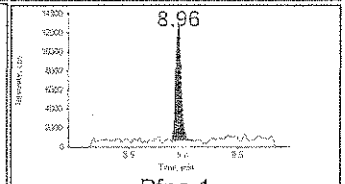
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



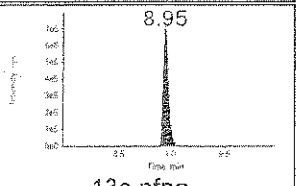
Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



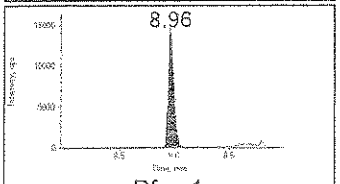
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



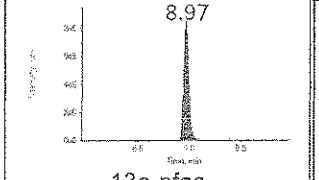
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



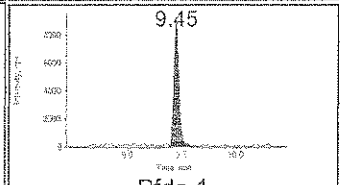
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



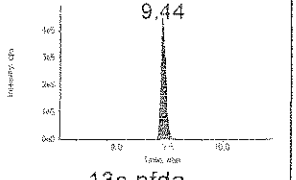
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



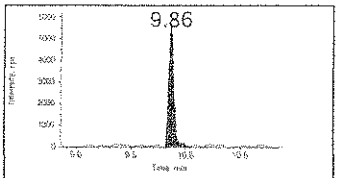
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



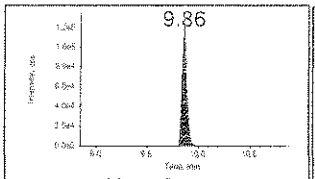
Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



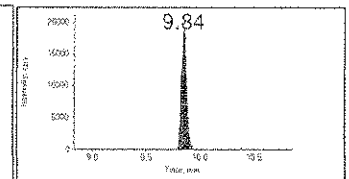
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



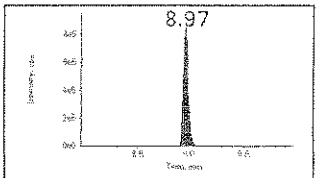
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



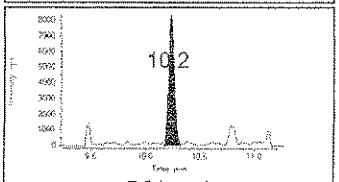
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



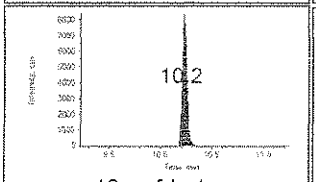
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



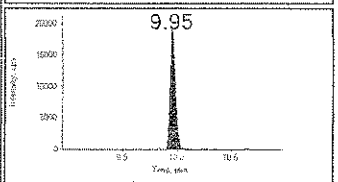
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



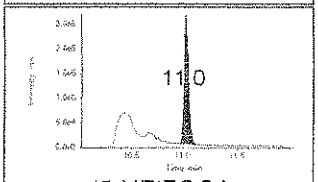
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



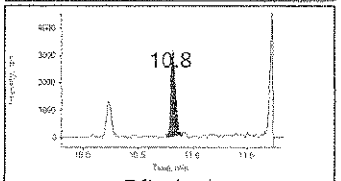
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



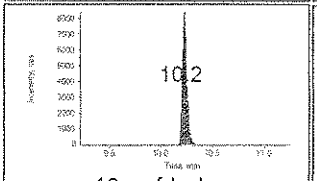
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



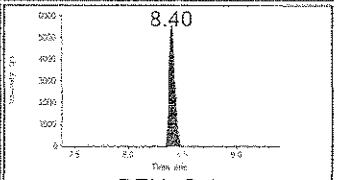
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



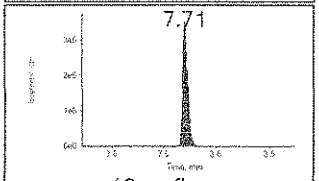
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



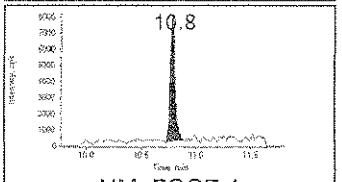
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



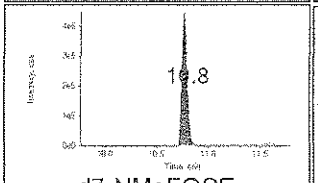
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



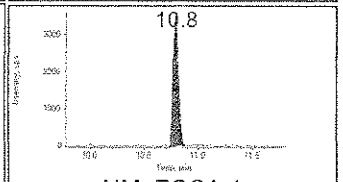
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



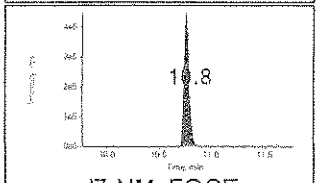
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



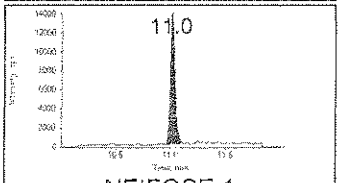
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



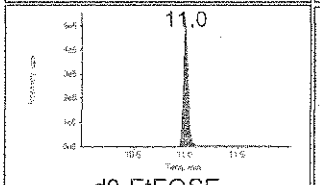
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



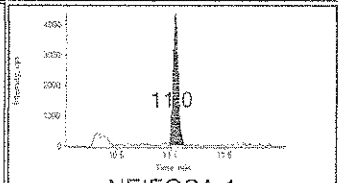
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



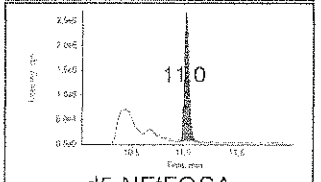
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



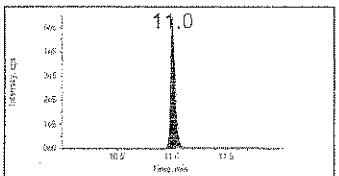
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



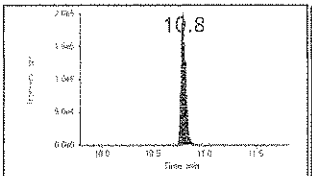
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



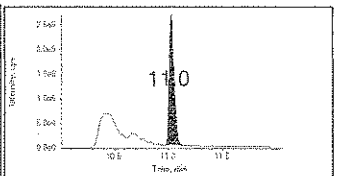
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



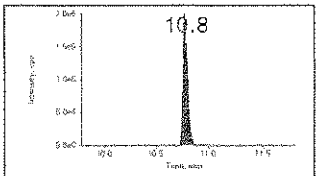
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



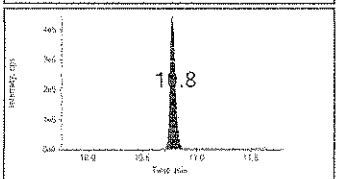
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



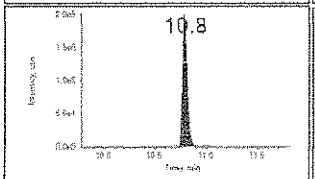
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



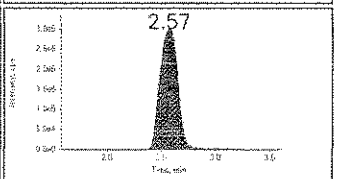
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



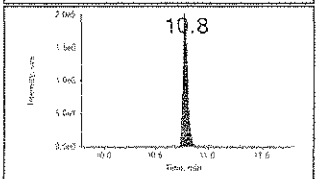
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



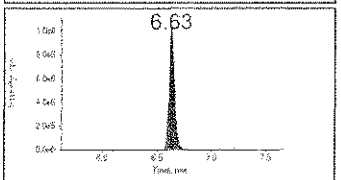
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



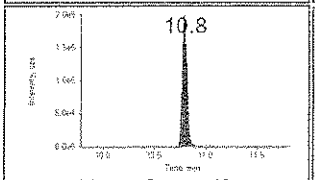
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



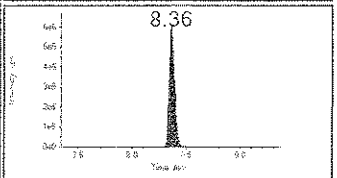
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



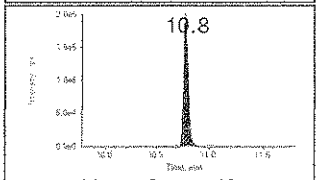
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



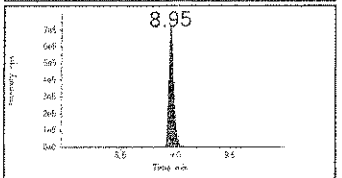
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



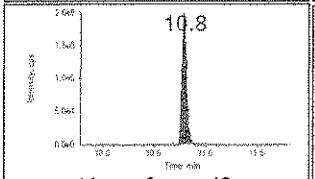
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



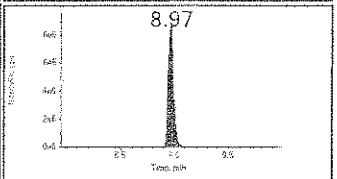
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



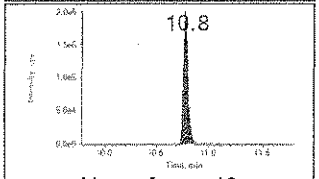
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



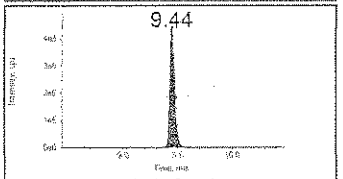
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



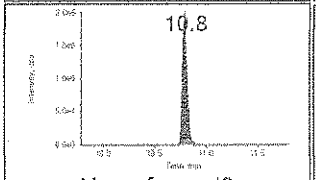
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



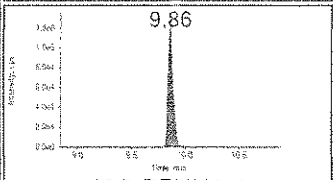
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



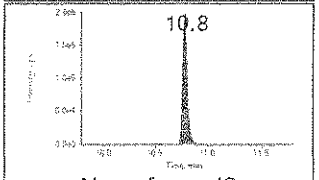
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



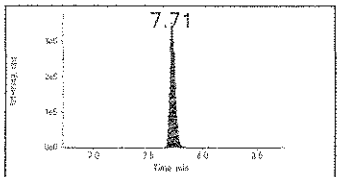
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



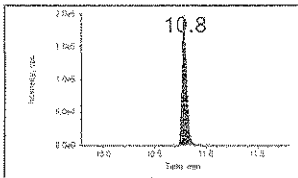
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



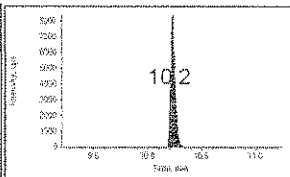
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



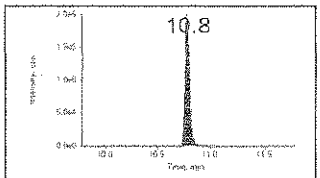
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



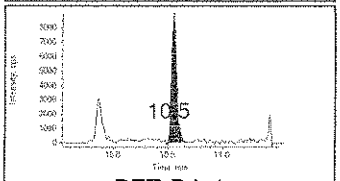
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



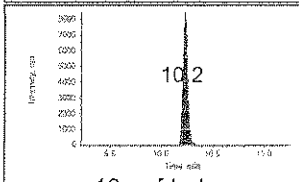
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



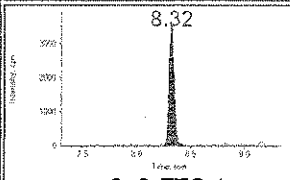
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



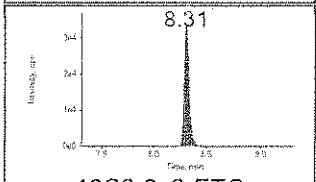
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



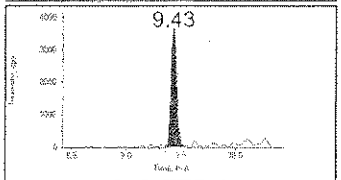
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



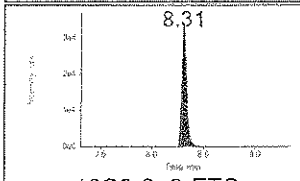
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



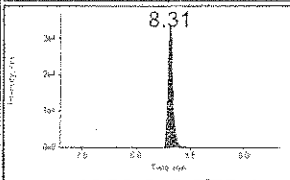
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



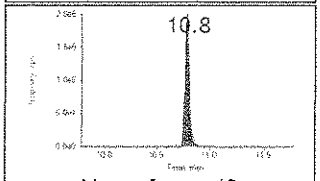
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

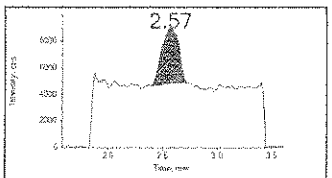


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

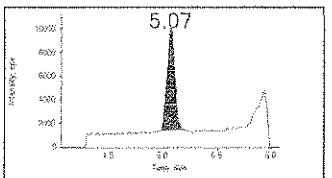


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

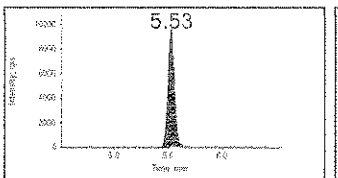
Ion Ratio Confirmation



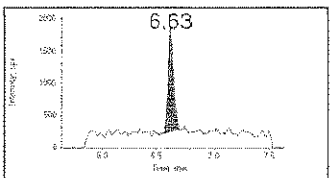
Pfba 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



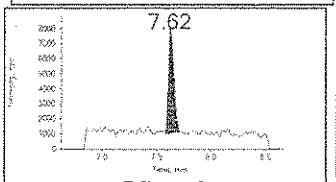
Pfpea 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



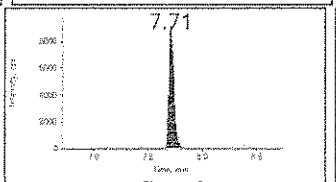
Pfbs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



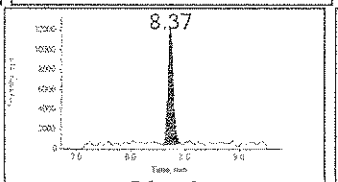
Pfhxa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



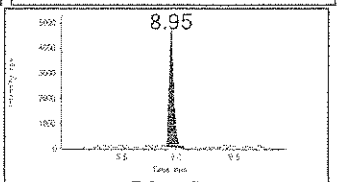
Pfhpa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



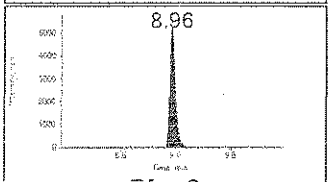
Pfhxs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



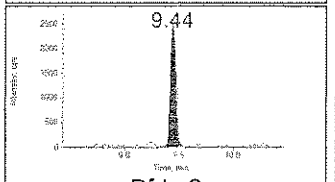
Pfoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



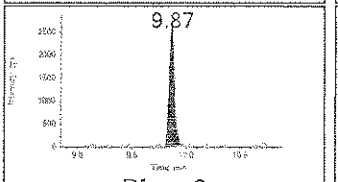
Pfna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



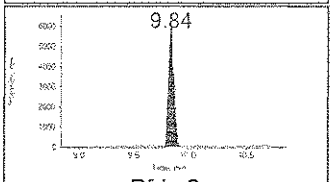
Pfos 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



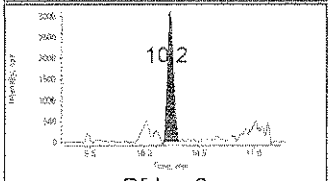
Pfda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



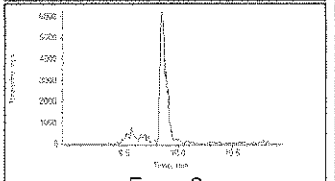
Pfuna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



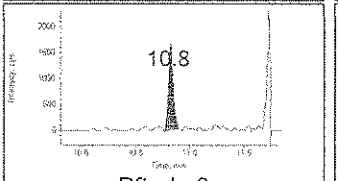
Pfds 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



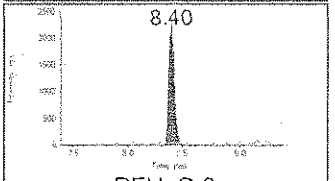
Pfdoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



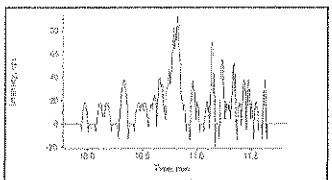
Fosa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



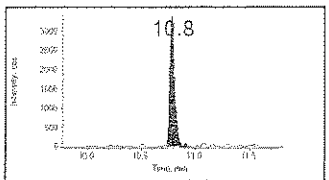
Pfteda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



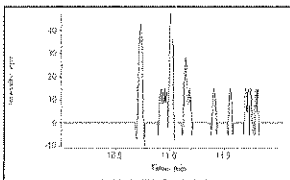
PFHpS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



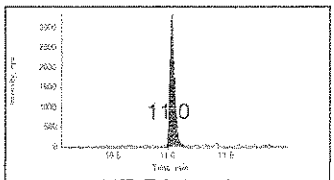
NMeFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



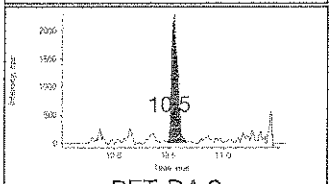
NMeFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



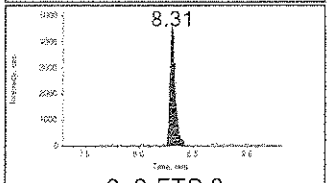
NEtFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



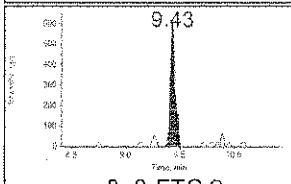
NEtFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak

Project	Ewan's Projects\PFCs	Result Table	033016.rdb
Data File	033016\1011.wiff	Algorithm Used	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	Instrument Name	LCMS02

Sample Name	PFC 0.25ppb	Injection Vial	6
Acquisition Date	3/30/2016 12:20:03 PM	Injection Volume	10
Acquisition Method	PFC_090315 schedule mrm.dam	Sample Type	Standard
Sample ID	15-OLC-02-35D	Dilution Factor	1.00

Results Summary

Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
Pfba 1	2.61 (2.60)	13c_pfba	3642423	147914	0.25	0.2560	102	No
Pfpea 1	5.09 (5.06)	13c_pfhxa	3975161	127270	0.25	0.2520	101	No
Pfbs 1	5.54 (5.53)	18o-pfhs	1292586	247157	0.25	0.2540	102	No
Pfhxa 1	6.64 (6.63)	13c_pfhxa	3975161	192793	0.25	0.2530	101	No
Pfhpa 1	7.64 (7.64)	13c_pfhxa	3975161	164933	0.25	0.2510	101	No
Pfhxs 1	7.72 (7.72)	18o-pfhs	1292586	183984	0.25	0.2620	105	No
Pfoa 1	8.38 (8.36)	13c-pfoa	2332236	64959	0.25	0.2580	103	No
Pfna 1	8.96 (8.95)	13c-pfna	2724113	126751	0.25	0.2520	101	No
Pfos 1	8.97 (8.96)	13c-pfos	3315168	142366	0.25	0.2430	97	No
Pfda 1	9.45 (9.44)	13c-pfda	1705548	82909	0.25	0.2300	92	No
Pfuna 1	9.86 (9.86)	13c-pfuna	459130	55136	0.25	0.2540	102	No
Pfds 1	9.85 (9.84)	13c-pfos	3315168	178499	0.25	0.2440	97	No
Pfdoa 1	10.20 (10.20)	13c-pfdoda	28994	73165	0.25	0.2240	90	No
Fosa 1	9.96 (9.94)	d5-NEtFOSA	853169	172689	0.25	0.2520	101	No
Pfteda 1	10.80 (10.80)	13c-pfdoda	28994	29087	0.25	0.2230	89	No
PFHpS 1	8.41 (8.39)	18o-pfhs	1292586	54954	0.25	0.2470	99	No
NMeFOSE 1	10.80 (10.80)	d7-NMeFOSE	1556257	77764	0.25	0.2620	105	No

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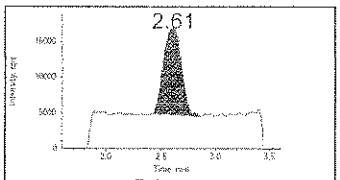
Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
NMeFOSA 1	10.80 (10.80)	d7-NMeFOSE	1556257	28333	0.25	0.2330	93	No
NEtFOSE 1	11.00 (11.00)	d9-EtFOSE	1511386	103616	0.25	0.2840	113	No
NEtFOSA 1	11.00 (11.00)	d5-NEtFOSA	853169	36616	0.25	0.2360	94	No
d9-EtFOSE 1	11.00 (11.00)	N_mefosa_d3	669763	1511386	5.00	4.5540	91	No
d5-NEtFOSA 1	11.00 (11.00)	N_mefosa_d3	669763	853169	5.00	4.8140	96	No
d7-NMeFOSE 1	10.80 (10.80)	N_mefosa_d3	669763	1556257	5.00	4.9440	99	No
13C_PFBA 1	2.59 (2.58)	N_mefosa_d3	669763	3642423	5.00	4.9050	98	No
13C_PFHXA 1	6.64 (6.63)	N_mefosa_d3	669763	3975161	5.00	4.9860	100	No
13C-PFOA 1	8.38 (8.35)	N_mefosa_d3	669763	2332236	5.00	5.2140	104	No
13C-PFNA 1	8.96 (8.96)	N_mefosa_d3	669763	2724113	5.00	5.2900	106	No
13C-PFOS 1	8.97 (8.95)	N_mefosa_d3	669763	3315168	5.00	5.0940	102	No
13C-PFDA 1	9.45 (9.45)	N_mefosa_d3	669763	1705548	5.00	5.4000	108	No
13C-PFUNA 1	9.87 (9.85)	N_mefosa_d3	669763	459130	5.00	5.1370	103	No
18O-PFHxS 1	7.72 (7.72)	N_mefosa_d3	669763	1292586	5.00	4.8620	97	No
13C-PFDoA 1	10.20 (10.20)	N_mefosa_d3	669763	28994	5.00	5.0360	101	No
PFTrDA 1	10.50 (10.50)	13c-pfdoda	28994	75311	0.25	0.2340	94	No
6_2-FTS 1	8.32 (8.31)	13C2-6_2-FTS	121909	36417	0.25	0.2410	96	No
8_2-FTS 1	9.43 (9.42)	13C2-6_2-FTS	121909	39518	0.25	0.2490	100	No
13C2-6_2-FTS 1	8.32 (8.31)	N_mefosa_d3	669763	121909	5.00	4.9680	99	No

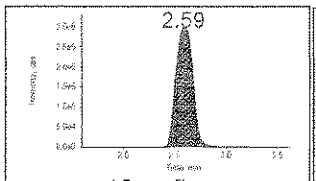
IRC Summary

Analyte Peak Name	RT (Expected)	Area	Modified?	Calculated Ion Ratio (Expected Value)
Pfba 2	2.60 (2.58)	139985	No	0.95
Pfpea 2	5.09 (5.07)	125843	No	0.99
Pfbs 2	5.53 (5.52)	111511	No	0.45
Pfhxa 2	6.64 (6.63)	15784	No	0.08
Pfhpa 2	7.64 (7.63)	66245	No	0.40
Pfhxs 2	7.72 (7.72)	68264	No	0.37
Pfoa 2	8.38 (8.36)	112307	No	1.73
Pfna 2	8.96 (8.95)	39362	No	0.31
Pfos 2	8.97 (8.95)	48972	No	0.34
Pfda 2	9.45 (9.44)	23301	No	0.28
Pfuna 2	9.86 (9.85)	26463	No	0.48
Pfds 2	9.85 (9.84)	61091	No	0.34
Pfdoa 2	10.20 (10.20)	26031	No	0.36
Fosa 2	9.97 (9.94)	3698	No	0.02
Pfteda 2	10.80 (10.80)	12833	No	0.44
PFHpS 2	8.41 (8.39)	22598	No	0.41
NMeFOSE 2	0.00 (10.80)	0	No	0.00
NMeFOSA 2	10.80 (10.80)	27700	No	0.98
NEtFOSE 2	0.00 (11.00)	0	No	0.00
NEtFOSA 2	11.00 (11.00)	27914	No	0.76
PFTrDA 2	10.50 (10.50)	25427	No	0.34
6_2-FTS 2	8.32 (8.30)	50843	No	1.40
8_2-FTS 2	9.43 (9.41)	4288	No	0.11

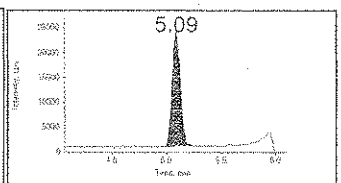
Quantitative Peak Review PFC 0.25ppb 15-OLC-02-35D



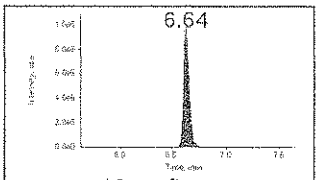
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



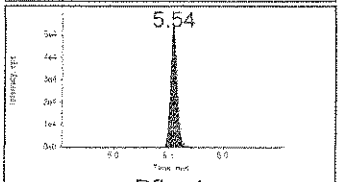
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



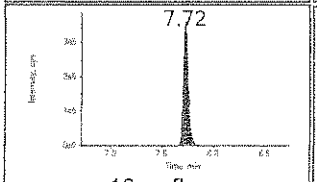
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



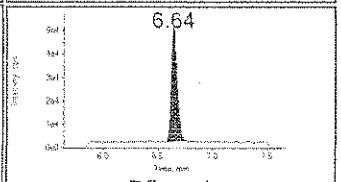
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



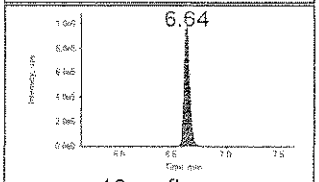
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



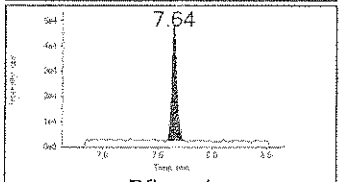
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



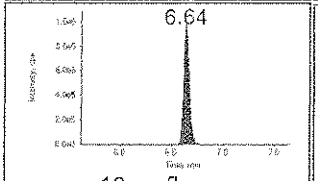
Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak



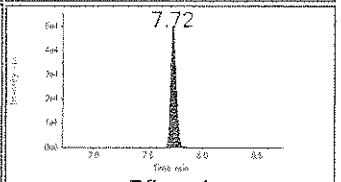
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



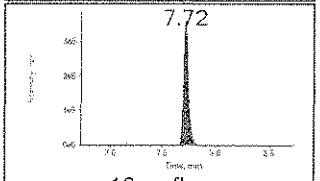
Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



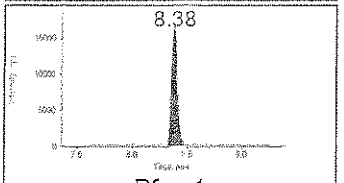
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



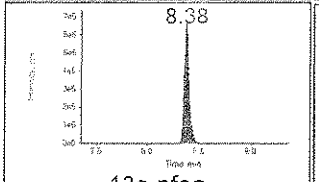
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



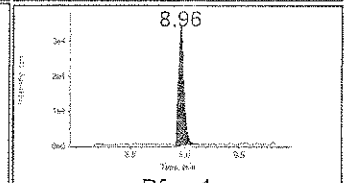
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



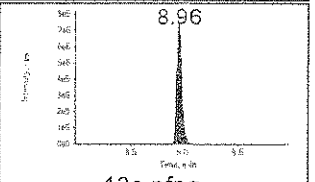
Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



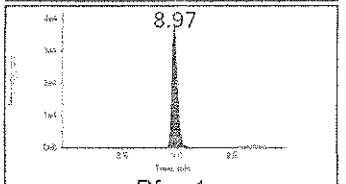
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



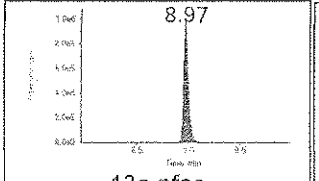
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



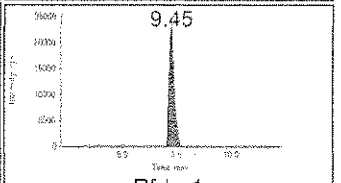
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



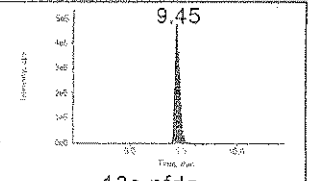
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



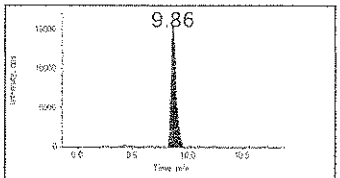
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



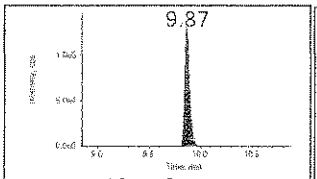
Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



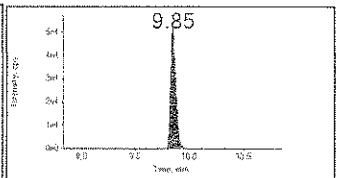
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



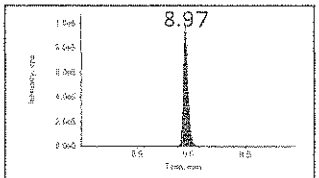
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



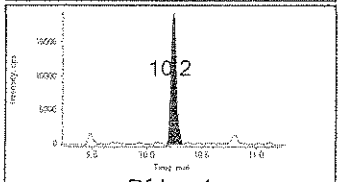
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



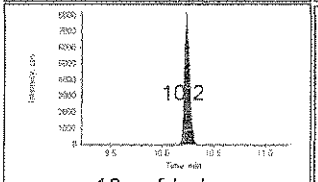
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



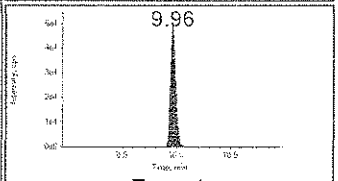
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



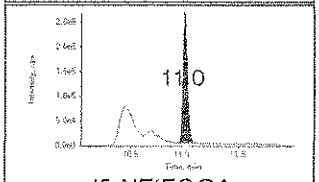
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



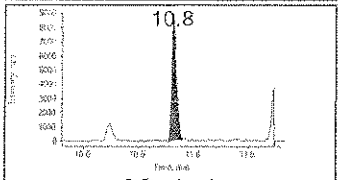
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



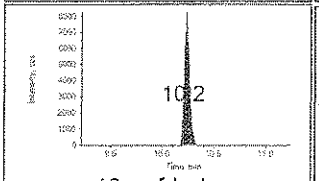
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



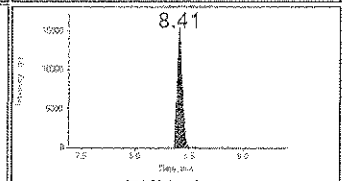
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



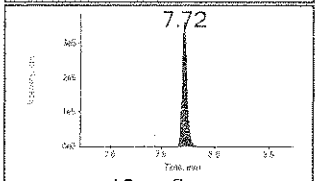
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



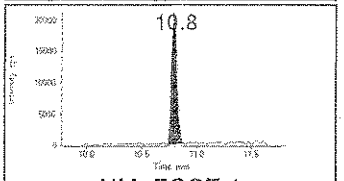
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



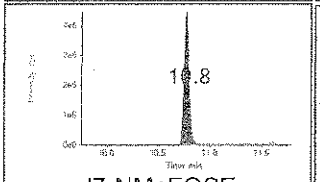
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



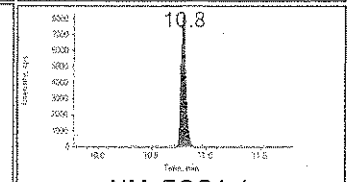
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



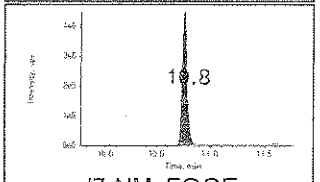
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



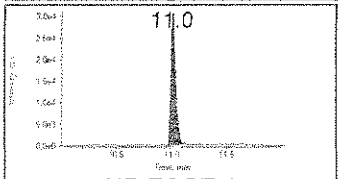
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



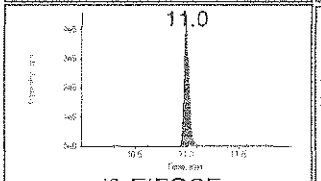
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



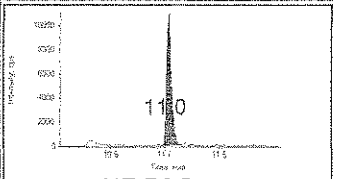
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



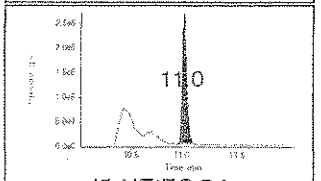
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



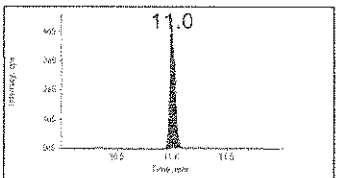
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



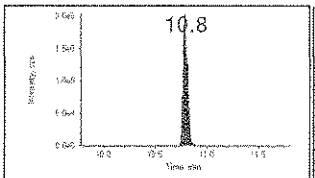
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



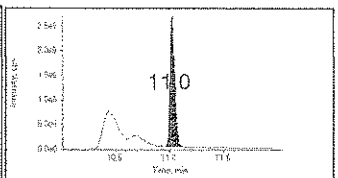
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



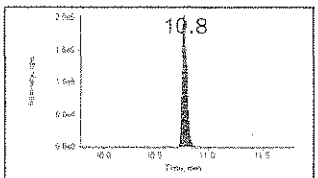
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



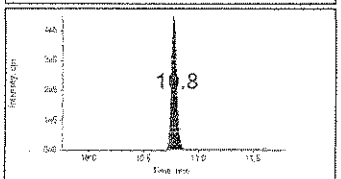
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



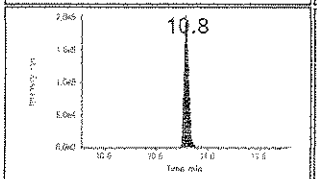
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



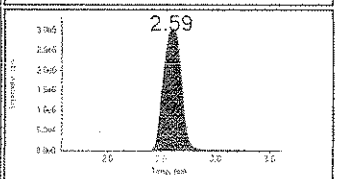
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



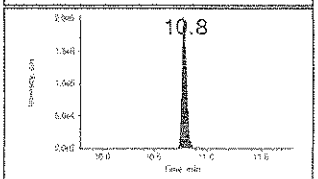
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



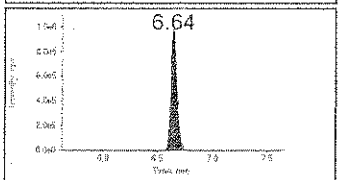
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



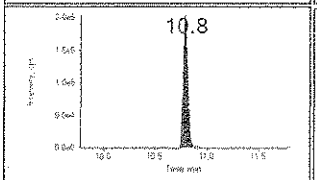
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



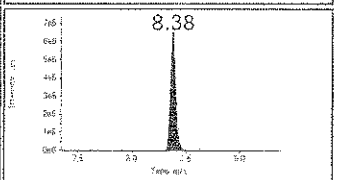
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



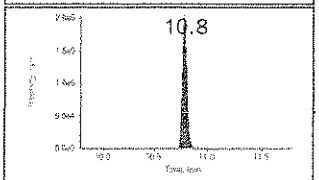
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



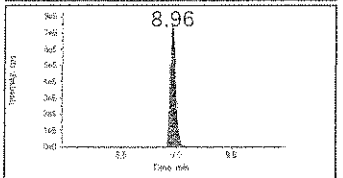
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



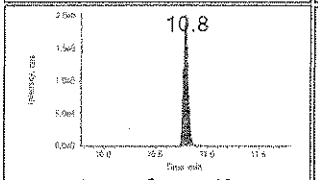
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



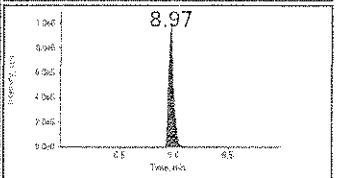
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



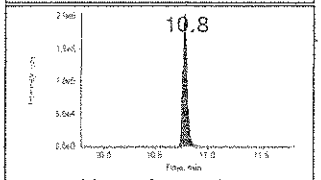
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



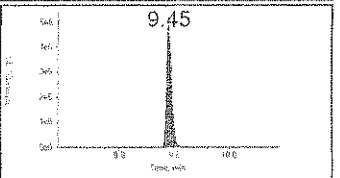
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



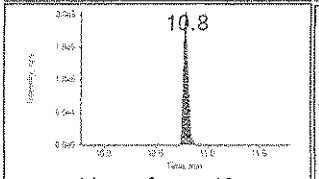
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



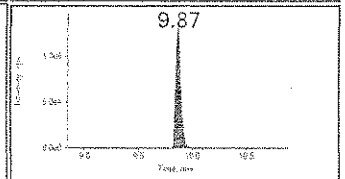
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



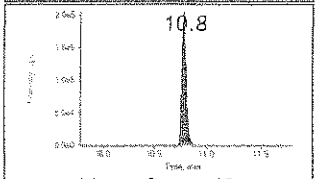
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



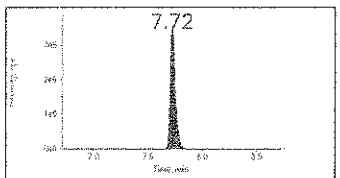
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



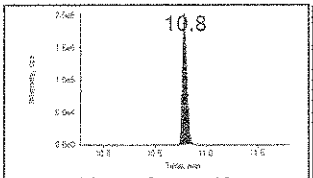
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



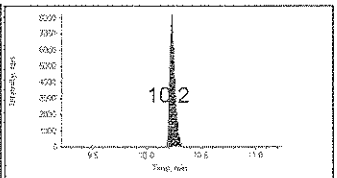
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



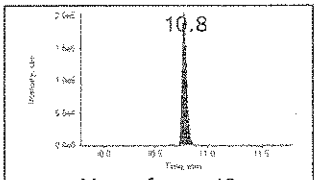
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



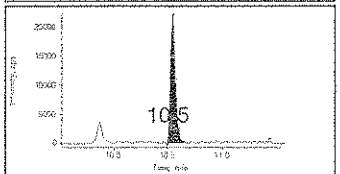
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



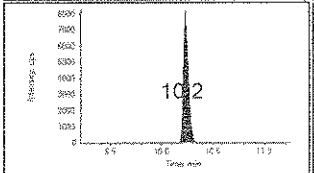
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



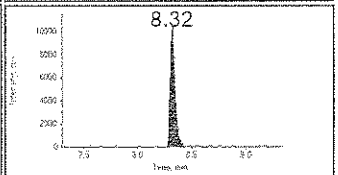
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



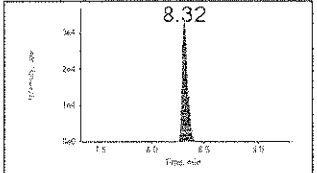
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



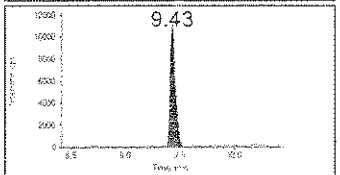
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



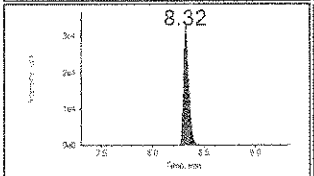
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



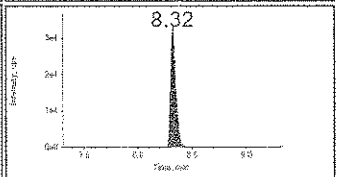
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



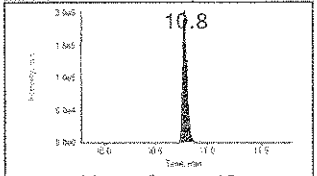
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

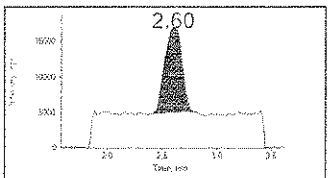


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

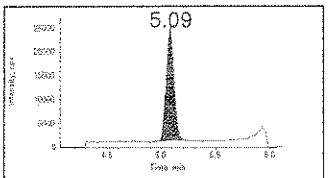


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

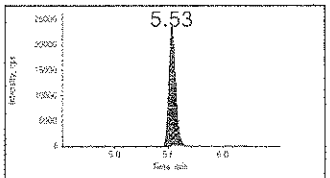
Ion Ratio Confirmation



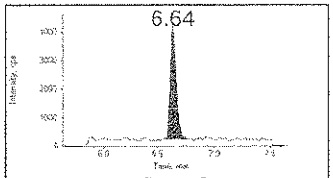
Pfba 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



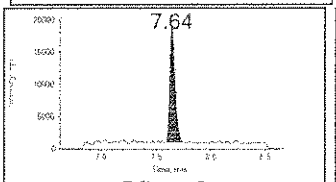
Pfpea 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



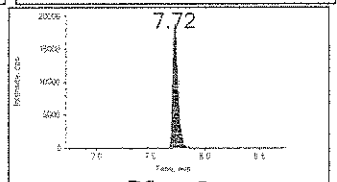
Pfbs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



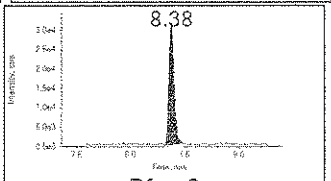
Pfhxa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



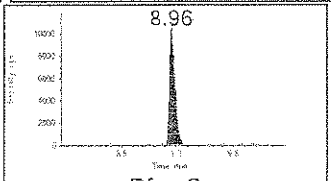
Pfhpa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



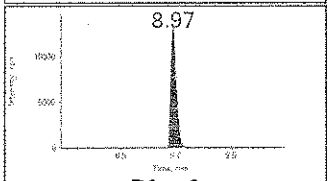
Pfhxs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



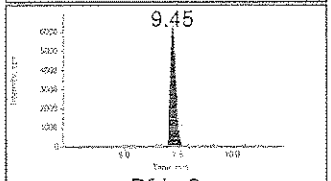
Pfoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



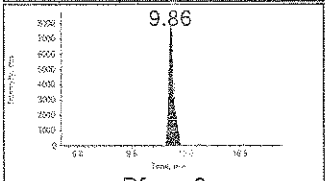
Pfna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



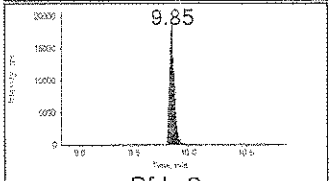
Pfos 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



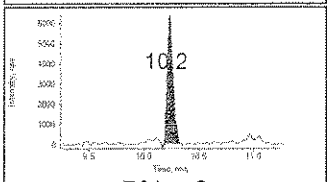
Pfda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



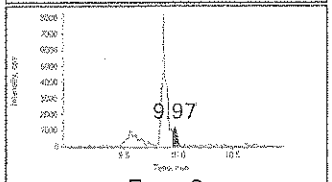
Pfuna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



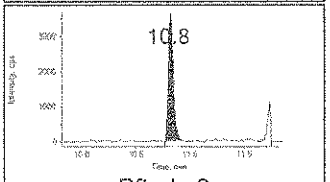
Pfds 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



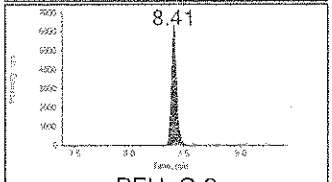
Pfdoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



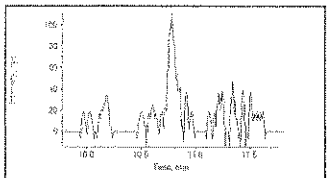
Fosa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



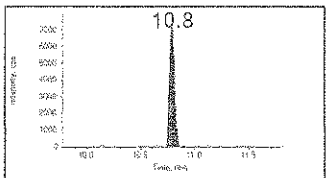
Pfteda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



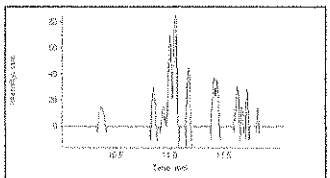
PFHpS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



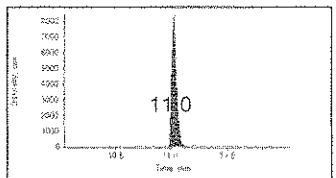
NMeFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



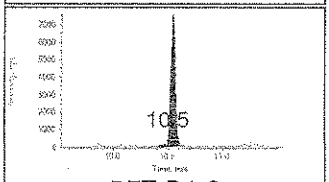
NMeFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



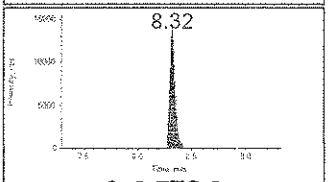
NEtFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



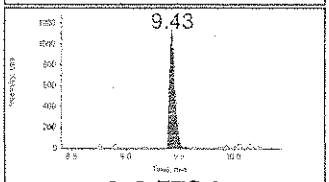
NEtFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak

Project	Ewan's Projects\PFCs	Result Table	033016.rdb
Data File	033016\1012.wiff	Algorithm Used	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	Instrument Name	LCMS02

Sample Name	PFC 0.50ppb	Injection Vial	7
Acquisition Date	3/30/2016 12:39:24 PM	Injection Volume	10
Acquisition Method	PFC_090315 schedule mrm.dam	Sample Type	Standard
Sample ID	15-OLC-02-35E	Dilution Factor	1.00

Results Summary

Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
Pfba 1	2.58 (2.60)	13c_pfba	3651585	296317	0.50	0.5110	102	No
Pfpea 1	5.08 (5.06)	13c_pfhxa	3965364	245775	0.50	0.4880	98	No
Pfbs 1	5.53 (5.53)	18o-pfhs	1367202	486811	0.50	0.4740	95	No
Pfhxa 1	6.63 (6.63)	13c_pfhxa	3965364	371524	0.50	0.4880	98	No
Pfhpa 1	7.63 (7.64)	13c_pfhxa	3965364	311911	0.50	0.4770	95	No
Pfhxs 1	7.71 (7.72)	18o-pfhs	1367202	354265	0.50	0.4760	95	No
Pfoa 1	8.36 (8.36)	13c-pfoa	2259807	120601	0.50	0.4940	99	No
Pfna 1	8.95 (8.95)	13c-pfna	2561239	247931	0.50	0.5230	105	No
Pfos 1	8.96 (8.96)	13c-pfos	3365571	280245	0.50	0.4720	94	No
Pfda 1	9.44 (9.44)	13c-pfda	1611199	161033	0.50	0.4730	95	No
Pfuna 1	9.86 (9.86)	13c-pfuna	446372	102556	0.50	0.4870	97	No
Pfds 1	9.84 (9.84)	13c-pfos	3365571	350240	0.50	0.4710	94	No
Pfdoa 1	10.20 (10.20)	13c-pfdoda	28627	152545	0.50	0.4740	95	No
Fosa 1	9.95 (9.94)	d5-NEtFOSA	824925	315809	0.50	0.4760	95	No
Pfteda 1	10.80 (10.80)	13c-pfdoda	28627	56440	0.50	0.4320	86	No
PFHpS 1	8.39 (8.39)	18o-pfhs	1367202	116406	0.50	0.4950	99	No
NMeFOSE 1	10.80 (10.80)	d7-NMeFOSE	1561638	145749	0.50	0.4890	98	No

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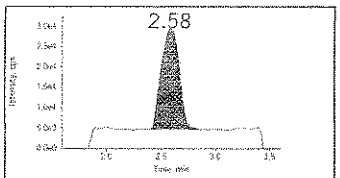
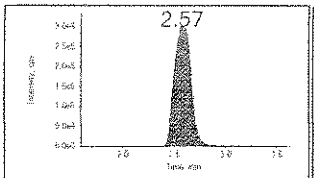
Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
NMeFOSA 1	10.80 (10.80)	d7-NMeFOSE	1561638	54636	0.50	0.4480	90	No
NEtFOSE 1	11.00 (11.00)	d9-EtFOSE	1630437	191526	0.50	0.4860	97	No
NEtFOSA 1	11.00 (11.00)	d5-NEtFOSA	824925	71959	0.50	0.4800	96	No
d9-EtFOSE 1	11.00 (11.00)	N_mefosa_d3	639196	1630437	5.00	5.1470	103	No
d5-NEtFOSA 1	11.00 (11.00)	N_mefosa_d3	639196	824925	5.00	4.8770	98	No
d7-NMeFOSE 1	10.80 (10.80)	N_mefosa_d3	639196	1561638	5.00	5.1990	104	No
13C_PFBA 1	2.57 (2.58)	N_mefosa_d3	639196	3651585	5.00	5.1520	103	No
13C_PFHXA 1	6.63 (6.63)	N_mefosa_d3	639196	3965364	5.00	5.2120	104	No
13C-PFOA 1	8.36 (8.35)	N_mefosa_d3	639196	2259807	5.00	5.2940	106	No
13C-PFNA 1	8.95 (8.96)	N_mefosa_d3	639196	2561239	5.00	5.2110	104	No
13C-PFOS 1	8.96 (8.95)	N_mefosa_d3	639196	3365571	5.00	5.4180	108	No
13C-PFDA 1	9.44 (9.45)	N_mefosa_d3	639196	1611199	5.00	5.3450	107	No
13C-PFUNA 1	9.86 (9.85)	N_mefosa_d3	639196	446372	5.00	5.2330	105	No
18O-PFHxS 1	7.71 (7.72)	N_mefosa_d3	639196	1367202	5.00	5.3890	108	No
13C-PFDoA 1	10.20 (10.20)	N_mefosa_d3	639196	28627	5.00	5.2100	104	No
PFTrDA 1	10.50 (10.50)	13c-pfdoda	28627	137758	0.50	0.4340	87	No
6_2-FTS 1	8.31 (8.31)	13C2-6_2-FTS	115091	74957	0.50	0.5250	105	No
8_2-FTS 1	9.42 (9.42)	13C2-6_2-FTS	115091	73205	0.50	0.4900	98	No
13C2-6_2-FTS 1	8.31 (8.31)	N_mefosa_d3	639196	115091	5.00	4.9140	98	No

IRC Summary

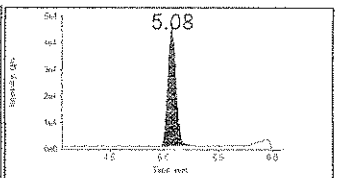
Analyte Peak Name	RT (Expected)	Area	Modified?	Calculated Ion Ratio (Expected Value)
Pfba 2	2.59 (2.58)	291746	No	0.98
Pfpea 2	5.07 (5.07)	247178	No	1.01
Pfbs 2	5.53 (5.52)	226468	No	0.47
Pfhxa 2	6.63 (6.63)	29885	No	0.08
Pfhpa 2	7.63 (7.63)	130701	No	0.42
Pfhxs 2	7.71 (7.72)	137281	No	0.39
Pfoa 2	8.36 (8.36)	216172	No	1.79
Pfna 2	8.95 (8.95)	79563	No	0.32
Pfos 2	8.96 (8.95)	101965	No	0.36
Pfda 2	9.45 (9.44)	47020	No	0.29
Pfuna 2	9.86 (9.85)	49411	No	0.48
Pfds 2	9.84 (9.84)	124395	No	0.36
Pfdoa 2	10.20 (10.20)	52758	No	0.35
Fosa 2	9.95 (9.94)	8539	No	0.03
Pfteda 2	10.80 (10.80)	21226	No	0.38
PFHpS 2	8.40 (8.39)	45191	No	0.39
NMeFOSE 2	10.80 (10.80)	858	No	0.01
NMeFOSA 2	10.80 (10.80)	52738	No	0.97
NEtFOSE 2	11.00 (11.00)	448	No	0.00
NEtFOSA 2	11.00 (11.00)	48908	No	0.68
PFTrDA 2	10.50 (10.50)	47445	No	0.34
6_2-FTS 2	8.31 (8.30)	97579	No	1.30
8_2-FTS 2	9.42 (9.41)	7613	No	0.10



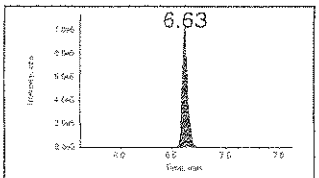
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



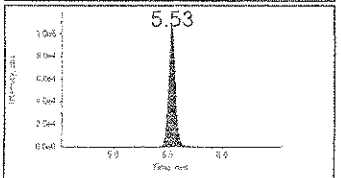
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



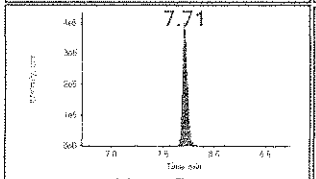
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



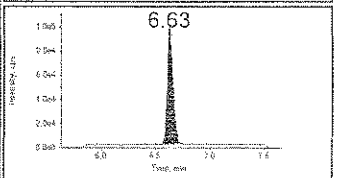
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



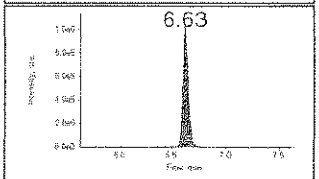
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



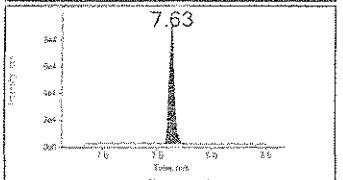
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



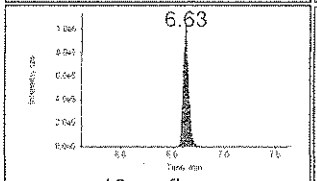
Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak



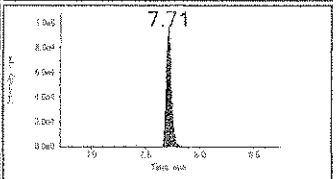
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



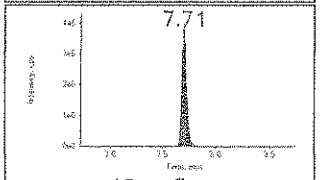
Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



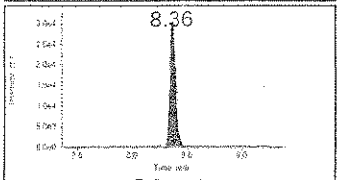
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



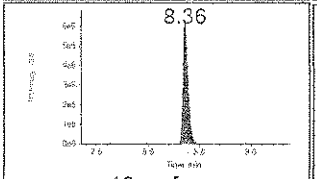
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



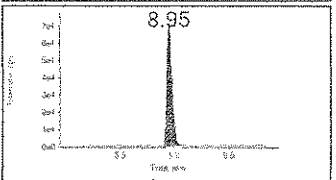
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



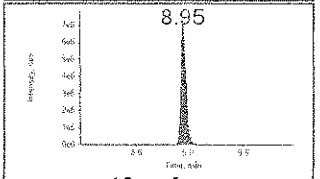
Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



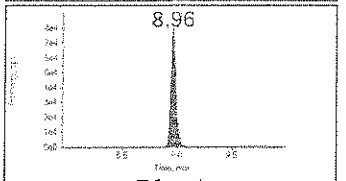
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



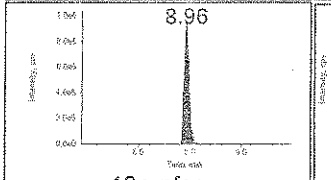
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



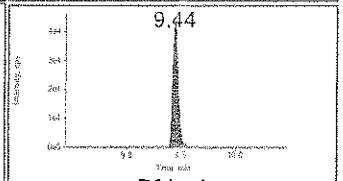
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



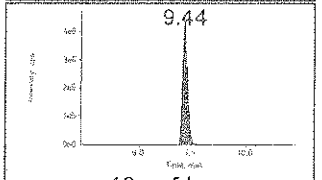
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



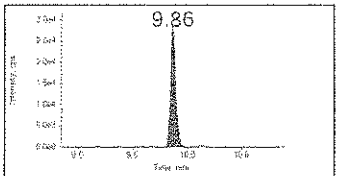
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



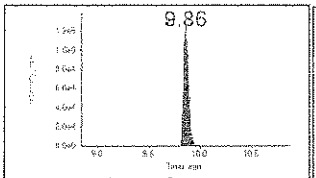
Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



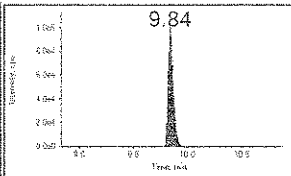
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



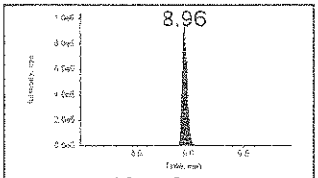
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



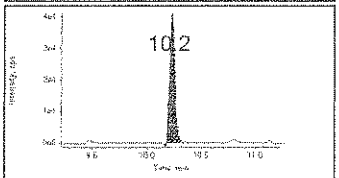
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



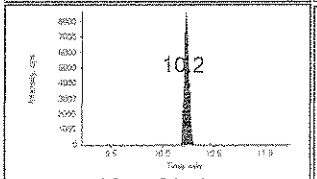
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



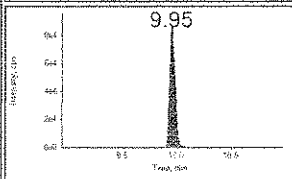
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



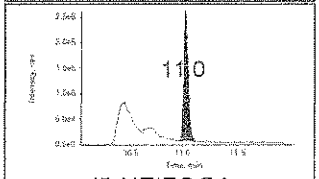
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



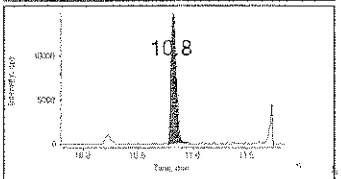
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



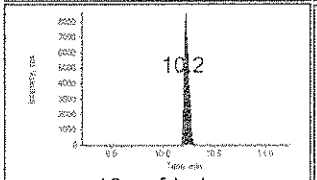
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



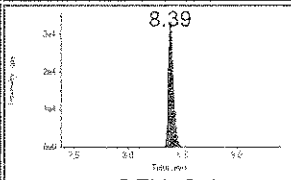
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



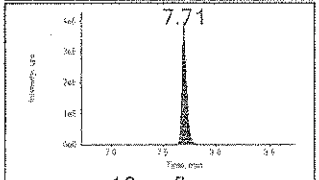
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



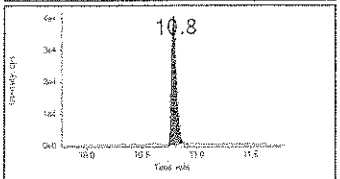
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



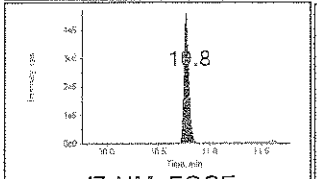
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



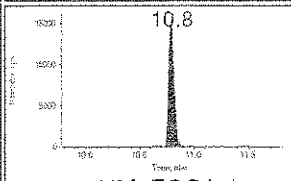
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



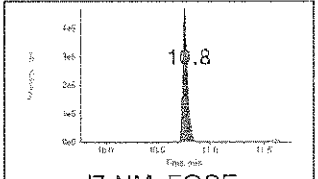
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



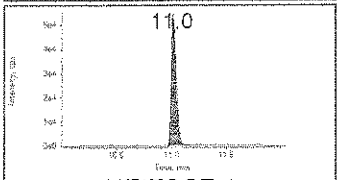
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



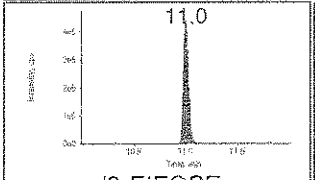
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



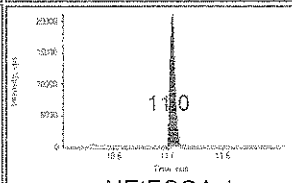
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



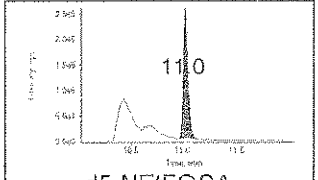
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



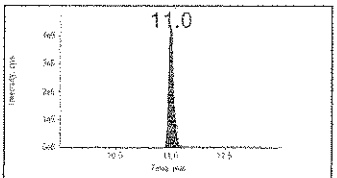
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



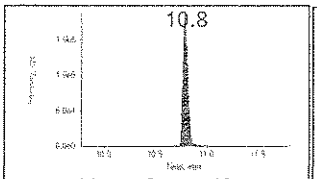
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



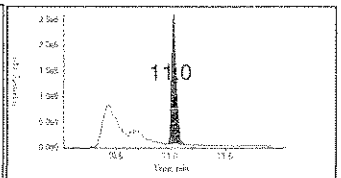
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



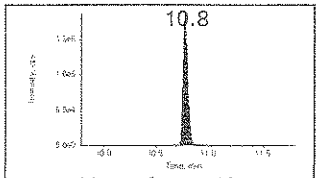
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



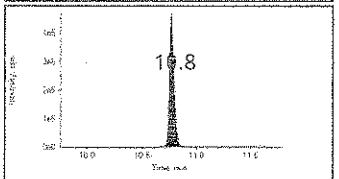
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



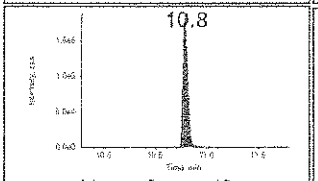
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



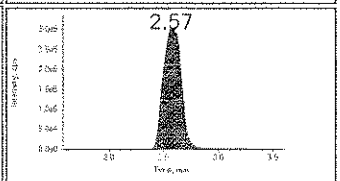
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



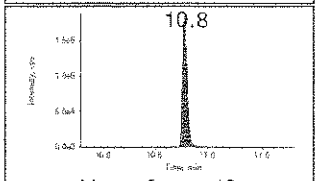
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



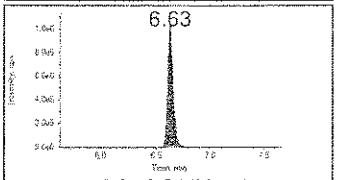
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



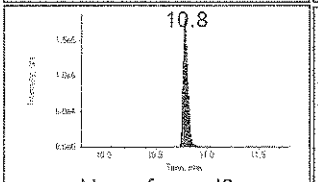
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



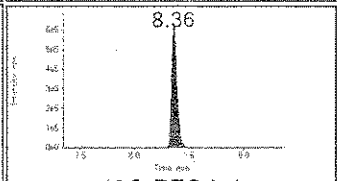
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



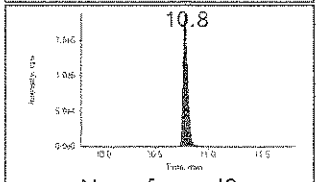
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



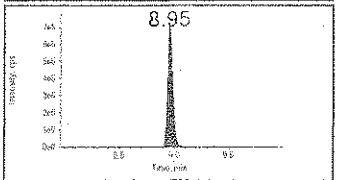
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



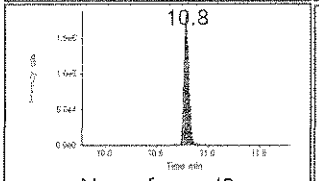
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



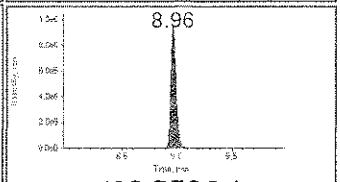
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



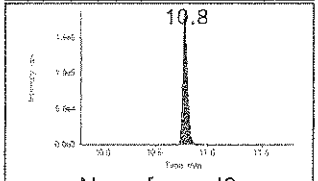
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



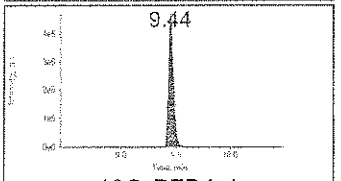
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



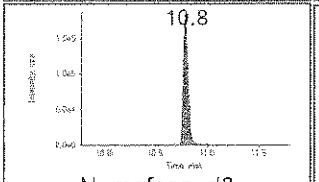
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



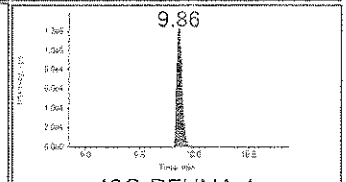
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



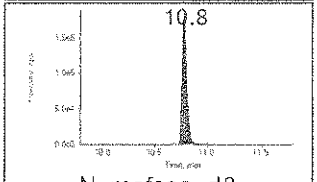
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



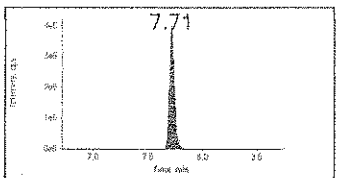
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



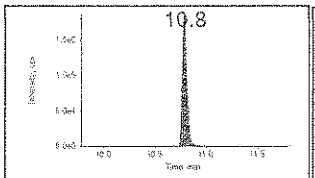
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



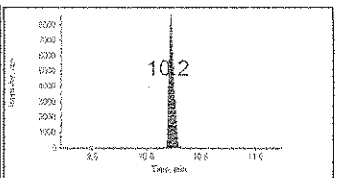
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



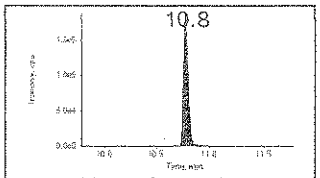
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



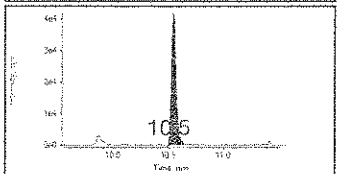
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



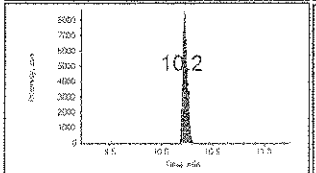
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



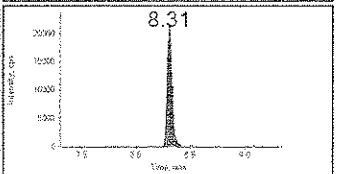
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



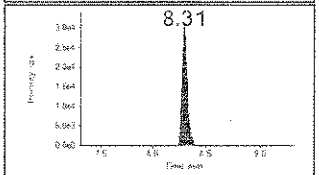
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



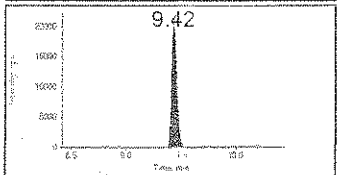
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



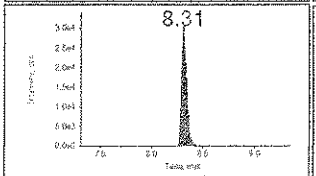
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



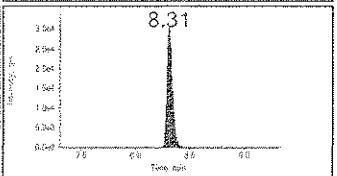
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



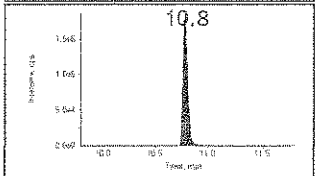
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

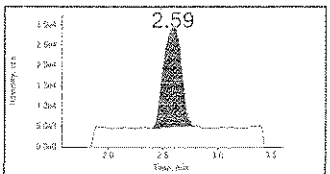


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

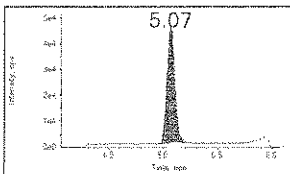


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

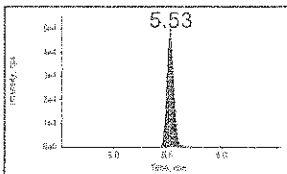
Ion Ratio Confirmation



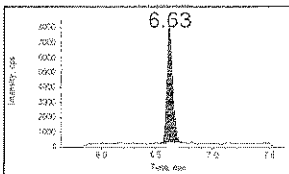
Pfba 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



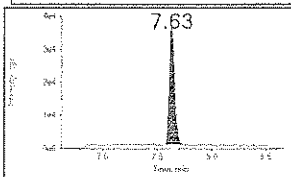
Pfpea 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



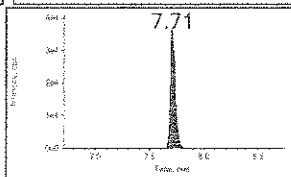
Pfbs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



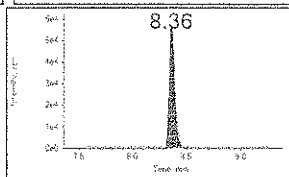
Pfhxa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



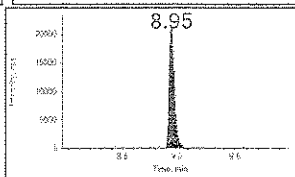
Pfhpa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



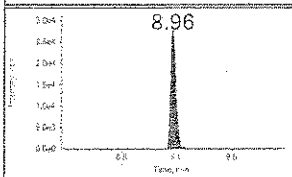
Pfhxs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



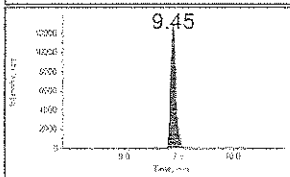
Pfoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



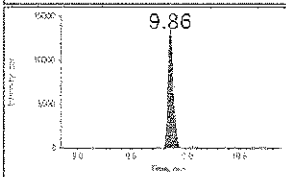
Pfna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



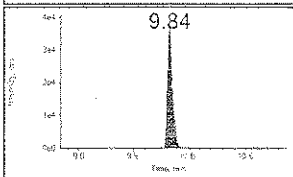
Pfos 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



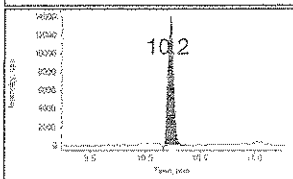
Pfda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



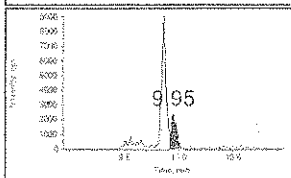
Pfuna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



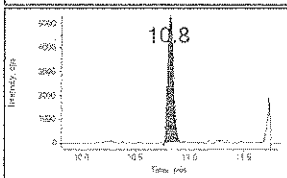
Pfds 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



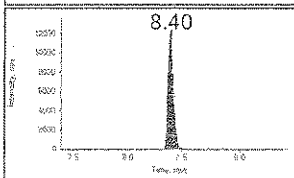
Pfdoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



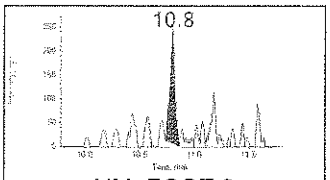
Fosa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



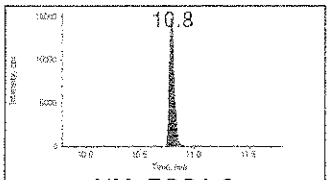
Pfteda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



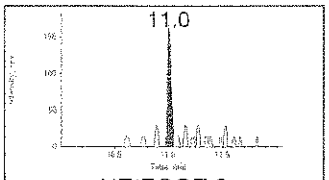
PFHpS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



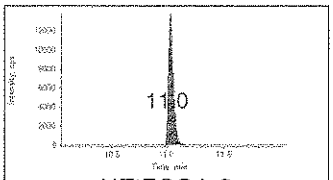
NMeFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



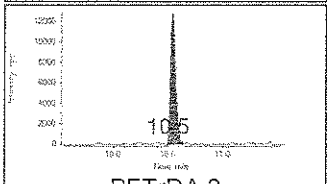
NMeFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



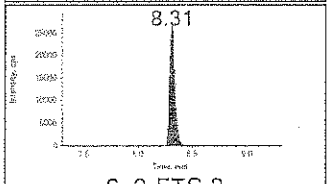
NEtFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



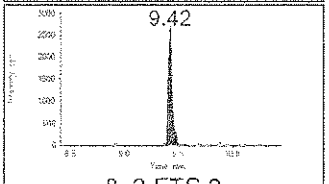
NEtFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak

Project	Ewan's Projects\PFCs	Result Table	033016.rdb
Data File	033016\1013.wiff	Algorithm Used	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	Instrument Name	LCMS02

Sample Name	PFC 1.0ppb	Injection Vial	8
Acquisition Date	3/30/2016 12:58:44 PM	Injection Volume	10
Acquisition Method	PFC_090315 schedule mrm.dam	Sample Type	Standard
Sample ID	15-OLC-02-35F	Dilution Factor	1.00

Results Summary

Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
Pfba 1	2.58 (2.60)	13c_pfba	3714826	661773	1.00	1.1210	112	No
Pfpea 1	5.07 (5.06)	13c_pfhxa	4053332	557244	1.00	1.0830	108	No
Pfbs 1	5.53 (5.53)	18o-pfhs	1363534	1065029	1.00	1.0390	104	No
Pfhxa 1	6.63 (6.63)	13c_pfhxa	4053332	817509	1.00	1.0510	105	No
Pfhpa 1	7.64 (7.64)	13c_pfhxa	4053332	702922	1.00	1.0510	105	No
Pfhxs 1	7.71 (7.72)	18o-pfhs	1363534	775970	1.00	1.0460	105	No
Pfoa 1	8.36 (8.36)	13c-pfoa	2237863	266259	1.00	1.1020	110	No
Pfna 1	8.95 (8.95)	13c-pfna	2683673	540438	1.00	1.0890	109	No
Pfos 1	8.96 (8.96)	13c-pfos	3412200	648615	1.00	1.0770	108	No
Pfda 1	9.44 (9.44)	13c-pfda	1593573	359626	1.00	1.0690	107	No
Pfuna 1	9.86 (9.86)	13c-pfuna	468707	235531	1.00	1.0640	106	No
Pfds 1	9.84 (9.84)	13c-pfos	3412200	787373	1.00	1.0440	104	No
Pfdoa 1	10.20 (10.20)	13c-pfdoda	30809	350178	1.00	1.0100	101	No
Fosa 1	9.95 (9.94)	d5-NEtFOSA	864809	746263	1.00	1.0720	107	No
Pfteda 1	10.80 (10.80)	13c-pfdoda	30809	138152	1.00	0.9790	98	No
PFHpS 1	8.40 (8.39)	18o-pfhs	1363534	255875	1.00	1.0910	109	No
NMeFOSE 1	10.80 (10.80)	d7-NMeFOSE	1617381	329783	1.00	1.0690	107	No

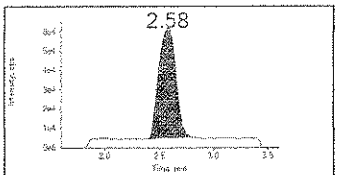
APR 0 1 2016

Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
NMeFOSA 1	10.80 (10.80)	d7-NMeFOSE	1617381	126695	1.00	1.0040	100	No
NEtFOSE 1	11.00 (11.00)	d9-EtFOSE	1644943	410190	1.00	1.0320	103	No
NEtFOSA 1	11.00 (11.00)	d5-NEtFOSA	864809	161873	1.00	1.0290	103	No
d9-EtFOSE 1	11.00 (11.00)	N_mefosa_d3	640888	1644943	5.00	5.1800	104	No
d5-NEtFOSA 1	11.00 (11.00)	N_mefosa_d3	640888	864809	5.00	5.0990	102	No
d7-NMeFOSE 1	10.80 (10.80)	N_mefosa_d3	640888	1617381	5.00	5.3700	107	No
13C_PFBA 1	2.58 (2.58)	N_mefosa_d3	640888	3714826	5.00	5.2280	105	No
13C_PFHXA 1	6.63 (6.63)	N_mefosa_d3	640888	4053332	5.00	5.3140	106	No
13C-PFOA 1	8.36 (8.35)	N_mefosa_d3	640888	2237863	5.00	5.2280	105	No
13C-PFNA 1	8.95 (8.96)	N_mefosa_d3	640888	2683673	5.00	5.4460	109	No
13C-PFOS 1	8.96 (8.95)	N_mefosa_d3	640888	3412200	5.00	5.4790	110	No
13C-PFDA 1	9.44 (9.45)	N_mefosa_d3	640888	1593573	5.00	5.2730	105	No
13C-PFUNA 1	9.85 (9.85)	N_mefosa_d3	640888	468707	5.00	5.4800	110	No
18O-PFHxS 1	7.71 (7.72)	N_mefosa_d3	640888	1363534	5.00	5.3600	107	No
13C-PFDoA 1	10.20 (10.20)	N_mefosa_d3	640888	30809	5.00	5.5930	112	No
PFTrDA 1	10.50 (10.50)	13c-pfdoda	30809	322470	1.00	0.9440	94	No
6_2-FTS 1	8.31 (8.31)	13C2-6_2-FTS	122645	172219	1.00	1.1320	113	No
8_2-FTS 1	9.42 (9.42)	13C2-6_2-FTS	122645	183531	1.00	1.1520	115	No
13C2-6_2-FTS 1	8.31 (8.31)	N_mefosa_d3	640888	122645	5.00	5.2230	104	No

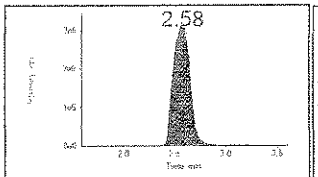
IRC Summary

Analyte Peak Name	RT (Expected)	Area	Modified?	Calculated Ion Ratio (Expected Value)
Pfba 2	2.58 (2.58)	671396	No	1.01
Pfpea 2	5.07 (5.07)	569244	No	1.02
Pfbs 2	5.52 (5.52)	491617	No	0.46
Pfhxa 2	6.63 (6.63)	67342	No	0.08
Pfhpa 2	7.63 (7.63)	305849	No	0.44
Pfhxs 2	7.71 (7.72)	299996	No	0.39
Pfoa 2	8.36 (8.36)	483387	No	1.82
Pfna 2	8.95 (8.95)	174912	No	0.32
Pfos 2	8.96 (8.95)	235270	No	0.36
Pfda 2	9.44 (9.44)	96143	No	0.27
Pfuna 2	9.85 (9.85)	119573	No	0.51
Pfds 2	9.84 (9.84)	270404	No	0.34
Pfdoa 2	10.20 (10.20)	127100	No	0.36
Fosa 2	9.95 (9.94)	18674	No	0.03
Pfteda 2	10.80 (10.80)	51409	No	0.37
PFHpS 2	8.39 (8.39)	104090	No	0.41
NMeFOSE 2	10.80 (10.80)	1202	No	0.00
NMeFOSA 2	10.80 (10.80)	117351	No	0.93
NEtFOSE 2	11.00 (11.00)	1207	No	0.00
NEtFOSA 2	11.00 (11.00)	117556	No	0.73
PFTrDA 2	10.50 (10.50)	104933	No	0.33
6_2-FTS 2	8.31 (8.30)	222406	No	1.29
8_2-FTS 2	9.41 (9.41)	18096	No	0.10

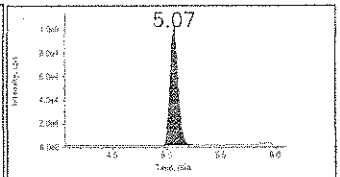
Quantitative Peak Review PFC 1.0ppb 15-OLC-02-35F



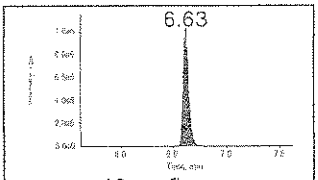
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



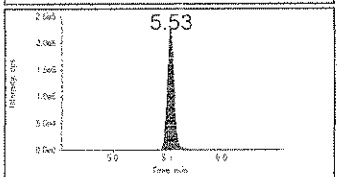
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



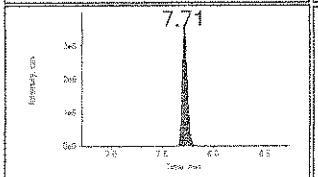
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



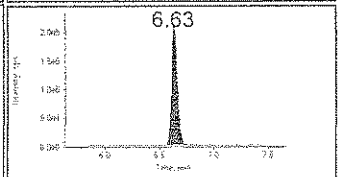
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



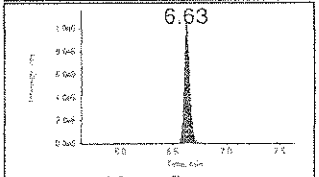
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



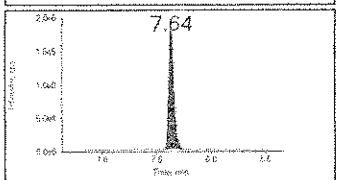
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



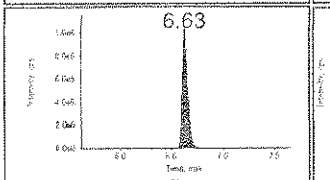
Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak



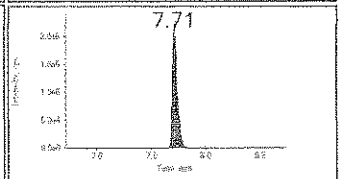
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



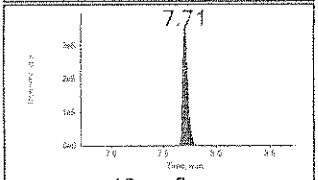
Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



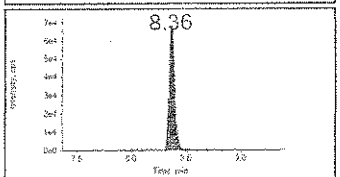
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



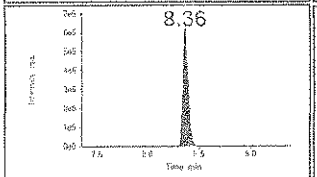
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



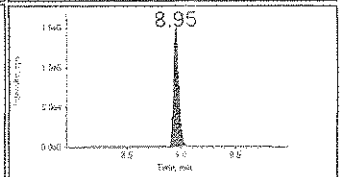
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



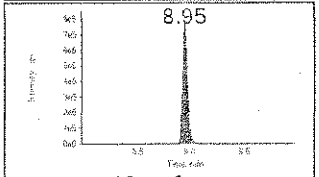
Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



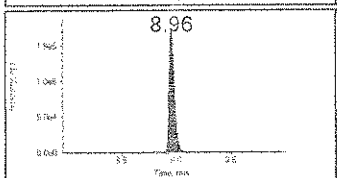
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



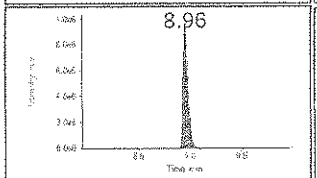
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



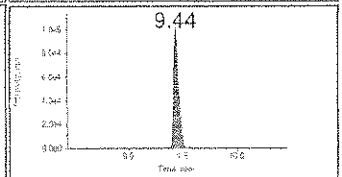
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



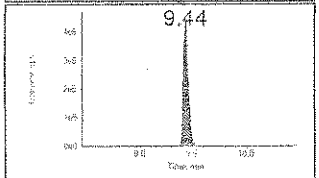
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



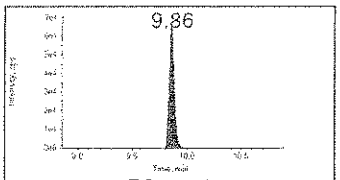
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



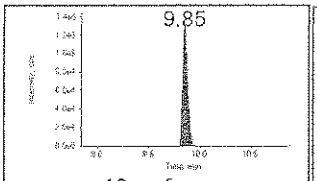
Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



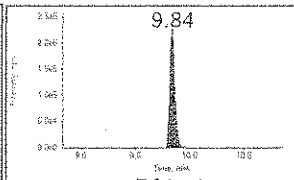
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



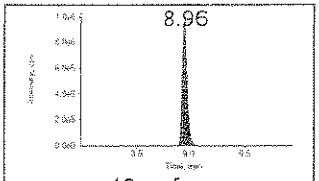
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



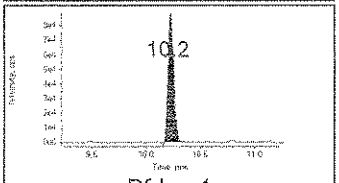
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



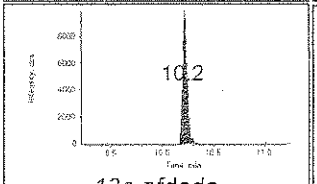
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



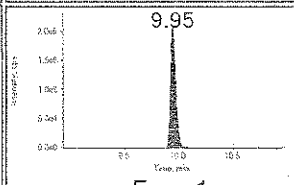
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



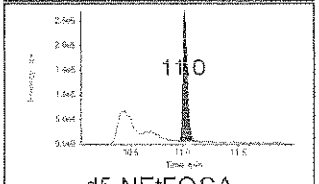
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



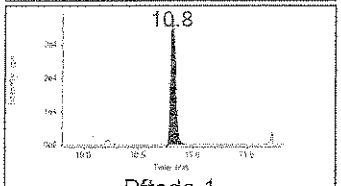
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



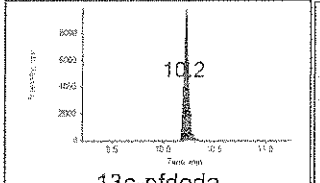
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



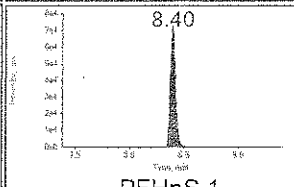
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



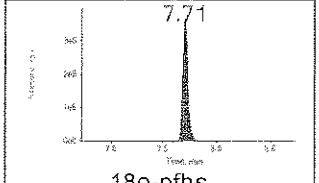
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



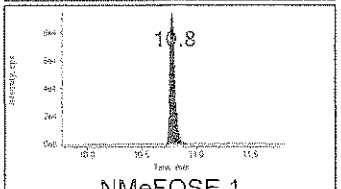
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



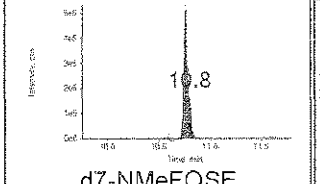
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



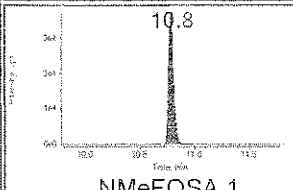
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



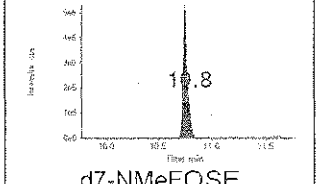
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



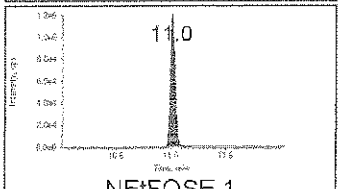
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



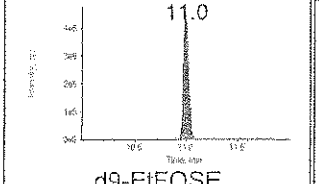
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



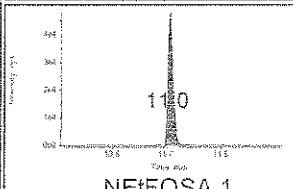
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



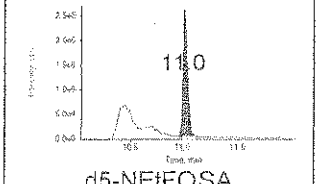
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



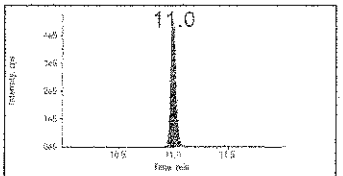
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



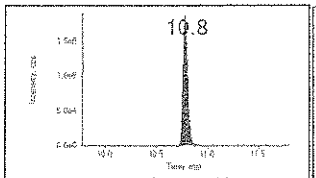
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



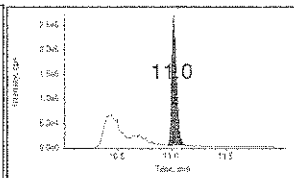
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



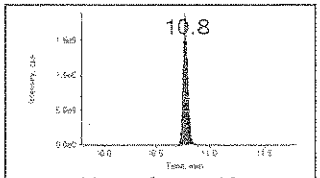
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



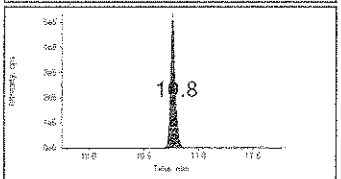
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



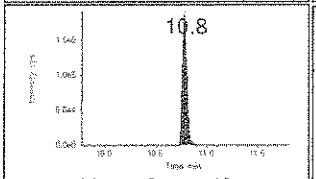
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



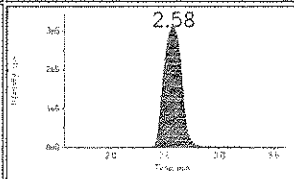
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



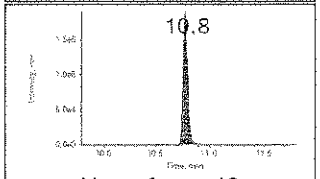
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



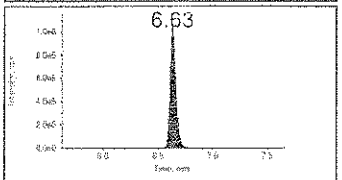
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



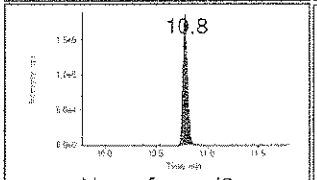
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



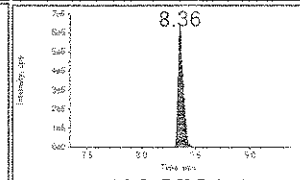
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



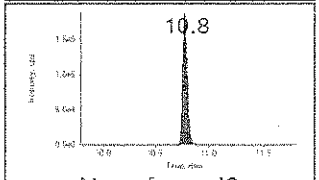
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



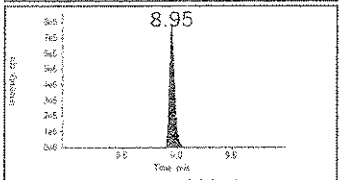
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



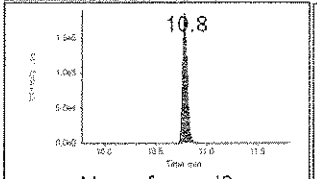
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



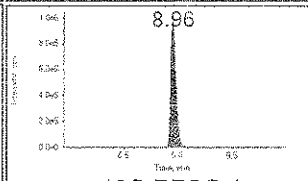
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



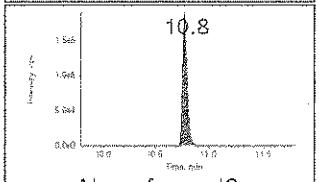
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



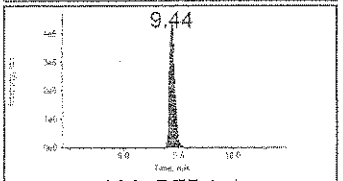
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



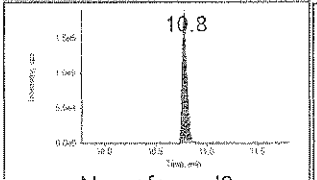
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



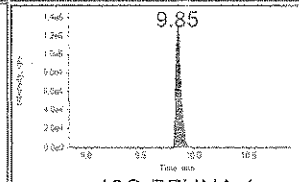
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



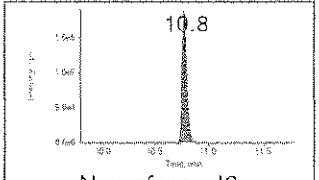
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



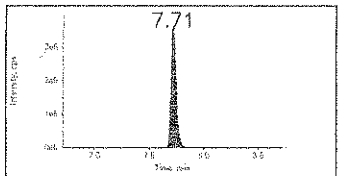
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



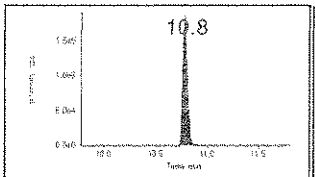
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



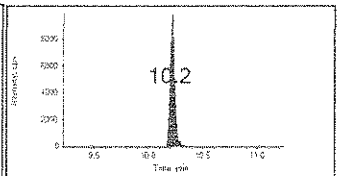
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



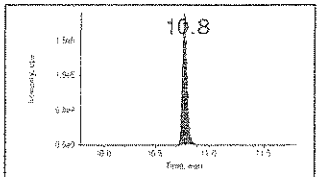
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



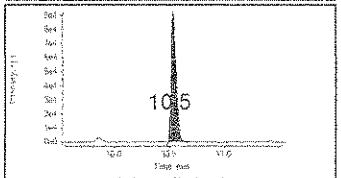
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



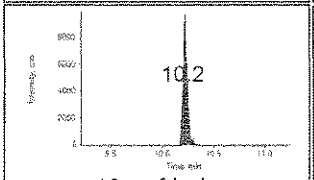
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



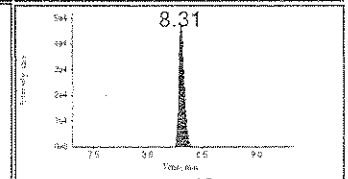
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



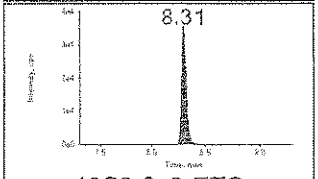
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



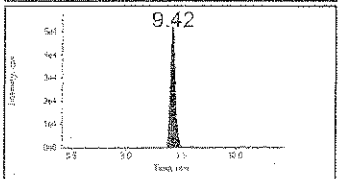
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



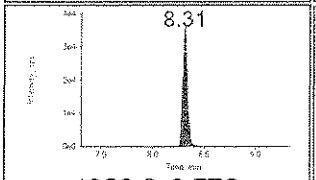
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



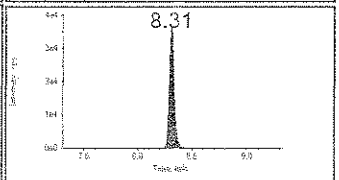
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



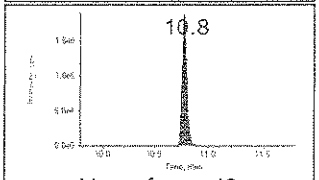
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

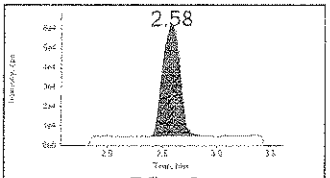


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

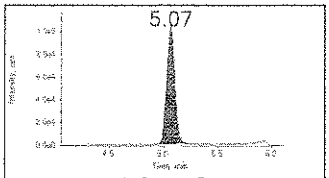


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

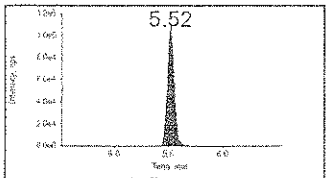
Ion Ratio Confirmation



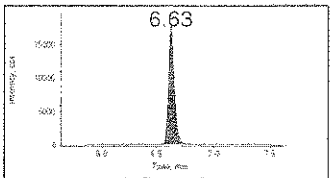
Pfba 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



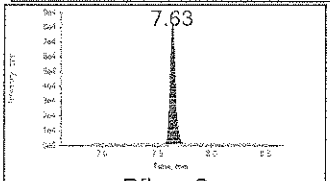
Pfpea 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



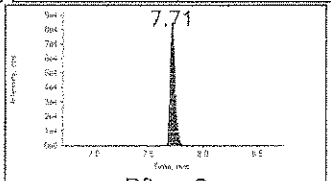
Pfbs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



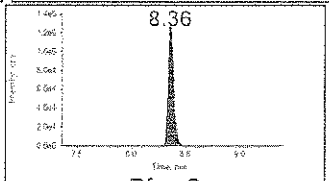
Pfhxa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



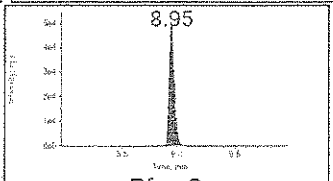
Pfhpa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



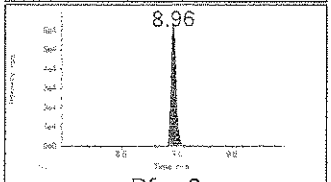
Pfhxs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



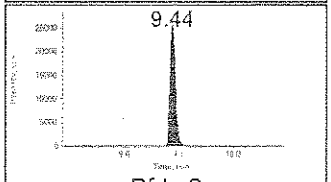
Pfoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



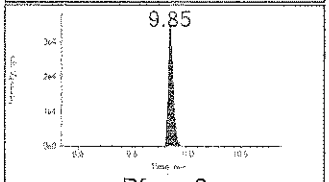
Pfna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



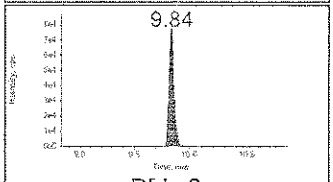
Pfos 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



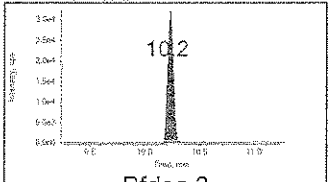
Pfda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



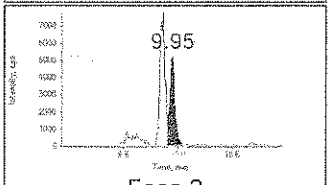
Pfuna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



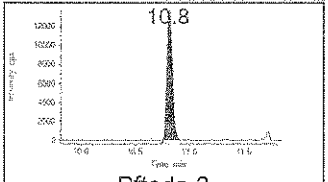
Pfds 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



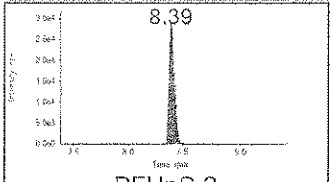
Pfdoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



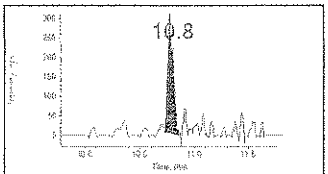
Fosa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



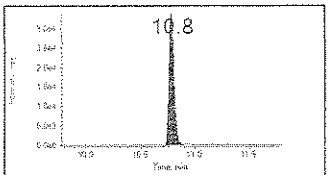
Pfteda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



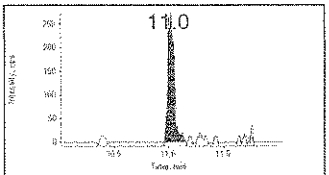
PFHpS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



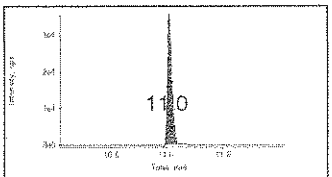
NMeFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



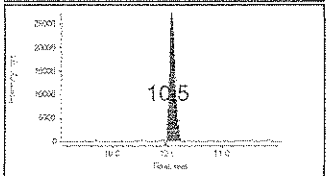
NMeFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



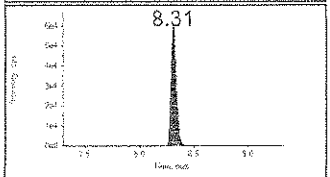
NEtFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



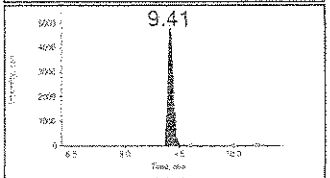
NEtFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak

Project	Ewan's Projects\PFCs	Result Table	033016.rdb
Data File	033016\1014.wiff	Algorithm Used	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	Instrument Name	LCMS02

Sample Name	PFC 5.0ppb	Injection Vial	9
Acquisition Date	3/30/2016 1:18:04 PM	Injection Volume	10
Acquisition Method	PFC_090315 schedule mrm.dam	Sample Type	Standard
Sample ID	15-OLC-02-35G	Dilution Factor	1.00

Results Summary

Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
Pfba 1	2.59 (2.60)	13c_pfba	3658458	2944428	5.00	5.0660	101	No
Pfpea 1	5.07 (5.06)	13c_pfhxa	3955927	2443960	5.00	4.8680	97	No
Pfbs 1	5.52 (5.53)	18o-pfhs	1334916	4745365	5.00	4.7290	95	No
Pfhxa 1	6.62 (6.63)	13c_pfhxa	3955927	3458061	5.00	4.5550	91	No
Pfhpa 1	7.62 (7.64)	13c_pfhxa	3955927	3104893	5.00	4.7560	95	No
Pfhxs 1	7.70 (7.72)	18o-pfhs	1334916	3324664	5.00	4.5800	92	No
Pfoa 1	8.36 (8.36)	13c-pfoa	2210216	1137097	5.00	4.7650	95	No
Pfna 1	8.94 (8.95)	13c-pfna	2501998	2237092	5.00	4.8340	97	No
Pfos 1	8.95 (8.96)	13c-pfos	3208439	2795048	5.00	4.9370	99	No
Pfda 1	9.43 (9.44)	13c-pfda	1552686	1540412	5.00	4.6980	94	No
Pfuna 1	9.85 (9.86)	13c-pfuna	421185	932784	5.00	4.6910	94	No
Pfds 1	9.83 (9.84)	13c-pfos	3208439	3321498	5.00	4.6830	94	No
Pfdoa 1	10.20 (10.20)	13c-pfdoda	22428	1515523	5.00	6.0070	120	No
Fosa 1	9.94 (9.94)	d5-NEtFOSA	838847	3216213	5.00	4.7640	95	No
Pfteda 1	10.80 (10.80)	13c-pfdoda	22428	552552	5.00	5.8080	116	No
PFHpS 1	8.39 (8.39)	18o-pfhs	1334916	1103727	5.00	4.8080	96	No
NMeFOSE 1	10.80 (10.80)	d7-NMeFOSE	1433448	1491581	5.00	5.4550	109	No

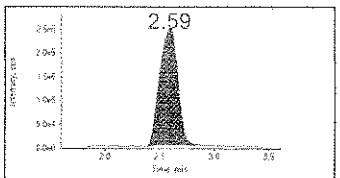
APR 01 2016

Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
NMeFOSA 1	10.80 (10.80)	d7-NMeFOSE	1433448	547594	5.00	4.8940	98	No
NEtFOSE 1	11.00 (11.00)	d9-EtFOSE	1559607	2040948	5.00	5.4150	108	No
NEtFOSA 1	11.00 (11.00)	d5-NEtFOSA	838847	729646	5.00	4.7840	96	No
d9-EtFOSE 1	11.00 (11.00)	N_mefosa_d3	598124	1559607	5.00	5.2620	105	No
d5-NEtFOSA 1	11.00 (11.00)	N_mefosa_d3	598124	838847	5.00	5.3000	106	No
d7-NMeFOSE 1	10.80 (10.80)	N_mefosa_d3	598124	1433448	5.00	5.0990	102	No
13C_PFBA 1	2.58 (2.58)	N_mefosa_d3	598124	3658458	5.00	5.5160	110	No
13C_PFHXA 1	6.62 (6.63)	N_mefosa_d3	598124	3955927	5.00	5.5570	111	No
13C-PFOA 1	8.35 (8.35)	N_mefosa_d3	598124	2210216	5.00	5.5330	111	No
13C-PFNA 1	8.94 (8.96)	N_mefosa_d3	598124	2501998	5.00	5.4400	109	No
13C-PFOS 1	8.95 (8.95)	N_mefosa_d3	598124	3208439	5.00	5.5200	110	No
13C-PFDA 1	9.43 (9.45)	N_mefosa_d3	598124	1552686	5.00	5.5050	110	No
13C-PFUNA 1	9.85 (9.85)	N_mefosa_d3	598124	421185	5.00	5.2770	106	No
18O-PFHxS 1	7.70 (7.72)	N_mefosa_d3	598124	1334916	5.00	5.6230	112	No
13C-PFDoA 1	10.20 (10.20)	N_mefosa_d3	598124	22428	5.00	4.3620	87	No
PFTrDA 1	10.50 (10.50)	13c-pfdoda	22428	1358430	5.00	5.4610	109	No
6_2-FTS 1	8.30 (8.31)	13C2-6_2-FTS	121032	703955	5.00	4.6880	94	No
8_2-FTS 1	9.41 (9.42)	13C2-6_2-FTS	121032	727708	5.00	4.6270	93	No
13C2-6_2-FTS 1	8.30 (8.31)	N_mefosa_d3	598124	121032	5.00	5.5230	110	No

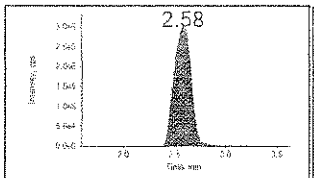
IRC Summary

Analyte Peak Name	RT (Expected)	Area	Modified?	Calculated Ion Ratio (Expected Value)
Pfba 2	2.58 (2.58)	2956187	No	1.00
Pfpea 2	5.07 (5.07)	2472479	No	1.01
Pfbs 2	5.52 (5.52)	2175608	No	0.46
Pfhxa 2	6.62 (6.63)	298331	No	0.09
Pfhpa 2	7.62 (7.63)	1296411	No	0.42
Pfhxs 2	7.70 (7.72)	1314332	No	0.40
Pfoa 2	8.35 (8.36)	2046277	No	1.80
Pfna 2	8.94 (8.95)	718152	No	0.32
Pfos 2	8.95 (8.95)	968175	No	0.35
Pfda 2	9.43 (9.44)	419192	No	0.27
Pfuna 2	9.85 (9.85)	462952	No	0.50
Pfds 2	9.83 (9.84)	1196315	No	0.36
Pfdoa 2	10.20 (10.20)	534834	No	0.35
Fosa 2	9.95 (9.94)	74147	No	0.02
Pfteda 2	10.80 (10.80)	235871	No	0.43
PFHpS 2	8.39 (8.39)	449003	No	0.41
NMeFOSE 2	10.80 (10.80)	6776	No	0.00
NMeFOSA 2	10.80 (10.80)	531663	No	0.97
NEtFOSE 2	11.00 (11.00)	5667	No	0.00
NEtFOSA 2	11.00 (11.00)	516268	No	0.71
PFTrDA 2	10.50 (10.50)	461724	No	0.34
6_2-FTS 2	8.30 (8.30)	959615	No	1.36
8_2-FTS 2	9.41 (9.41)	73563	No	0.10

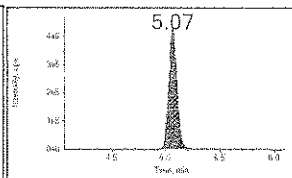
Quantitative Peak Review PFC 5.0ppb 15-OLC-02-35G



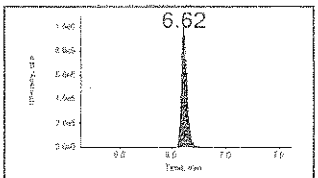
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



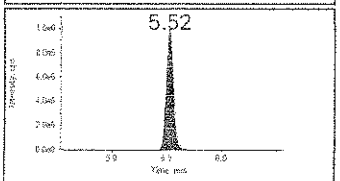
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



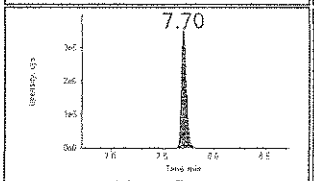
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



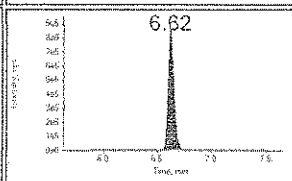
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



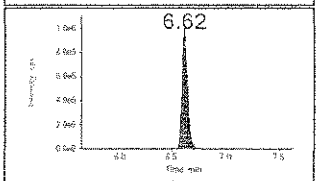
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



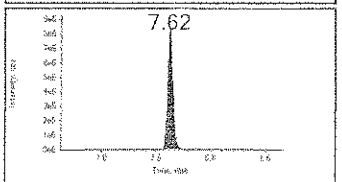
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



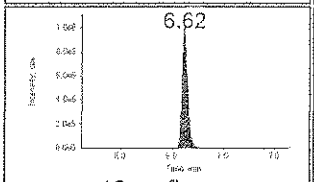
Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak



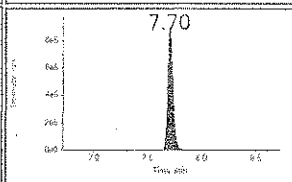
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



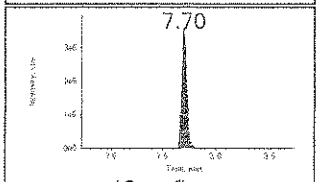
Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



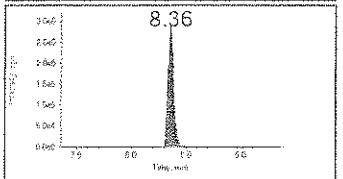
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



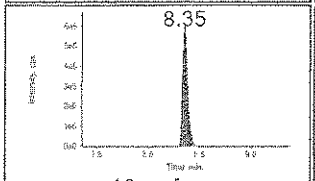
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



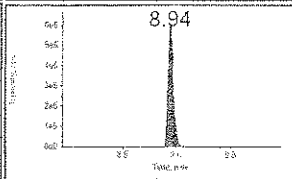
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



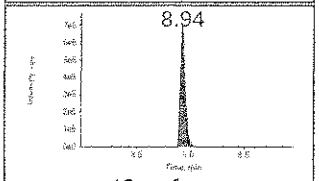
Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



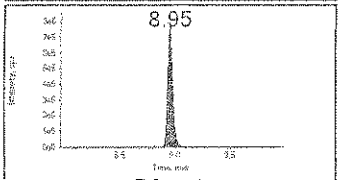
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



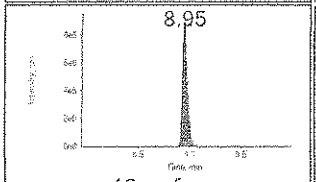
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



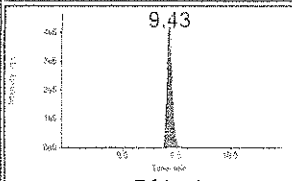
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



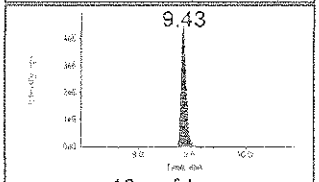
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



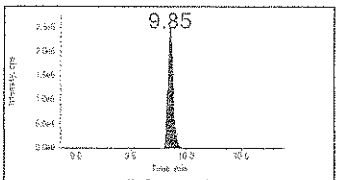
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



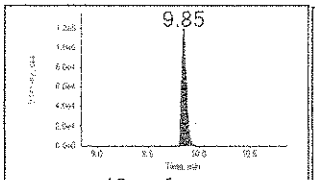
Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



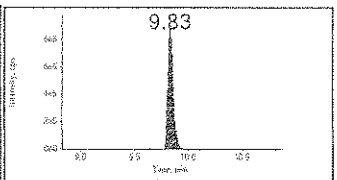
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



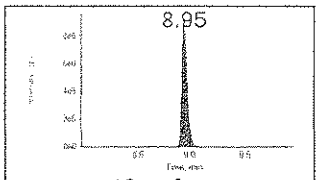
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



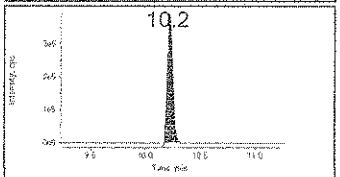
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



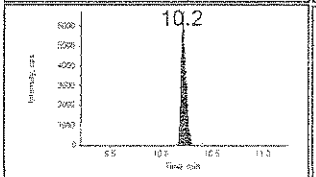
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



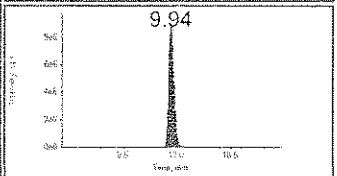
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



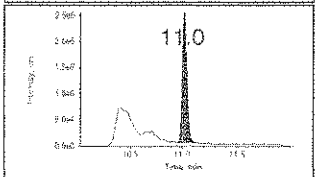
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



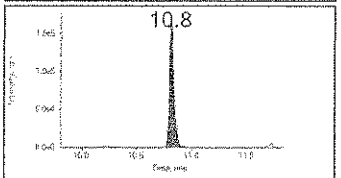
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



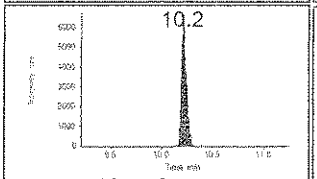
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



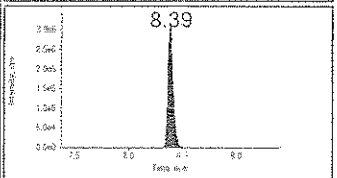
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



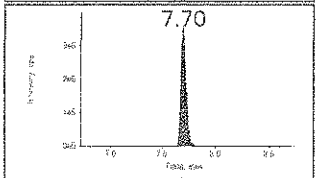
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



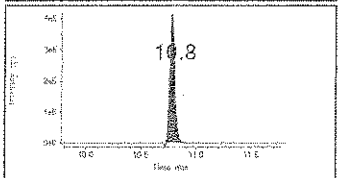
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



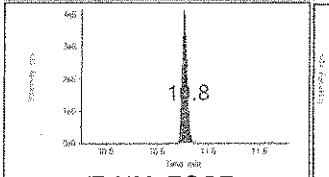
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



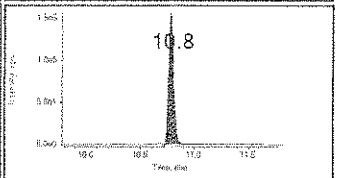
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



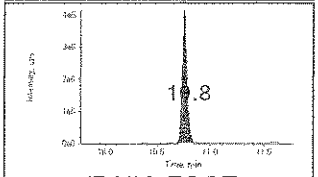
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



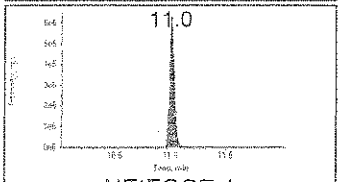
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



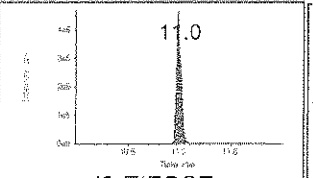
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



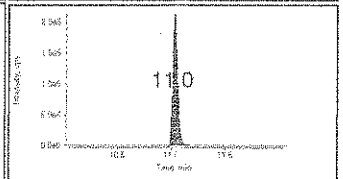
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



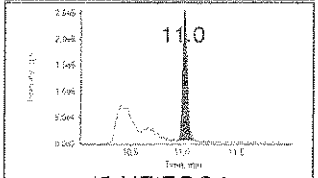
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



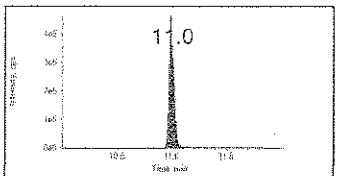
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



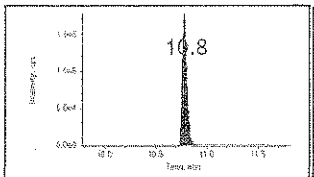
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



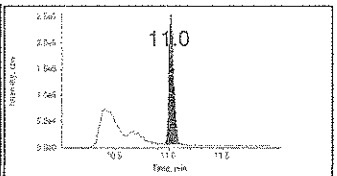
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



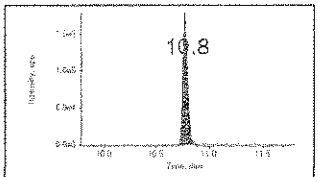
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



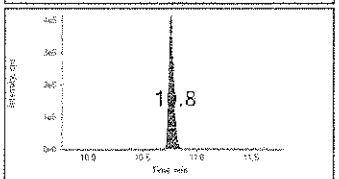
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



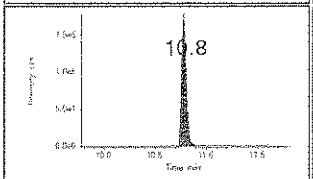
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



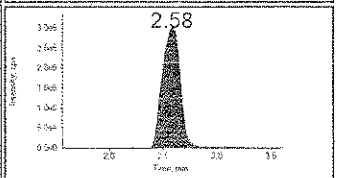
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



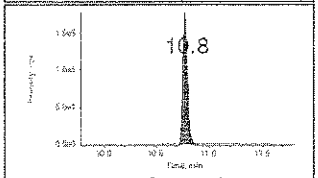
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



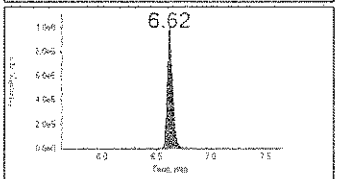
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



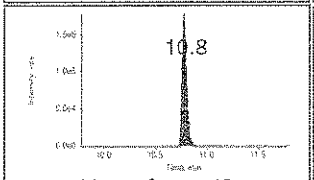
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



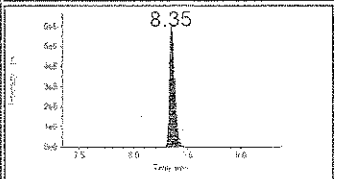
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



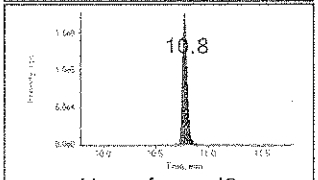
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



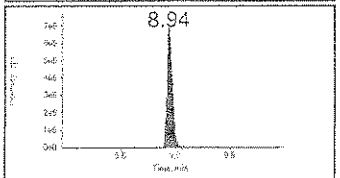
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



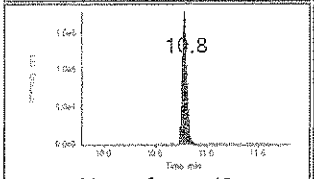
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



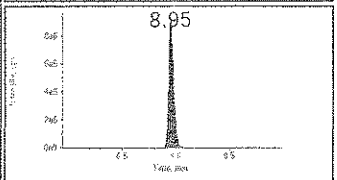
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



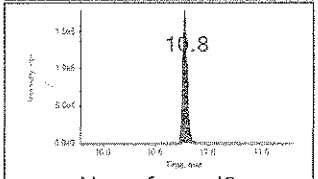
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



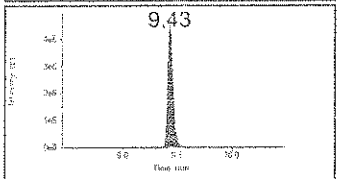
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



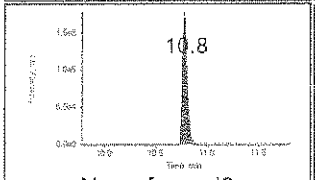
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



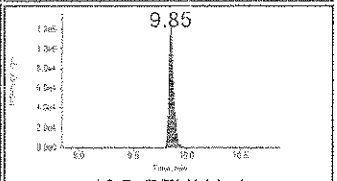
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



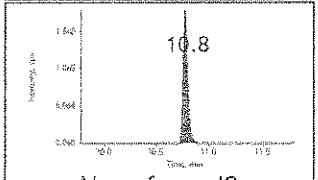
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



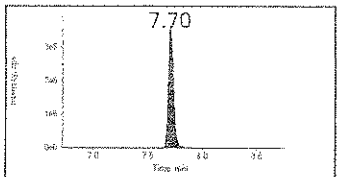
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



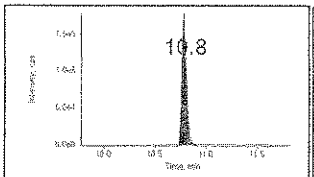
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



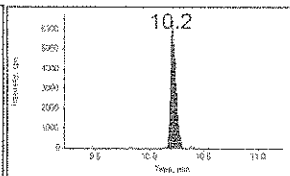
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



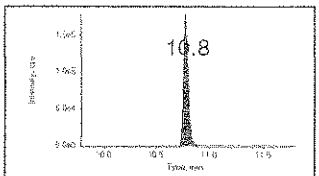
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



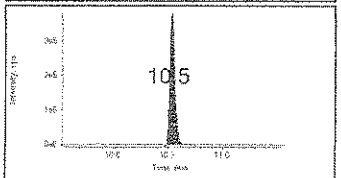
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



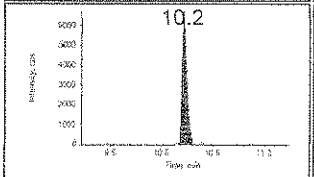
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



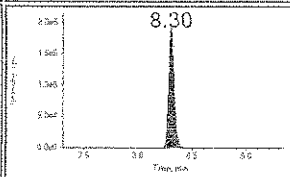
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



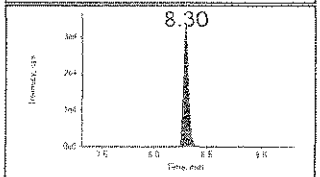
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



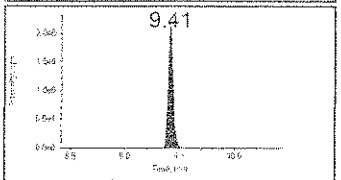
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



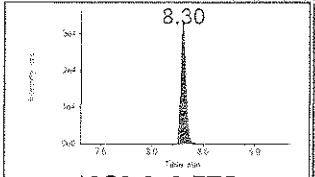
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



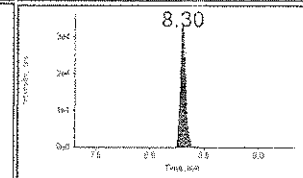
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



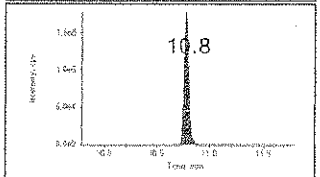
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

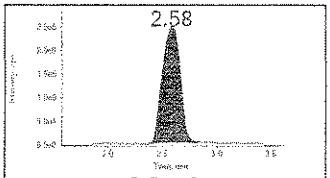


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

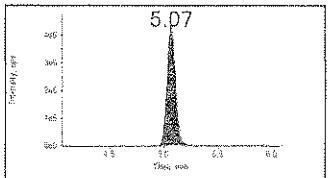


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

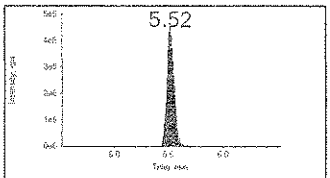
Ion Ratio Confirmation



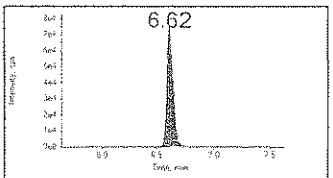
Pfba 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



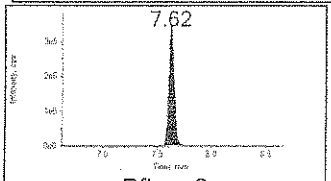
Pfpea 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



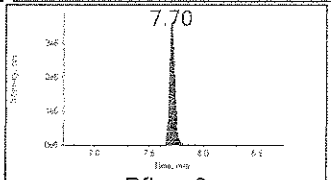
Pfbs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



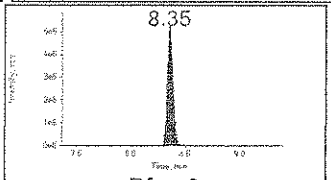
Pfhxa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



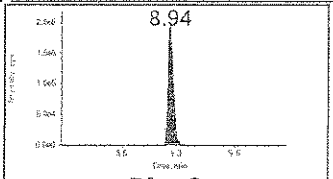
Pfhpa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



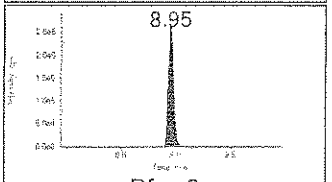
Pfhxs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



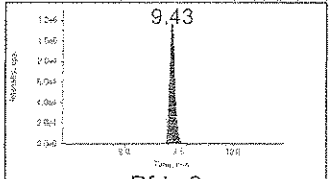
Pfoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



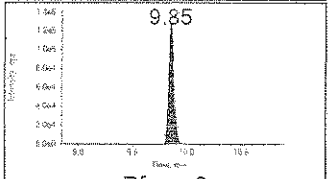
Pfna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



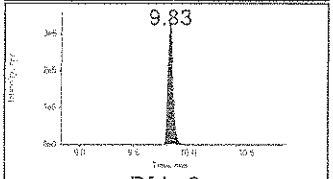
Pfos 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



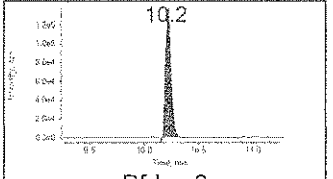
Pfda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



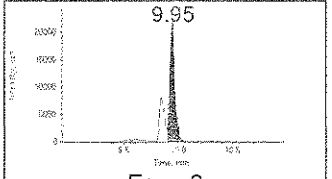
Pfuna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



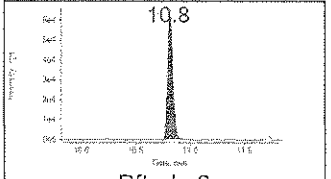
Pfds 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



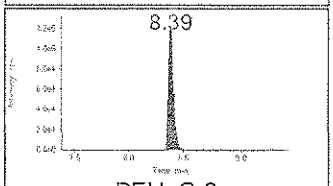
Pfdoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



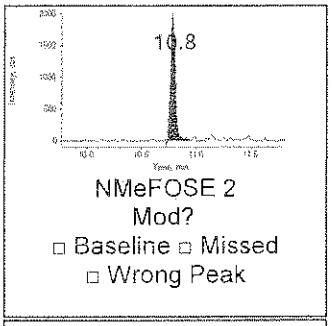
Fosa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



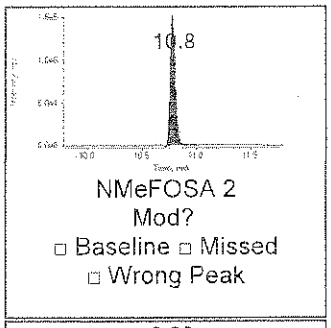
Pfteda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



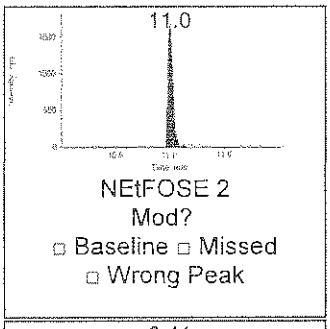
PFHpS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



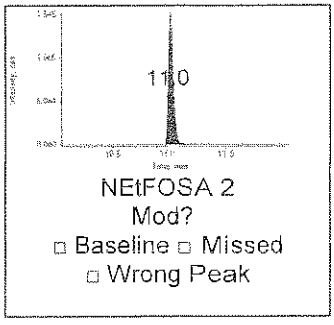
NMeFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



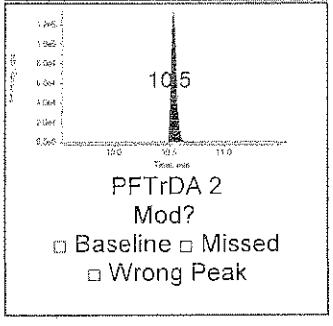
NMeFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



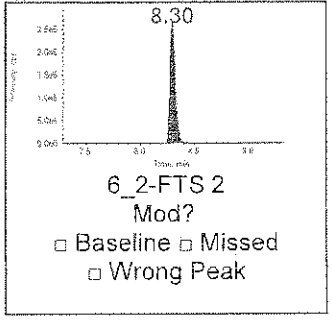
NEtFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



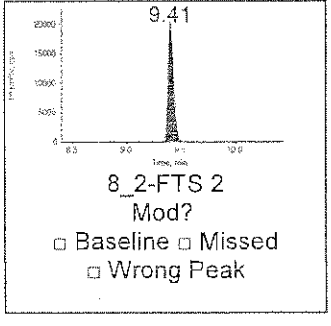
NEtFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak

Project	Ewan's Projects\PFCs	Result Table	033016.rdb
Data File	033016\1015.wiff	Algorithm Used	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	Instrument Name	LCMS02

Sample Name	PFC 10ppb	Injection Vial	10
Acquisition Date	3/30/2016 1:37:21 PM	Injection Volume	10
Acquisition Method	PFC_090315 schedule mrm.dam	Sample Type	Standard
Sample ID	15-OLC-02-35H	Dilution Factor	1.00

Results Summary

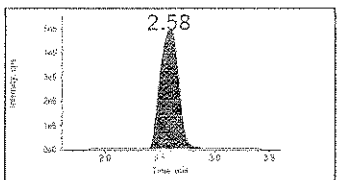
Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
Pfba 1	2.58 (2.60)	13c_pfba	3520569	5903550	10.00	10.5550	106	No
Pfpea 1	5.07 (5.06)	13c_pfhxa	3757293	4759492	10.00	9.9810	100	No
Pfbs 1	5.52 (5.53)	18o-pfhs	1260875	9098084	10.00	9.5980	96	No
Pfhxa 1	6.62 (6.63)	13c_pfhxa	3757293	6725879	10.00	9.3270	93	No
Pfhpa 1	7.63 (7.64)	13c_pfhxa	3757293	5933318	10.00	9.5690	96	No
Pfhxs 1	7.71 (7.72)	18o-pfhs	1260875	6395282	10.00	9.3270	93	No
Pfoa 1	8.36 (8.36)	13c-pfoa	2162717	2214892	10.00	9.4850	95	No
Pfna 1	8.95 (8.95)	13c-pfna	2441822	4240284	10.00	9.3880	94	No
Pfos 1	8.95 (8.96)	13c-pfos	3003032	5279275	10.00	9.9630	100	No
Pfda 1	9.44 (9.44)	13c-pfda	1421843	2891139	10.00	9.6280	96	No
Pfuna 1	9.86 (9.86)	13c-pfuna	409432	1757828	10.00	9.0940	91	No
Pfds 1	9.84 (9.84)	13c-pfos	3003032	6425104	10.00	9.6780	97	No
Pfdoa 1	10.20 (10.20)	13c-pfdoda	28018	2636938	10.00	8.3670	84	No
Fosa 1	9.95 (9.94)	d5-NEtFOSA	819419	6346074	10.00	9.6240	96	No
Pfteda 1	10.80 (10.80)	13c-pfdoda	28018	994458	10.00	8.8570	89	No
PFHpS 1	8.39 (8.39)	18o-pfhs	1260875	2099079	10.00	9.6810	97	No
NMeFOSE 1	10.80 (10.80)	d7-NMeFOSE	1382760	2936952	10.00	11.1340	111	No

APR 01 2016

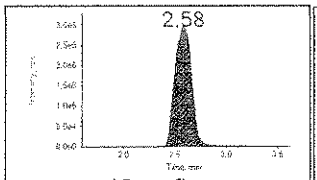
Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
NMeFOSA 1	10.80 (10.80)	d7-NMeFOSE	1382760	1089546	10.00	10.0950	101	No
NEtFOSE 1	11.00 (11.00)	d9-EtFOSE	1570669	3445013	10.00	9.0760	91	No
NEtFOSA 1	11.00 (11.00)	d5-NEtFOSA	819419	1482640	10.00	9.9510	100	No
d9-EtFOSE 1	11.00 (11.00)	N_mefosa_d3	676434	1570669	5.00	4.6860	94	No
d5-NEtFOSA 1	11.00 (11.00)	N_mefosa_d3	676434	819419	5.00	4.5780	92	No
d7-NMeFOSE 1	10.80 (10.80)	N_mefosa_d3	676434	1382760	5.00	4.3500	87	No
13C_PFBA 1	2.58 (2.58)	N_mefosa_d3	676434	3520569	5.00	4.6940	94	No
13C_PFHXA 1	6.62 (6.63)	N_mefosa_d3	676434	3757293	5.00	4.6670	93	No
13C-PFOA 1	8.35 (8.35)	N_mefosa_d3	676434	2162717	5.00	4.7870	96	No
13C-PFNA 1	8.94 (8.96)	N_mefosa_d3	676434	2441822	5.00	4.6950	94	No
13C-PFOS 1	8.95 (8.95)	N_mefosa_d3	676434	3003032	5.00	4.5690	91	No
13C-PFDA 1	9.43 (9.45)	N_mefosa_d3	676434	1421843	5.00	4.4570	89	No
13C-PFUNA 1	9.85 (9.85)	N_mefosa_d3	676434	409432	5.00	4.5360	91	No
18O-PFHxS 1	7.71 (7.72)	N_mefosa_d3	676434	1260875	5.00	4.6960	94	No
13C-PFDoA 1	10.20 (10.20)	N_mefosa_d3	676434	28018	5.00	4.8190	96	No
PFTrDA 1	10.50 (10.50)	13c-pfdoda	28018	2479106	10.00	7.9770	80	No
6_2-FTS 1	8.30 (8.31)	13C2-6_2-FTS	118424	1403597	10.00	9.5540	96	No
8_2-FTS 1	9.42 (9.42)	13C2-6_2-FTS	118424	1445403	10.00	9.3930	94	No
13C2-6_2-FTS 1	8.30 (8.31)	N_mefosa_d3	676434	118424	5.00	4.7780	96	No

IRC Summary

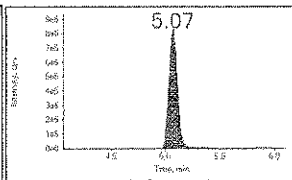
Analyte Peak Name	RT (Expected)	Area	Modified?	Calculated Ion Ratio (Expected Value)
Pfba 2	2.58 (2.58)	5887271	No	1.00
Pfpea 2	5.07 (5.07)	4886935	No	1.03
Pfbs 2	5.52 (5.52)	4256075	No	0.47
Pfhxa 2	6.62 (6.63)	568792	No	0.08
Pfhpa 2	7.63 (7.63)	2544719	No	0.43
Pfhxs 2	7.70 (7.72)	2572927	No	0.40
Pfoa 2	8.36 (8.36)	3964180	No	1.79
Pfna 2	8.95 (8.95)	1468341	No	0.35
Pfos 2	8.95 (8.95)	1893262	No	0.36
Pfda 2	9.44 (9.44)	808612	No	0.28
Pfuna 2	9.85 (9.85)	883492	No	0.50
Pfds 2	9.84 (9.84)	2198400	No	0.34
Pfdoa 2	10.20 (10.20)	1093878	No	0.41
Fosa 2	9.94 (9.94)	156309	No	0.02
Pfteda 2	10.80 (10.80)	451071	No	0.45
PFHpS 2	8.39 (8.39)	882530	No	0.42
NMeFOSE 2	10.80 (10.80)	15217	No	0.01
NMeFOSA 2	10.80 (10.80)	1050369	No	0.96
NEtFOSE 2	11.00 (11.00)	11186	No	0.00
NEtFOSA 2	11.00 (11.00)	1019350	No	0.69
PFTrDA 2	10.50 (10.50)	921981	No	0.37
6_2-FTS 2	8.30 (8.30)	1835447	No	1.31
8_2-FTS 2	9.42 (9.41)	152927	No	0.11



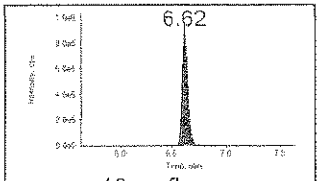
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



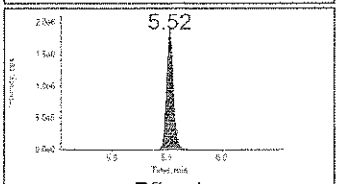
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



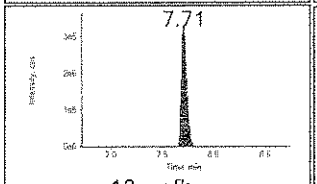
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



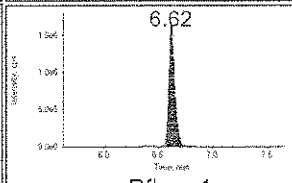
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



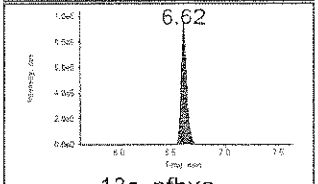
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



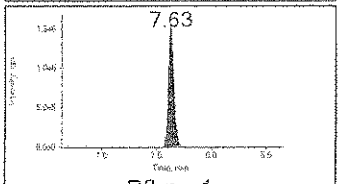
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



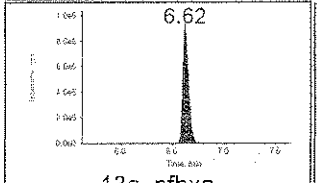
Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak



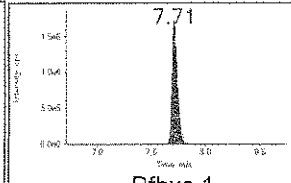
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



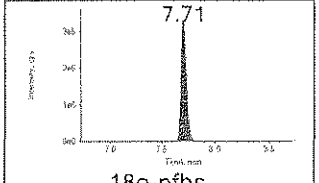
Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



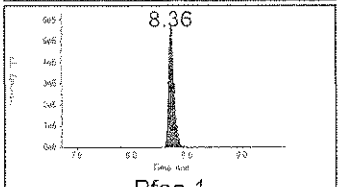
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



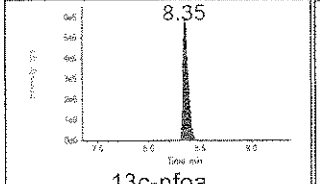
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



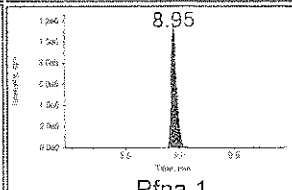
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



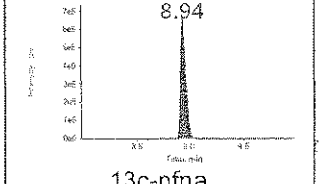
Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



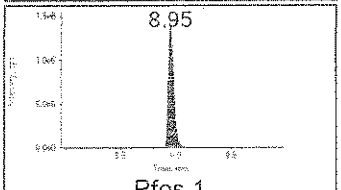
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



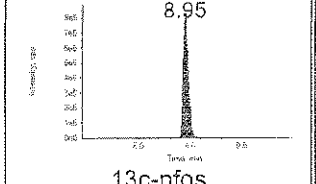
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



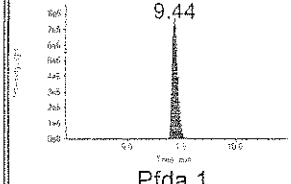
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



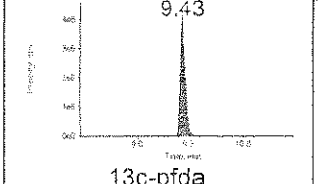
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



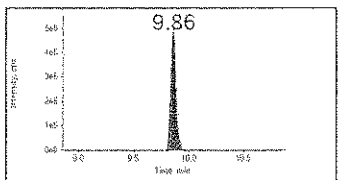
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



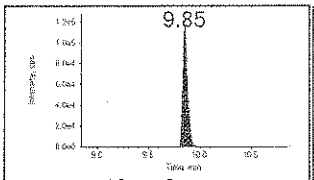
Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



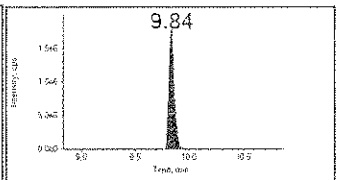
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



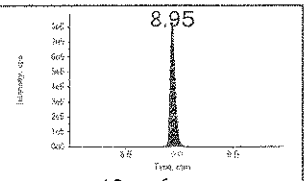
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



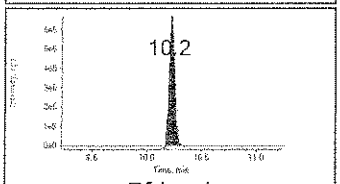
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



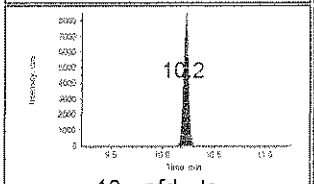
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



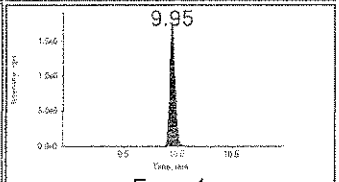
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



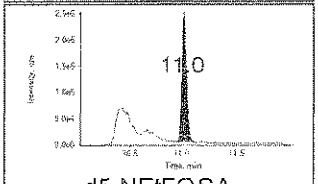
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



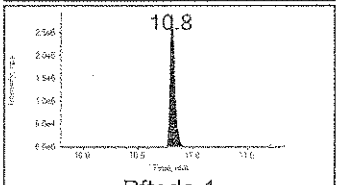
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



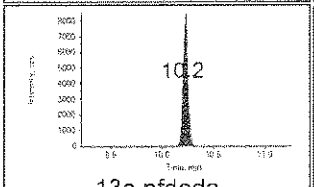
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



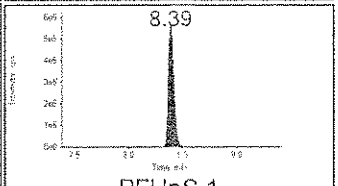
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



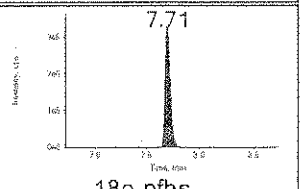
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



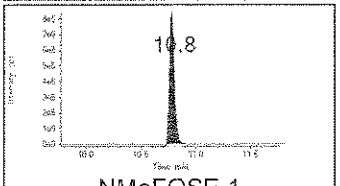
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



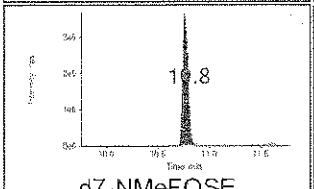
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



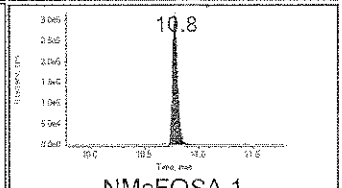
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



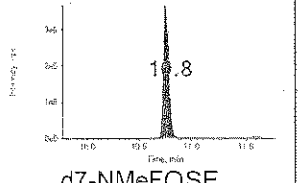
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



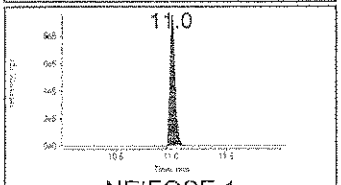
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



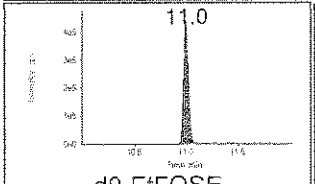
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



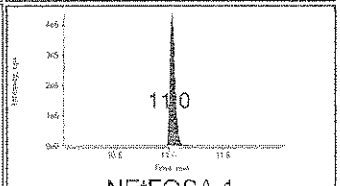
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



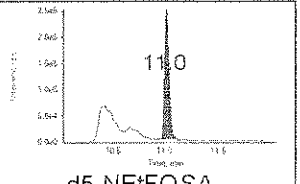
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



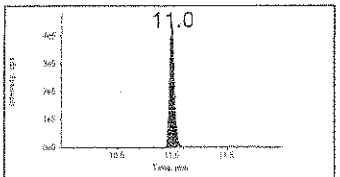
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



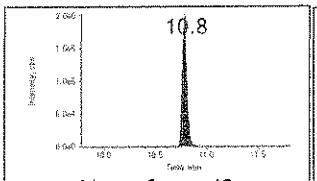
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



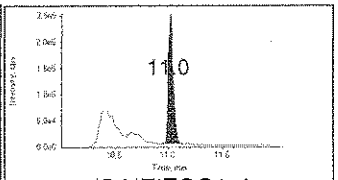
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



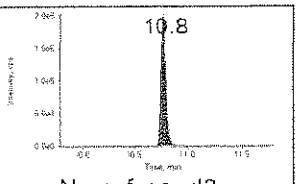
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



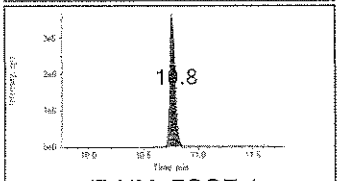
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



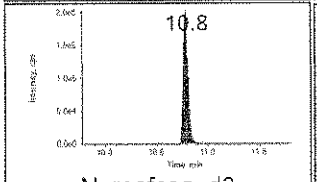
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



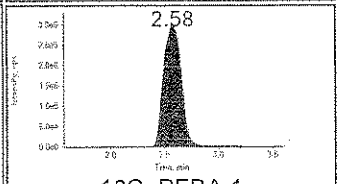
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



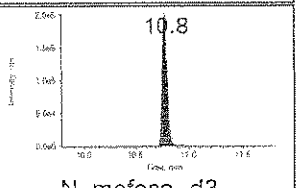
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



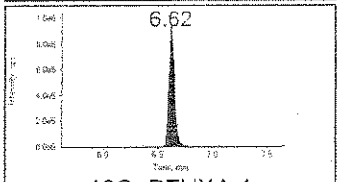
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



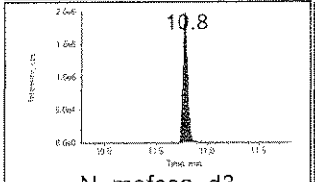
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



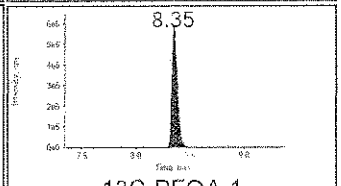
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



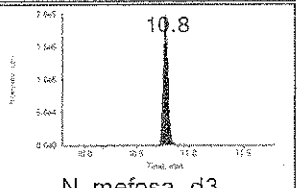
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



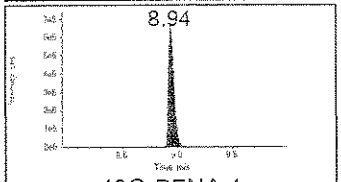
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



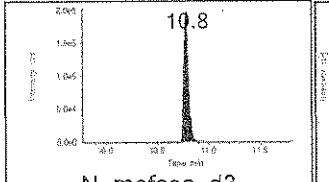
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



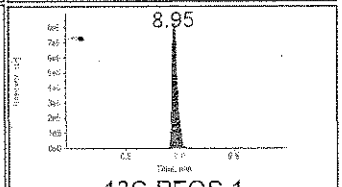
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



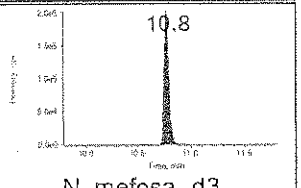
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



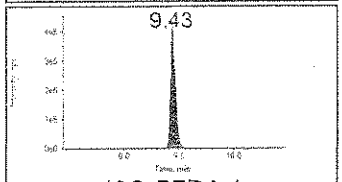
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



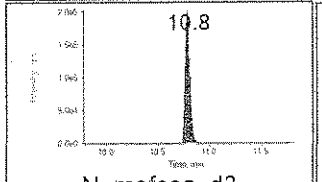
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



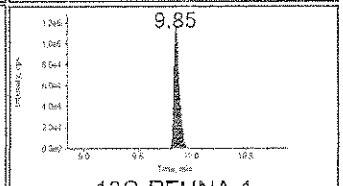
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



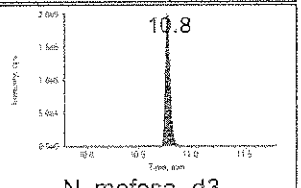
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



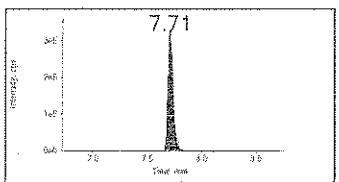
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



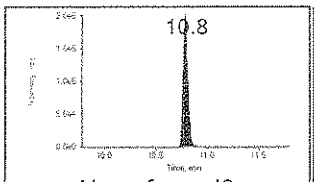
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



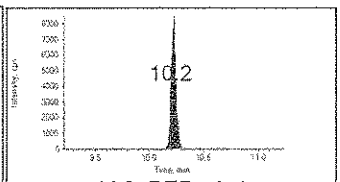
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



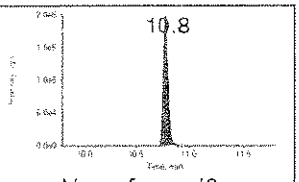
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



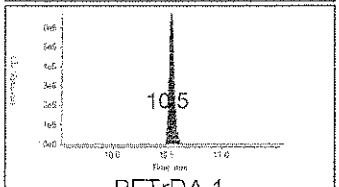
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



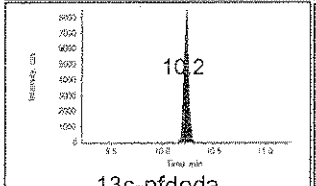
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



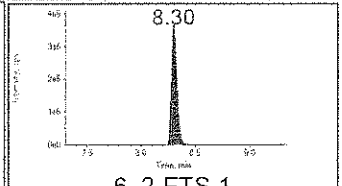
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



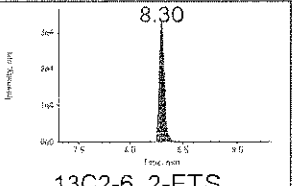
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



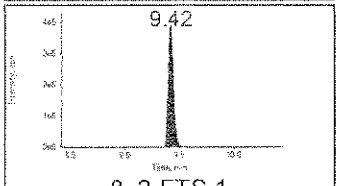
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



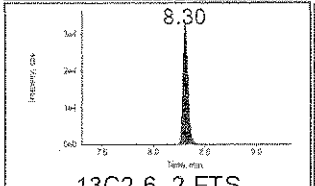
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



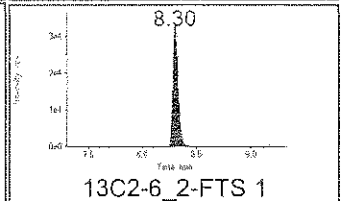
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



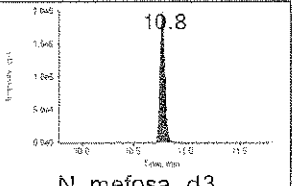
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

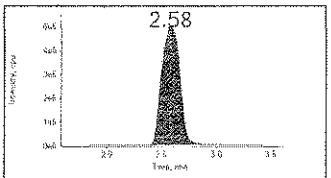


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

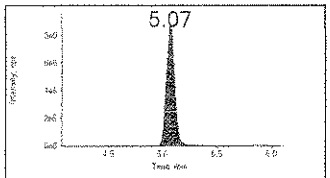


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

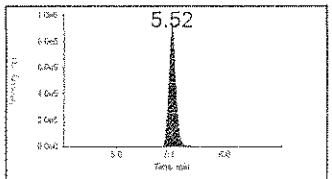
Ion Ratio Confirmation



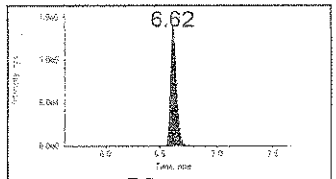
Pfba 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



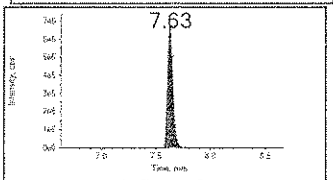
Pfpea 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



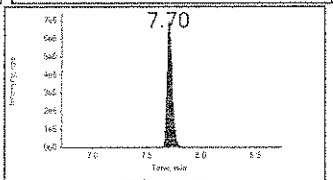
Pfbs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



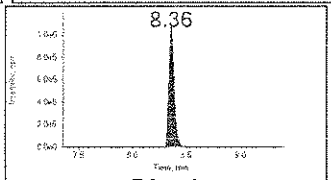
Pfhxa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



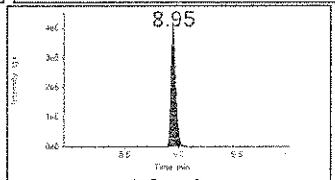
Pfhpa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



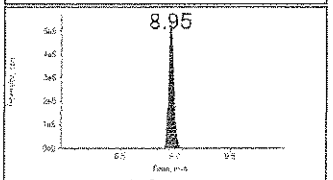
Pfhxs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



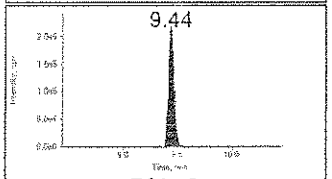
Pfoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



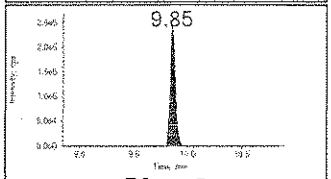
Pfna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



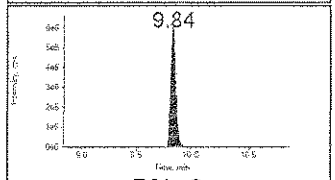
Pfos 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



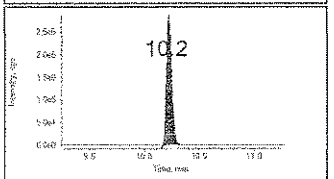
Pfda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



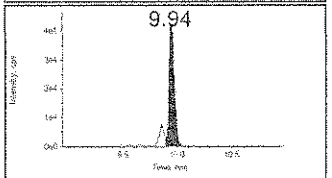
Pfuna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



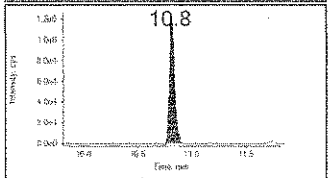
Pfds 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



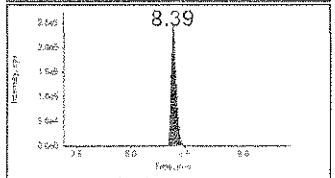
Pfdoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



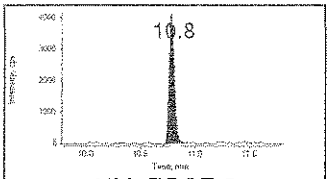
Fosa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



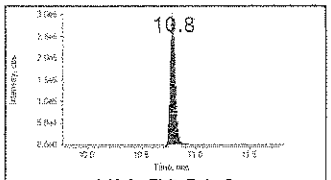
Pfteda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



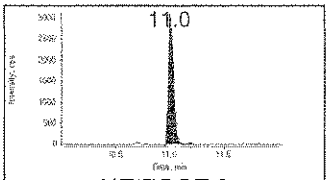
PFHpS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



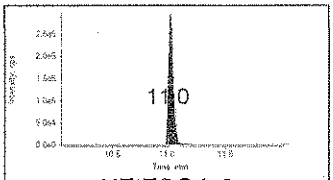
NMeFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



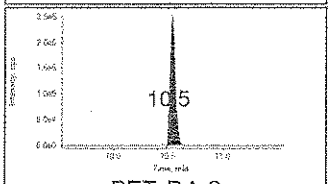
NMeFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



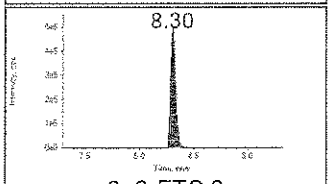
NEtFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



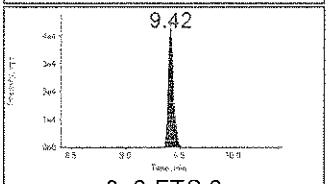
NEtFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak

Project	Ewan's Projects\PFCs	Result Table	033016.rdb
Data File	033016\1016.wiff	Algorithm Used	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	Instrument Name	LCMS02

Sample Name	PFC 20ppb	Injection Vial	11
Acquisition Date	3/30/2016 1:56:43 PM	Injection Volume	10
Acquisition Method	PFC_090315 schedule mrm.dam	Sample Type	Standard
Sample ID	15-OLC-02-35I	Dilution Factor	1.00

Results Summary

Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
Pfba 1	2.61 (2.60)	13c_pfba	3511011	10134512	20.00	18.1690	91	No
Pfpea 1	5.09 (5.06)	13c_pfhxa	3672176	7951915	20.00	17.0630	85	No
Pfbs 1	5.54 (5.53)	18o-pfhs	1228832	15135231	20.00	16.3840	82	No
Pfhxa 1	6.64 (6.63)	13c_pfhxa	3672176	10792347	20.00	15.3140	77	No
Pfhpa 1	7.64 (7.64)	13c_pfhxa	3672176	9174313	20.00	15.1380	76	No
Pfhxs 1	7.72 (7.72)	18o-pfhs	1228832	10323417	20.00	15.4480	77	No
Pfoa 1	8.37 (8.36)	13c-pfoa	2015623	3604680	20.00	16.5640	83	No
Pfna 1	8.96 (8.95)	13c-pfna	2243387	6883261	20.00	16.5880	83	No
Pfos 1	8.97 (8.96)	13c-pfos	2992496	8887987	20.00	16.8320	84	No
Pfda 1	9.45 (9.44)	13c-pfda	1346025	4635865	20.00	16.3080	82	No
Pfuna 1	9.87 (9.86)	13c-pfuna	367813	2651452	20.00	15.2680	76	No
Pfds 1	9.85 (9.84)	13c-pfos	2992496	10435082	20.00	15.7740	79	No
Pfdoa 1	10.20 (10.20)	13c-pfdoda	26797	4686308	20.00	15.5470	78	No
Fosa 1	9.96 (9.94)	d5-NEtFOSA	857791	10366529	20.00	15.0170	75	No
Pfteda 1	10.80 (10.80)	13c-pfdoda	26797	1713380	20.00	20.7060	104	No
PFHpS 1	8.40 (8.39)	18o-pfhs	1228832	3414330	20.00	16.1570	81	No
NMeFOSE 1	10.80 (10.80)	d7-NMeFOSE	1525960	4946716	20.00	16.9930	85	No

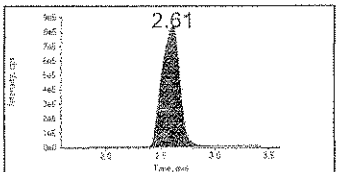
APR 01 2016

Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
NMeFOSA 1	10.80 (10.80)	d7-NMeFOSE	1525960	1890210	20.00	15.8700	79	No
NEtFOSE 1	11.00 (11.00)	d9-EtFOSE	1612673	6436738	20.00	16.5150	83	No
NEtFOSA 1	11.00 (11.00)	d5-NEtFOSA	857791	2542952	20.00	16.3040	82	No
d9-EtFOSE 1	11.00 (11.00)	N_mefosa_d3	675629	1612673	5.00	4.8170	96	No
d5-NEtFOSA 1	11.00 (11.00)	N_mefosa_d3	675629	857791	5.00	4.7980	96	No
d7-NMeFOSE 1	10.80 (10.80)	N_mefosa_d3	675629	1525960	5.00	4.8060	96	No
13C_PFBA 1	2.59 (2.58)	N_mefosa_d3	675629	3511011	5.00	4.6870	94	No
13C_PFHXA 1	6.64 (6.63)	N_mefosa_d3	675629	3672176	5.00	4.5660	91	No
13C-PFOA 1	8.37 (8.35)	N_mefosa_d3	675629	2015623	5.00	4.4670	89	No
13C-PFNA 1	8.96 (8.96)	N_mefosa_d3	675629	2243387	5.00	4.3180	86	No
13C-PFOS 1	8.97 (8.95)	N_mefosa_d3	675629	2992496	5.00	4.5580	91	No
13C-PFDA 1	9.46 (9.45)	N_mefosa_d3	675629	1346025	5.00	4.2250	85	No
13C-PFUNA 1	9.87 (9.85)	N_mefosa_d3	675629	367813	5.00	4.0790	82	No
18O-PFHxS 1	7.72 (7.72)	N_mefosa_d3	675629	1228832	5.00	4.5820	92	No
13C-PFDoA 1	10.20 (10.20)	N_mefosa_d3	675629	26797	5.00	4.6140	92	No
PFTrDA 1	10.50 (10.50)	13c-pfdoda	26797	3852139	20.00	12.9600	65	No
6_2-FTS 1	8.32 (8.31)	13C2-6_2-FTS	116745	2120571	20.00	14.6420	73	No
8_2-FTS 1	9.43 (9.42)	13C2-6_2-FTS	116745	2205852	20.00	14.5410	73	No
13C2-6_2-FTS 1	8.32 (8.31)	N_mefosa_d3	675629	116745	5.00	4.7160	94	No

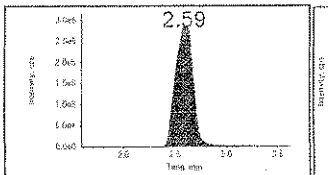
IRC Summary

Analyte Peak Name	RT (Expected)	Area	Modified?	Calculated Ion Ratio (Expected Value)
Pfba 2	2.61 (2.58)	10063245	No	0.99
Pfpea 2	5.09 (5.07)	8153448	No	1.03
Pfbs 2	5.54 (5.52)	7146720	No	0.47
Pfhxa 2	6.64 (6.63)	954296	No	0.09
Pfhpa 2	7.64 (7.63)	4149924	No	0.45
Pfhxs 2	7.72 (7.72)	4205064	No	0.41
Pfoa 2	8.37 (8.36)	6418412	No	1.78
Pfna 2	8.96 (8.95)	2339651	No	0.34
Pfos 2	8.97 (8.95)	3138836	No	0.35
Pfda 2	9.45 (9.44)	1293870	No	0.28
Pfuna 2	9.87 (9.85)	1341973	No	0.51
Pfds 2	9.85 (9.84)	3699551	No	0.35
Pfdoa 2	10.20 (10.20)	1892469	No	0.40
Fosa 2	9.96 (9.94)	243198	No	0.02
Pfteda 2	10.80 (10.80)	713504	No	0.42
PFHpS 2	8.40 (8.39)	1373765	No	0.40
NMeFOSE 2	10.80 (10.80)	23941	No	0.00
NMeFOSA 2	10.80 (10.80)	1765958	No	0.93
NEtFOSE 2	11.00 (11.00)	18261	No	0.00
NEtFOSA 2	11.00 (11.00)	1762344	No	0.69
PFTrDA 2	10.50 (10.50)	1290798	No	0.34
6_2-FTS 2	8.32 (8.30)	2809109	No	1.32
8_2-FTS 2	9.43 (9.41)	221141	No	0.10

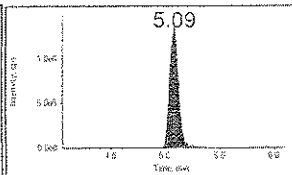
Quantitative Peak Review PFC 20ppb 15-OLC-02-35I



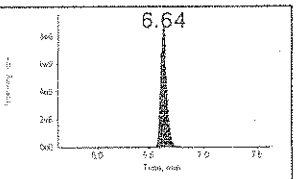
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



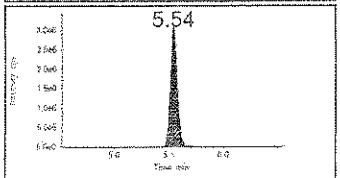
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



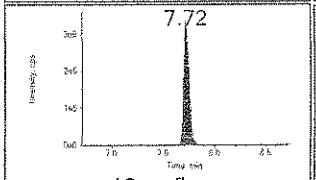
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



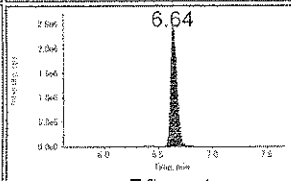
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



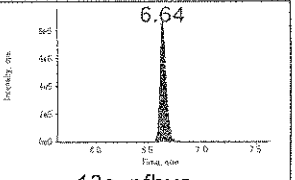
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



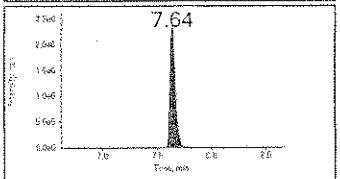
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



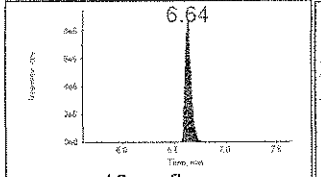
Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak



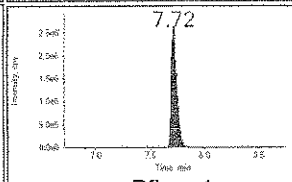
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



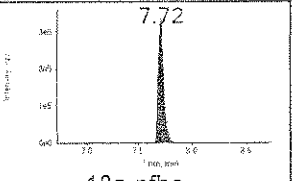
Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



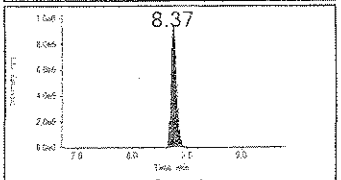
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



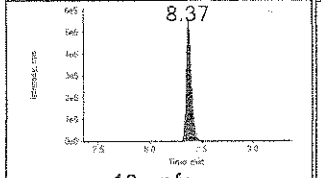
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



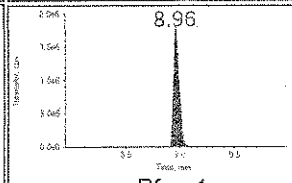
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



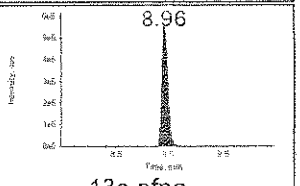
Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



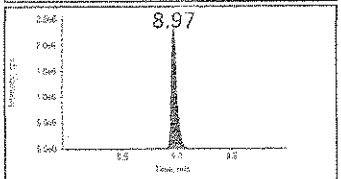
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



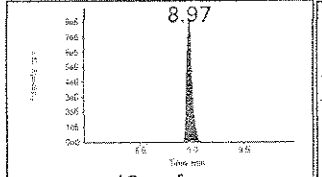
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



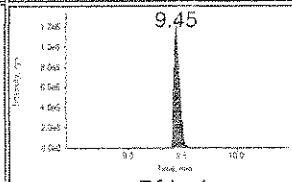
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



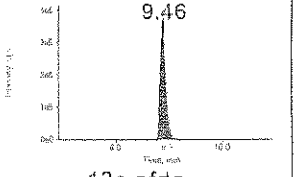
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



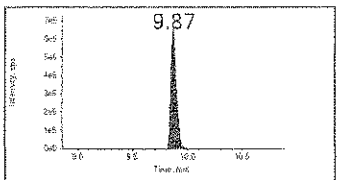
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



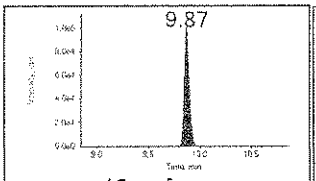
Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



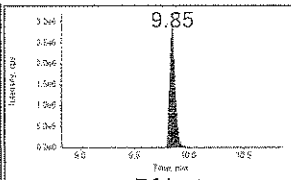
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



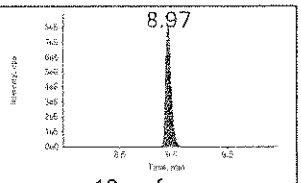
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



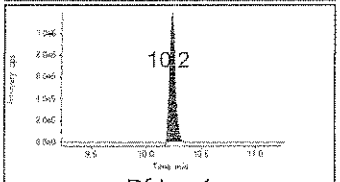
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



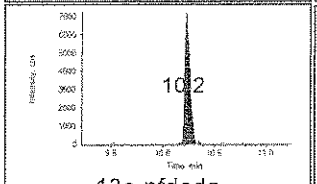
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



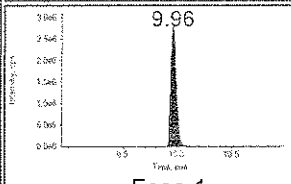
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



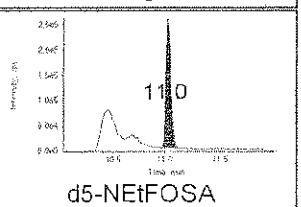
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



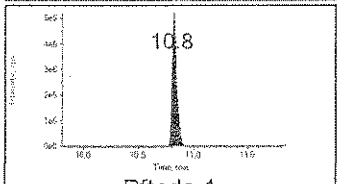
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



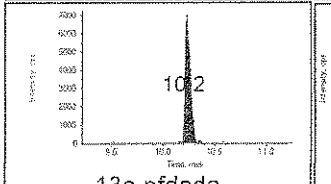
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



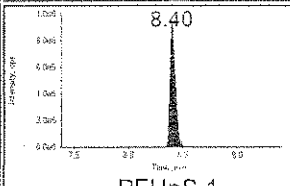
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
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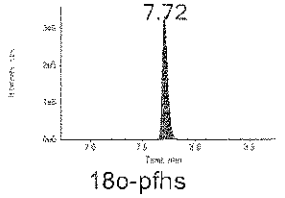
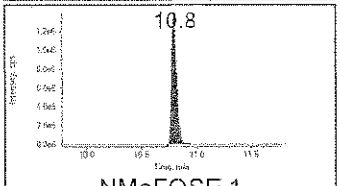
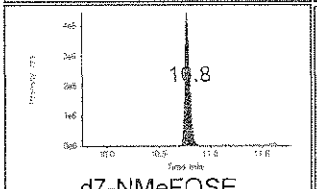


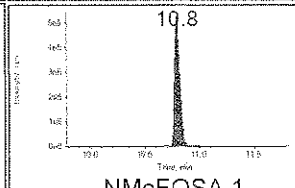
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



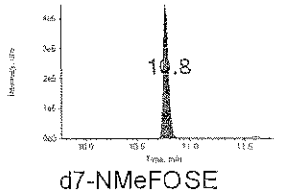
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



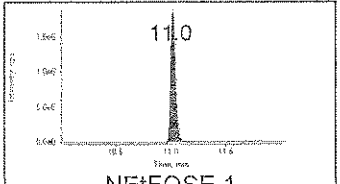
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



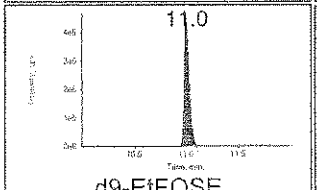
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



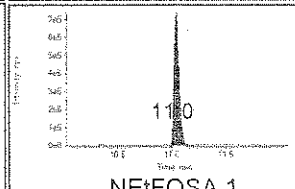
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



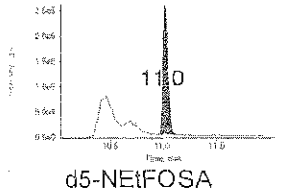
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



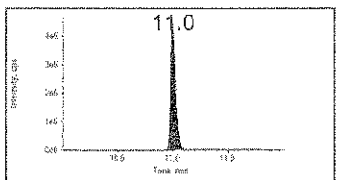
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



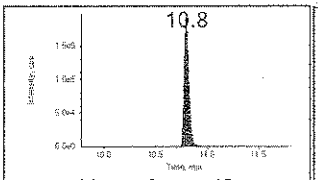
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



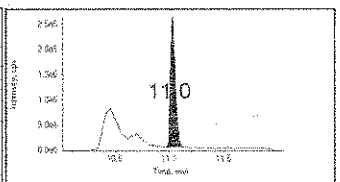
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



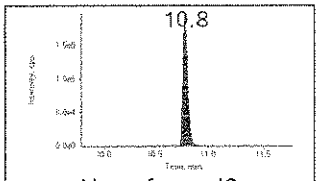
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



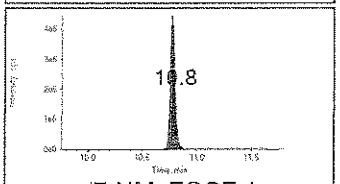
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



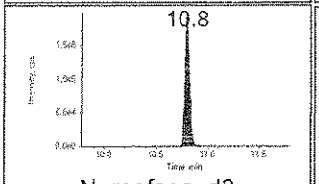
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



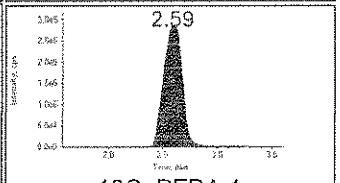
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



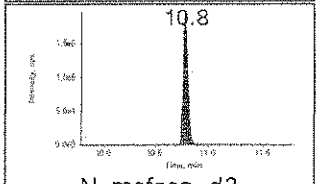
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



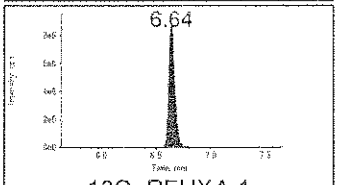
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



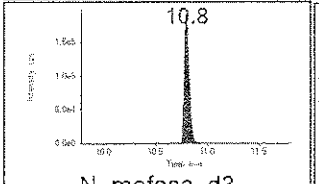
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



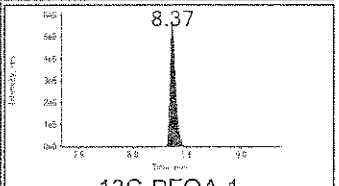
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



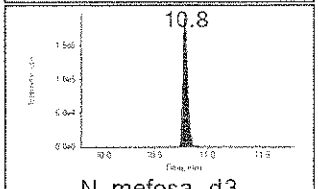
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



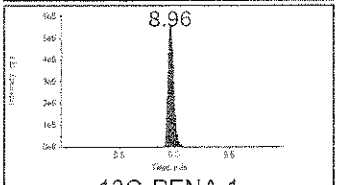
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



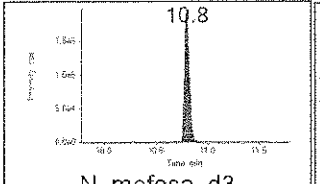
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



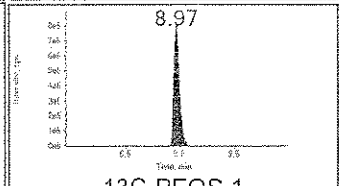
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



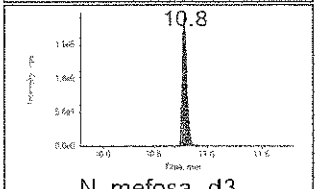
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



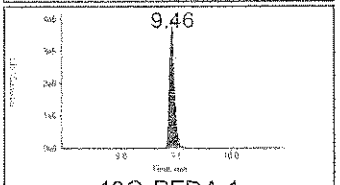
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



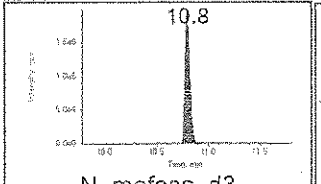
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



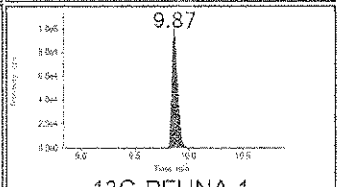
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



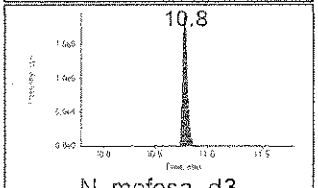
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



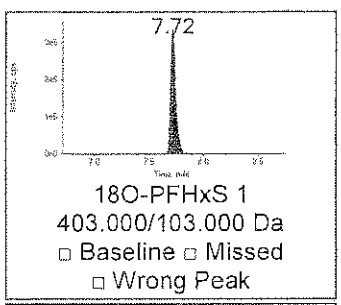
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



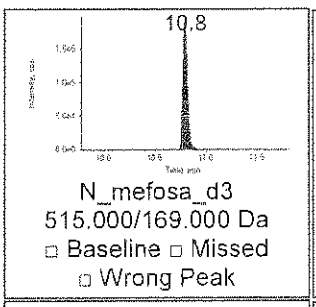
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



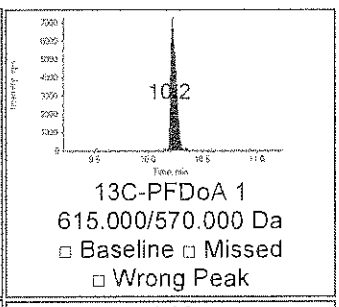
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



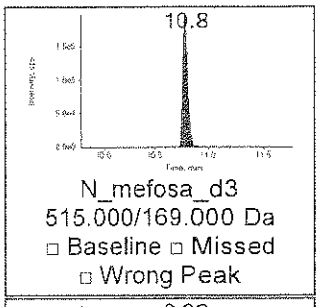
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



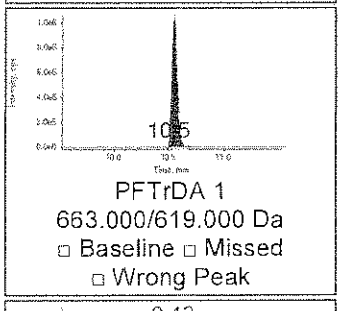
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



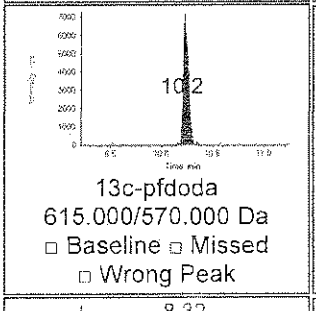
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



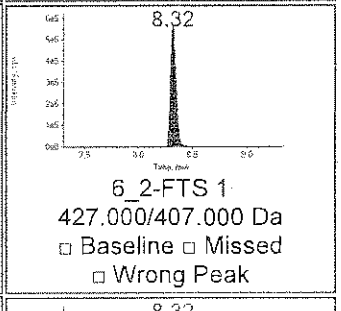
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



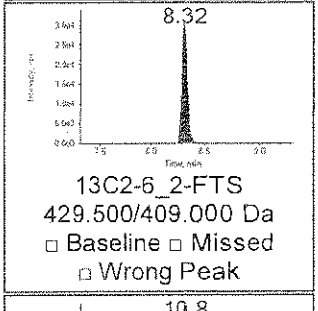
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



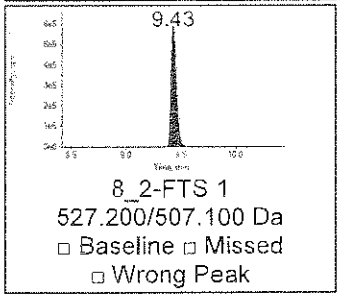
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



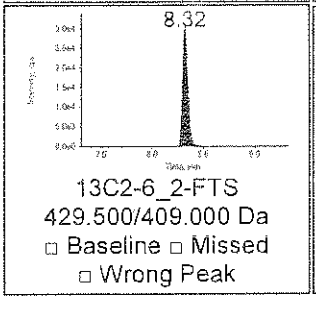
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



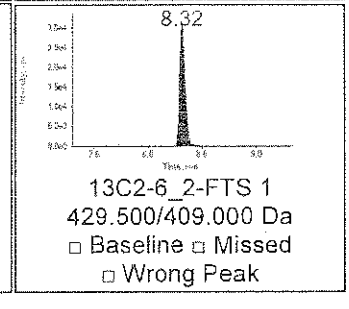
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



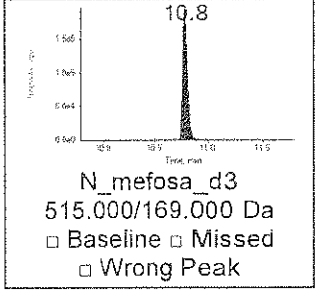
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

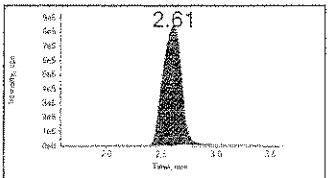


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

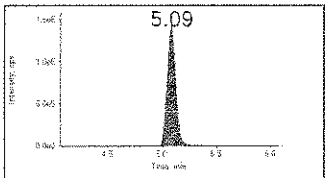


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

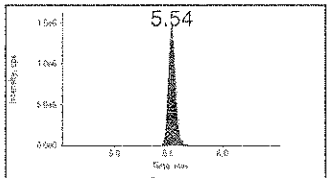
Ion Ratio Confirmation



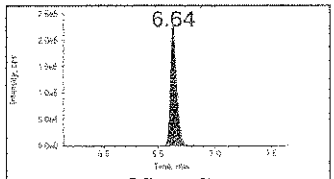
Pfba 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



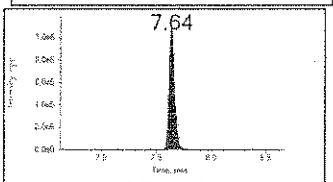
Pfpea 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



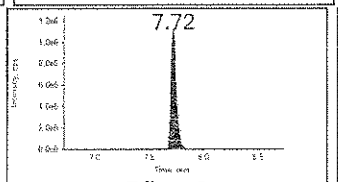
Pfbs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



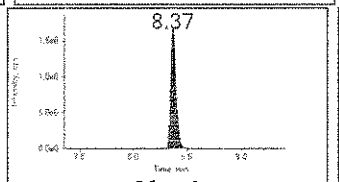
Pfhxa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



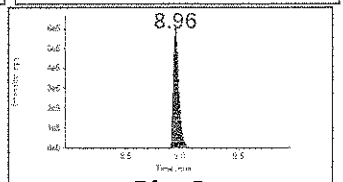
Pfhpa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



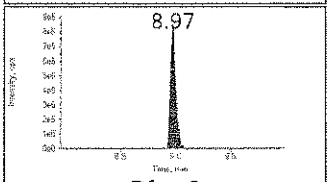
Pfhxs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



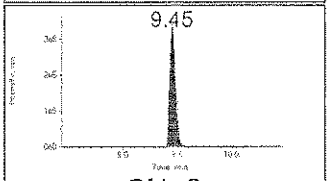
Pfoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



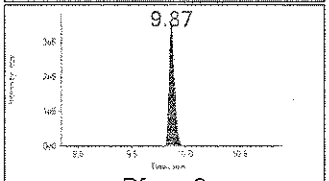
Pfna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



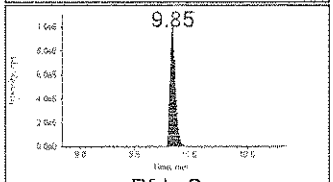
Pfos 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



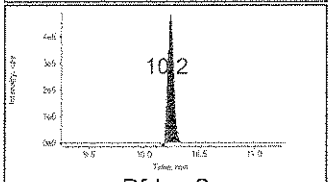
Pfda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



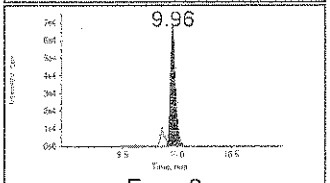
Pfuna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



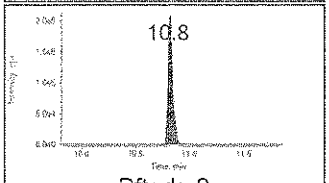
Pfds 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



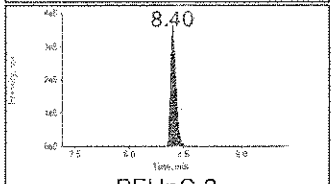
Pfdoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



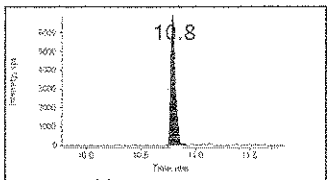
Fosa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



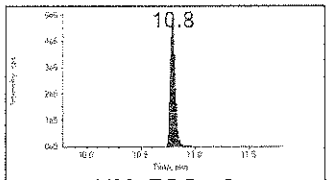
Pfteda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



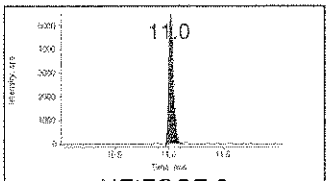
PFHpS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



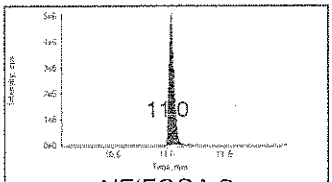
NMeFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



NMeFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



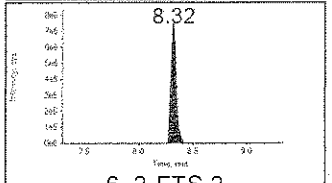
NEtFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



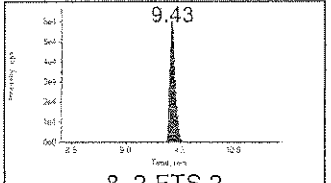
NEtFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak

Project	Ewan's Projects\PFCs	Result Table	033016.rdb
Data File	033016\1017.wiff	Algorithm Used	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	Instrument Name	LCMS02

Sample Name	PFC 50ppb	Injection Vial	12
Acquisition Date	3/30/2016 2:16:04 PM	Injection Volume	10
Acquisition Method	PFC_090315 schedule mrm.dam	Sample Type	Standard
Sample ID	15-OLC-02-35J	Dilution Factor	1.00

Results Summary

Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
Pfba 1	2.57 (2.60)	13c_pfba	3039364	4117389 1	50.00	85.2700	171	No
Pfpea 1	5.07 (5.06)	13c_pfhxa	2832161	2810156 2	50.00	78.1840	156	No
Pfbs 1	5.52 (5.53)	18o-pfhs	948543	4258880 9	50.00	59.7250	119	No
Pfhxa 1	6.63 (6.63)	13c_pfhxa	2832161	3208655 6	50.00	59.0320	118	No
Pfhpa 1	7.62 (7.64)	13c_pfhxa	2832161	2765647 7	50.00	59.1700	118	No
Pfhxs 1	7.71 (7.72)	18o-pfhs	948543	3122773 9	50.00	60.5370	121	No
Pfoa 1	8.36 (8.36)	13c-pfoa	1505048	1246763 7	50.00	76.7250	153	No
Pfna 1	8.95 (8.95)	13c-pfna	1702704	2212419 3	50.00	70.2480	140	No
Pfos 1	8.95 (8.96)	13c-pfos	2191804	2755741 2	50.00	71.2510	143	No
Pfda 1	9.44 (9.44)	13c-pfda	1079548	1622660 8	50.00	71.1710	142	No
Pfuna 1	9.85 (9.86)	13c-pfuna	271003	9913986	50.00	77.4840	155	No
Pfds 1	9.83 (9.84)	13c-pfos	2191804	3020978 6	50.00	62.3470	125	No
Pfdoa 1	10.20 (10.20)	13c-pfdoda	17705	1588375 7	50.00	79.7550	160	No
Fosa 1	9.94 (9.94)	d5-NEtFOSA	816397	3333063 0	50.00	50.7330	101	No
Pfteda 1	10.80 (10.80)	13c-pfdoda	17705	6460580	50.00	N/A	N/A	No
PFHpS 1	8.39 (8.39)	18o-pfhs	948543	1361402 5	50.00	83.4620	167	No
NMeFOSE 1	10.80 (10.80)	d7-NMeFOSE	1216254	1859699 3	50.00	80.1510	160	No

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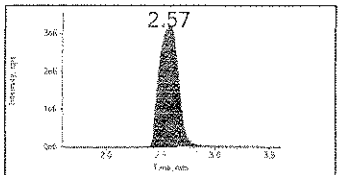
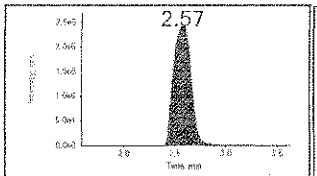
Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
NMeFOSA 1	10.80 (10.80)	d7-NMeFOSE	1216254	9533984	50.00	100.4300	201	No
NEtFOSE 1	11.00 (11.00)	d9-EtFOSE	1458965	24259309	50.00	68.8020	138	No
NEtFOSA 1	11.00 (11.00)	d5-NEtFOSA	816397	12815043	50.00	86.3300	173	No
d9-EtFOSE 1	11.00 (11.00)	N_mefosa_d3	577028	1458965	5.00	5.1020	102	No
d5-NEtFOSA 1	11.00 (11.00)	N_mefosa_d3	577028	816397	5.00	5.3460	107	No
d7-NMeFOSE 1	10.80 (10.80)	N_mefosa_d3	577028	1216254	5.00	4.4850	90	No
13C_PFBA 1	2.57 (2.58)	N_mefosa_d3	577028	3039364	5.00	4.7500	95	No
13C_PFHXA 1	6.62 (6.63)	N_mefosa_d3	577028	2832161	5.00	4.1240	83	No
13C-PFOA 1	8.35 (8.35)	N_mefosa_d3	577028	1505048	5.00	3.9050	78	No
13C-PFNA 1	8.94 (8.96)	N_mefosa_d3	577028	1702704	5.00	3.8380	77	No
13C-PFOS 1	8.95 (8.95)	N_mefosa_d3	577028	2191804	5.00	3.9090	78	No
13C-PFDA 1	9.43 (9.45)	N_mefosa_d3	577028	1079548	5.00	3.9670	79	No
13C-PFUNA 1	9.85 (9.85)	N_mefosa_d3	577028	271003	5.00	3.5190	70	No
18O-PFHxS 1	7.70 (7.72)	N_mefosa_d3	577028	948543	5.00	4.1410	83	No
13C-PFDoA 1	10.20 (10.20)	N_mefosa_d3	577028	17705	5.00	3.5700	71	No
PFTrDA 1	10.50 (10.50)	13c-pfdoda	17705	12976832	50.00	66.0790	132	No
6_2-FTS 1	8.30 (8.31)	13C2-6_2-FTS	143014	8310185	50.00	46.8390	94	No
8_2-FTS 1	9.41 (9.42)	13C2-6_2-FTS	143014	8917196	50.00	47.9850	96	No
13C2-6_2-FTS 1	8.30 (8.31)	N_mefosa_d3	577028	143014	5.00	6.7650	135	No

IRC Summary

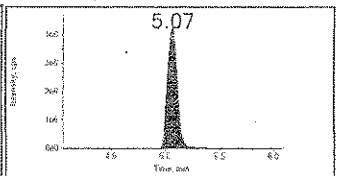
Analyte Peak Name	RT (Expected)	Area	Modified?	Calculated Ion Ratio (Expected Value)
Pfba 2	2.59 (2.58)	41427145	No	1.01
Pfpea 2	5.06 (5.07)	28435874	No	1.01
Pfbs 2	5.52 (5.52)	24869958	No	0.58
Pfhxa 2	6.63 (6.63)	3712367	No	0.12
Pfhpa 2	7.62 (7.63)	14934262	No	0.54
Pfhxs 2	7.70 (7.72)	15392196	No	0.49
Pfoa 2	8.36 (8.36)	20759027	No	1.67
Pfna 2	8.95 (8.95)	8652030	No	0.39
Pfos 2	8.95 (8.95)	11274391	No	0.41
Pfda 2	9.44 (9.44)	5193940	No	0.32
Pfuna 2	9.85 (9.85)	5253734	No	0.53
Pfds 2	9.83 (9.84)	12826224	No	0.42
Pfdoa 2	10.20 (10.20)	6417076	No	0.40
Fosa 2	9.94 (9.94)	1334611	No	0.04
Pfteda 2	10.80 (10.80)	2810563	No	0.44
PFHpS 2	8.39 (8.39)	5753573	No	0.42
NMeFOSE 2	10.80 (10.80)	116210	No	0.01
NMeFOSA 2	10.80 (10.80)	8975077	No	0.94
NEtFOSE 2	11.00 (11.00)	88618	No	0.00
NEtFOSA 2	11.00 (11.00)	9152201	No	0.71
PFTrDA 2	10.50 (10.50)	5572254	No	0.43
6_2-FTS 2	8.30 (8.30)	11221304	No	1.35
8_2-FTS 2	9.41 (9.41)	978173	No	0.11



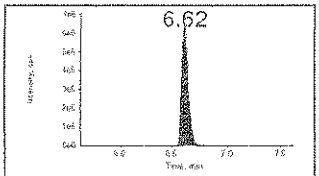
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



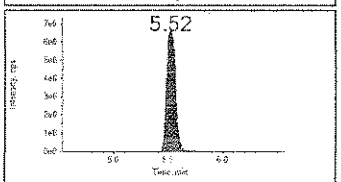
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



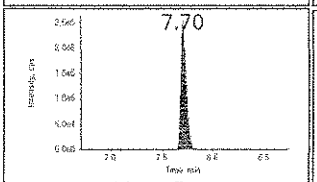
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



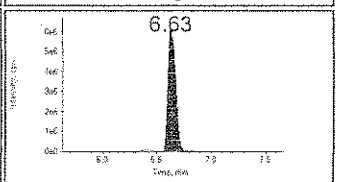
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



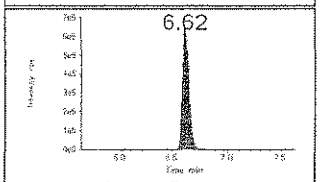
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



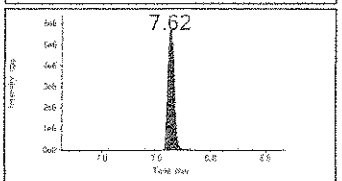
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



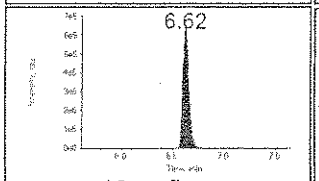
Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak



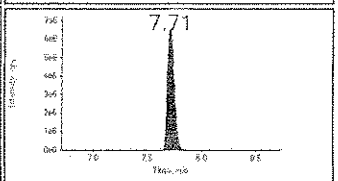
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



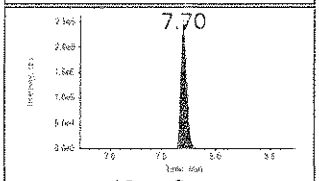
Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



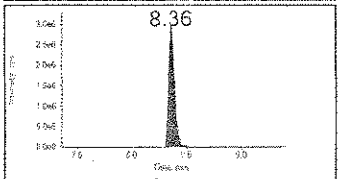
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



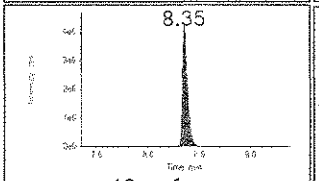
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



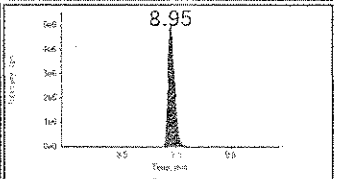
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



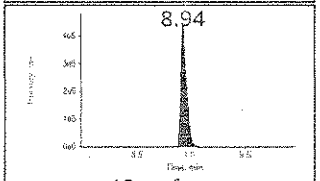
Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



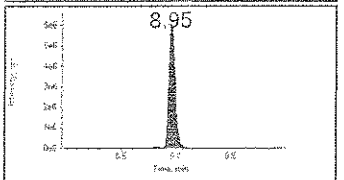
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



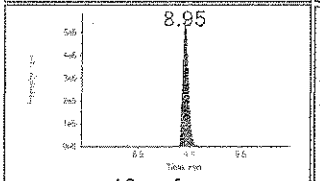
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



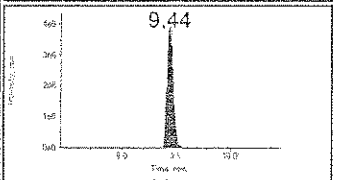
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



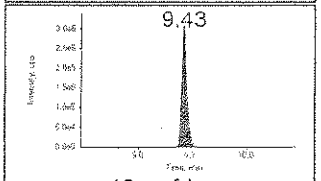
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



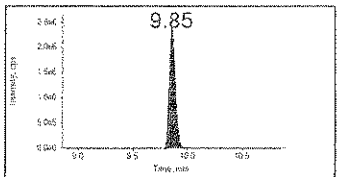
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



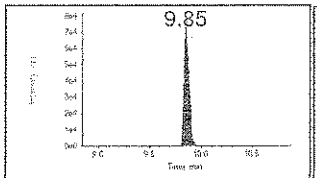
Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



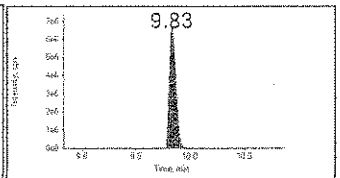
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



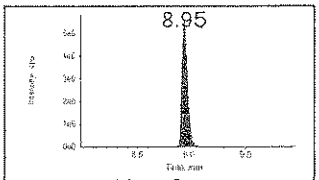
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
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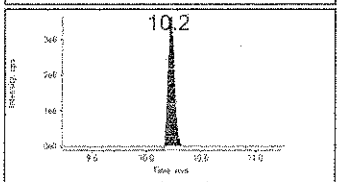
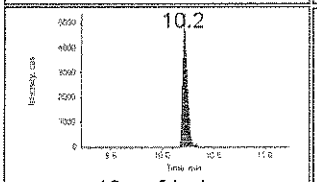
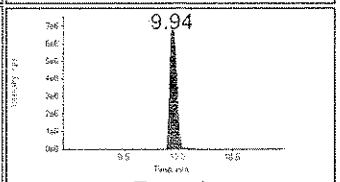


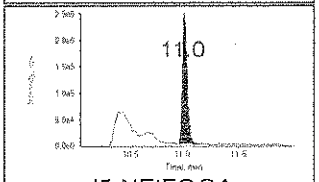
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



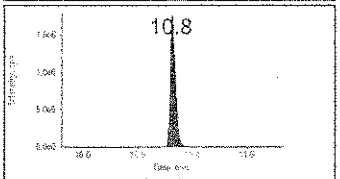
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



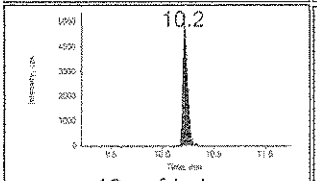
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



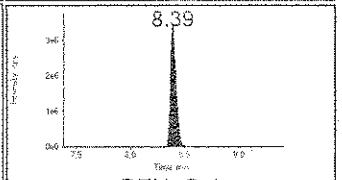
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



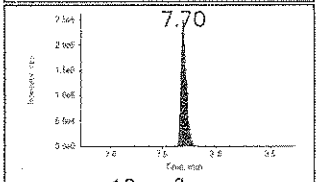
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



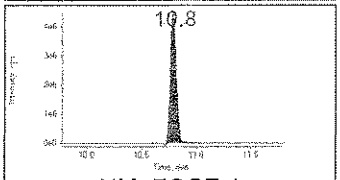
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



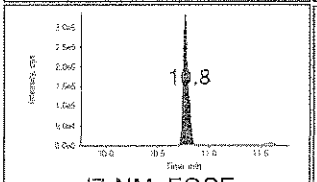
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



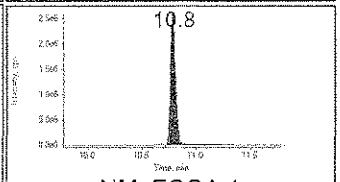
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



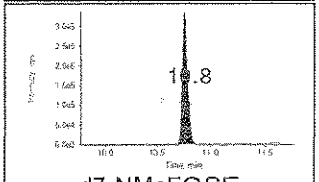
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



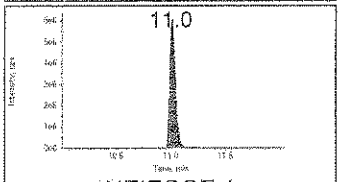
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



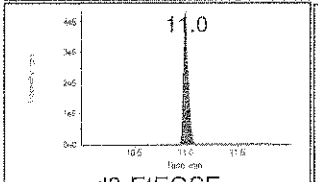
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



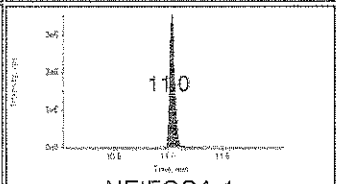
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



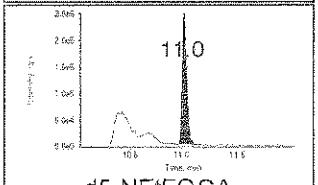
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



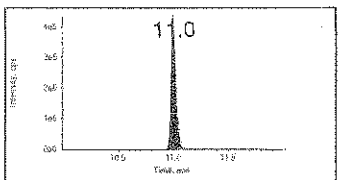
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



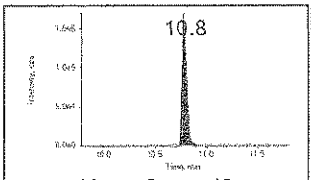
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



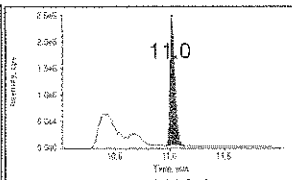
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



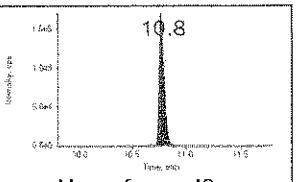
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



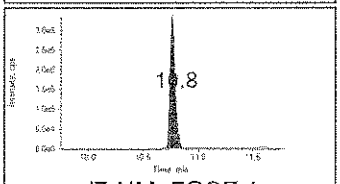
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



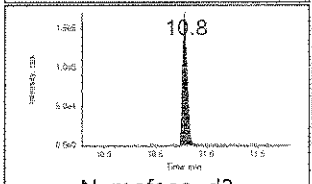
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



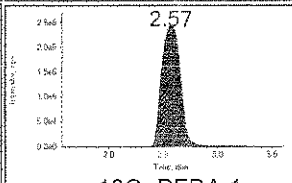
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



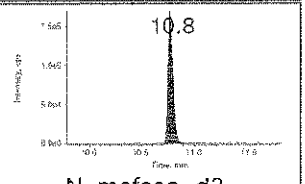
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



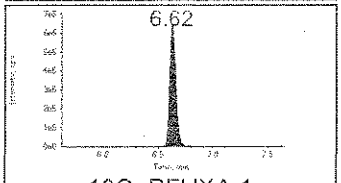
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



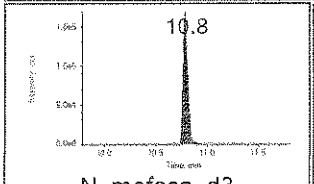
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



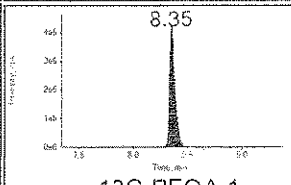
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



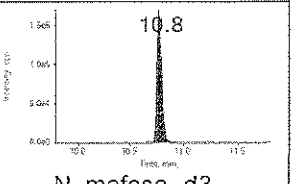
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



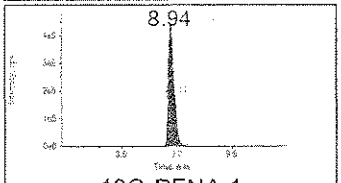
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



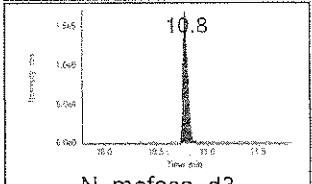
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



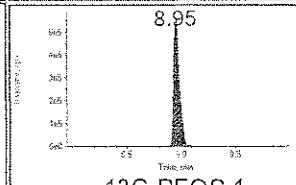
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



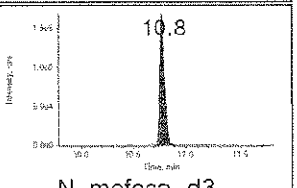
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



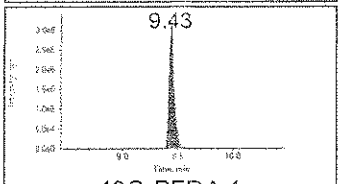
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



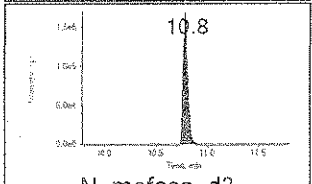
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



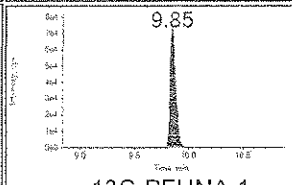
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



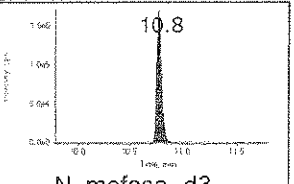
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



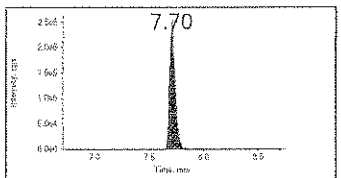
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



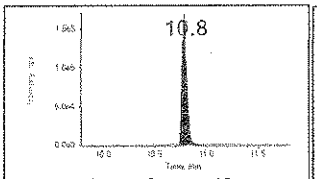
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



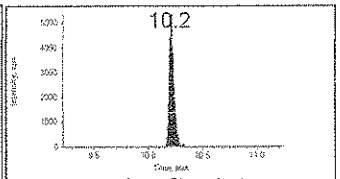
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



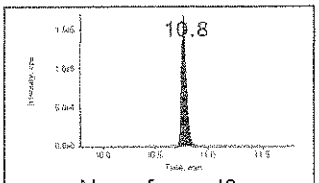
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



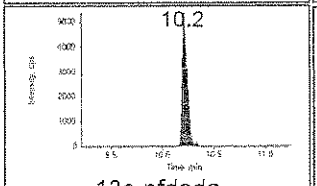
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



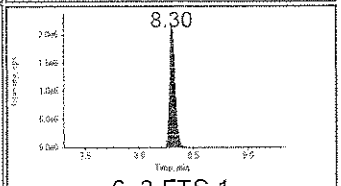
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



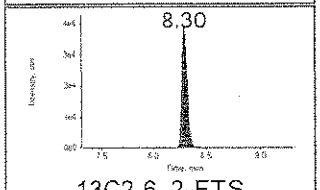
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



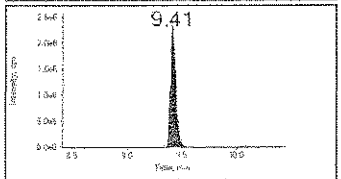
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



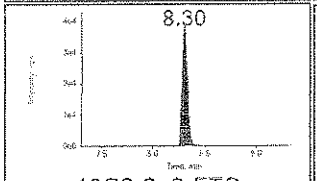
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



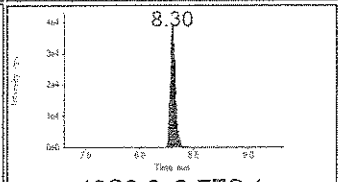
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



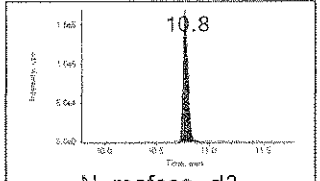
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

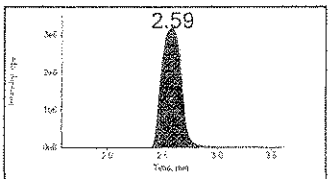


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

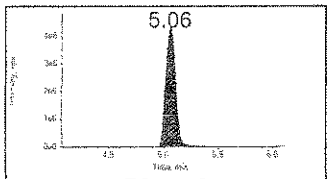


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

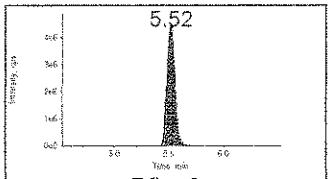
Ion Ratio Confirmation



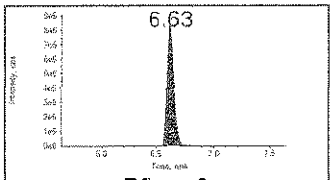
Pfba 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



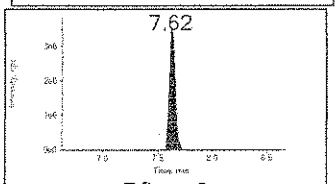
Pfpea 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



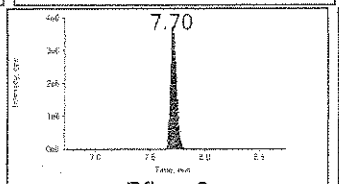
Pfbs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



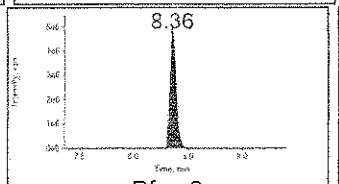
Pfhxa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



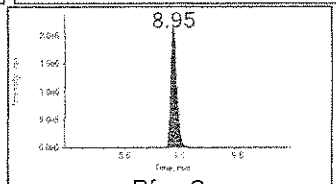
Pfhpa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



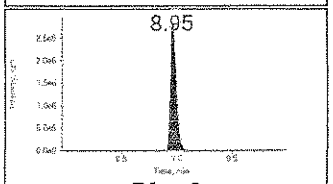
Pfhxs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



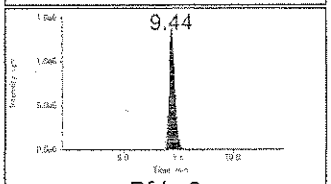
Pfoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



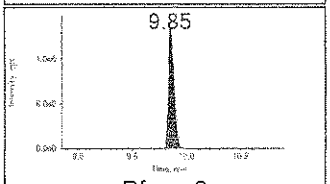
Pfna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



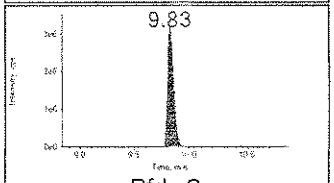
Pfos 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



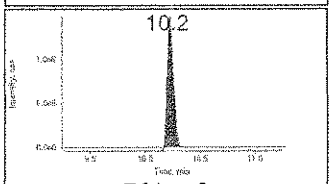
Pfda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



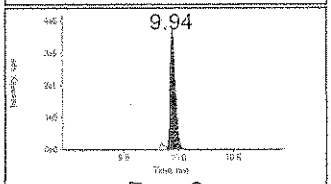
Pfuna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



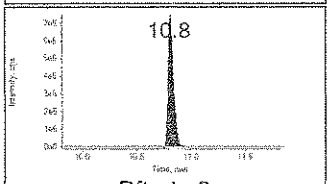
Pfds 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



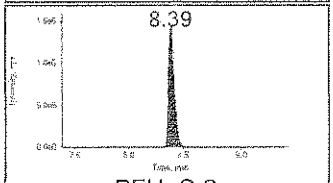
Pfdoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



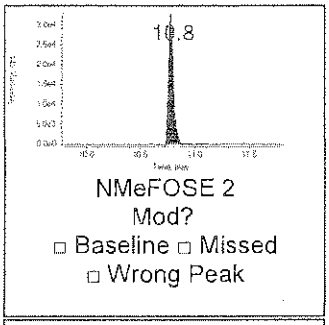
Fosa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



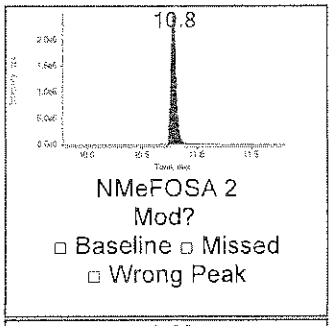
Pfteda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



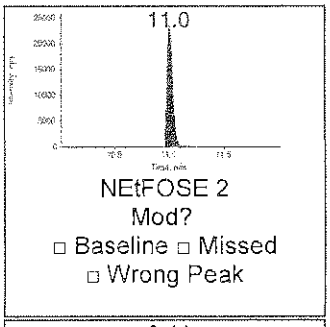
PFHpS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



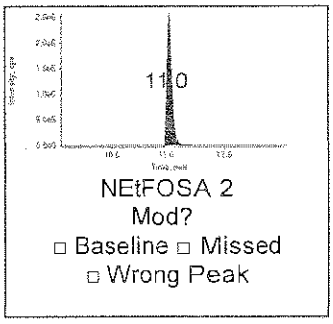
NMeFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



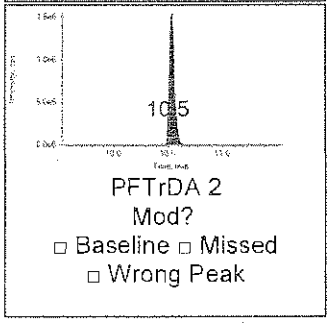
NMeFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



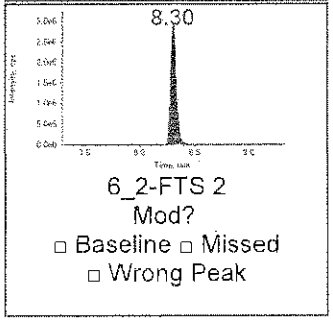
NEtFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



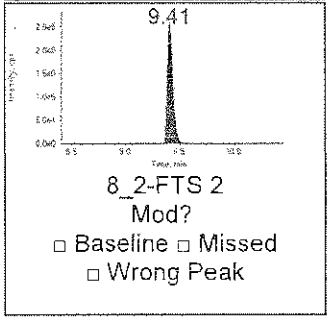
NEtFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak

Project	Ewan's Projects\PFCs
Data File	033016\1018.wiff
Result Table	033016.rdb
Instrument Name	LCMS02

Sample Name	IB	Injection Volume	10
Acquisition Date	3/30/2016 2:35:21 PM	Sample Type	Unknown
Acquisition Method	PFC_090315 schedule mrm.dam	Dilution Factor	1.00
Injection Vial	2	Weight to Volume	0.00

Results Summary

Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
Pfba 1	13c_pfba	3393361	0.00 (2.60)	0	N/A	Yes
Pfpea 1	13c_pfhxa	3829499	0.00 (5.06)	0	N/A	No
Pfbs 1	18o-pfhs	1291218	0.00 (5.53)	0	N/A	No
Pfhxa 1	13c_pfhxa	3829499	6.62 (6.63)	3590	0.0050	No
Pfhpa 1	13c_pfhxa	3829499	0.00 (7.64)	0	N/A	No
Pfhxs 1	18o-pfhs	1291218	7.69 (7.72)	12471	0.0180	No
Pfoa 1	13c-pfoa	2236011	8.35 (8.36)	2604	0.0110	No
Pfna 1	13c-pfna	2565665	0.00 (8.95)	0	N/A	No
Pfos 1	13c-pfos	3076304	0.00 (8.96)	0	N/A	No
Pfda 1	13c-pfda	1552571	0.00 (9.44)	0	N/A	No
Pfuna 1	13c-pfuna	408721	9.85 (9.86)	2269	0.0120	No
Pfds 1	13c-pfos	3076304	9.86 (9.84)	1355	0.0020	No
Pfdoa 1	13c-pfdoda	28074	10.20 (10.20)	4484	0.0140	No
Fosa 1	d5-NEtFOSA	829845	9.94 (9.94)	12445	0.0190	No
Pfteda 1	13c-pfdoda	28074	10.80 (10.80)	2506	0.0280	No
PFHpS 1	18o-pfhs	1291218	0.00 (8.39)	0	N/A	No
NMeFOSE 1	d7-NMeFOSE	1561517	10.80 (10.80)	2371	0.0080	No
NMeFOSA 1	d7-NMeFOSE	1561517	10.80 (10.80)	2048	0.0170	No
NEtFOSE 1	d9-EtFOSE	1815683	11.00 (11.00)	7185	0.0160	No

APR 01 2016

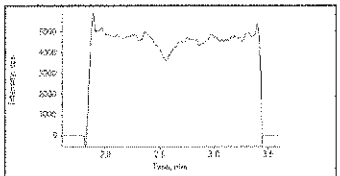
Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
NEtFOSA 1	d5-NEtFOSA	829845	11.00 (11.00)	3079	0.0200	No
d9-EtFOSE 1	N_mefosa_d3	698073	11.00 (11.00)	1815683	5.2490	No
d5-NEtFOSA 1	N_mefosa_d3	698073	11.00 (11.00)	829845	4.4920	No
d7-NMeFOSE 1	N_mefosa_d3	698073	10.70 (10.80)	1561517	4.7600	No
13C_PFBA 1	N_mefosa_d3	698073	2.58 (2.58)	3393361	4.3840	No
13C_PFHXA 1	N_mefosa_d3	698073	6.62 (6.63)	3829499	4.6090	No
13C-PFOA 1	N_mefosa_d3	698073	8.35 (8.35)	2236011	4.7960	No
13C-PFNA 1	N_mefosa_d3	698073	8.94 (8.96)	2565665	4.7800	No
13C-PFOS 1	N_mefosa_d3	698073	8.94 (8.95)	3076304	4.5350	No
13C-PFDA 1	N_mefosa_d3	698073	9.42 (9.45)	1552571	4.7160	No
13C-PFUNA 1	N_mefosa_d3	698073	9.84 (9.85)	408721	4.3870	No
18O-PFHxS 1	N_mefosa_d3	698073	7.69 (7.72)	1291218	4.6600	No
13C-PFDoA 1	N_mefosa_d3	698073	10.20 (10.20)	28074	4.6790	No
PFTrDA 1	13c-pfdoda	28074	10.50 (10.50)	4445	0.0140	No
6_2-FTS 1	13C2-6_2-FTS	107951	0.00 (8.31)	0	N/A	No
8_2-FTS 1	13C2-6_2-FTS	107951	0.00 (9.42)	0	N/A	No
13C2-6_2-FTS 1	N_mefosa_d3	698073	8.29 (8.31)	107951	4.2210	No

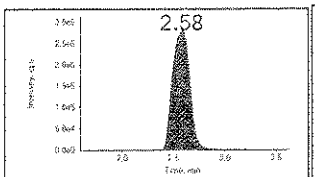
IRC Summary

Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfba 2	0.00 (2.58)	0	No	0.00 (0.98)	No
Pfpea 2	0.00 (5.07)	0	No	0.00 (1.01)	No
Pfbs 2	0.00 (5.52)	0	No	0.00 (0.48)	No
Pfhxa 2	0.00 (6.63)	0	No	0.00 (0.09)	No
Pfhpa 2	0.00 (7.63)	0	No	0.00 (0.44)	No
Pfhxs 2	7.70 (7.72)	4607	No	0.37 (0.40)	YES
Pfoa 2	8.35 (8.36)	4930	No	1.89 (1.81)	YES

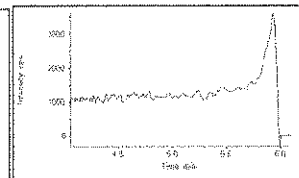
Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfna 2	0.00 (8.95)	0	No	0.00 (0.33)	No
Pfos 2	0.00 (8.95)	0	No	0.00 (0.36)	No
Pfda 2	0.00 (9.44)	0	No	0.00 (0.26)	No
Pfuna 2	9.85 (9.85)	2085	No	0.92 (0.50)	No
Pfds 2	0.00 (9.84)	0	No	0.00 (0.36)	No
Pfdoa 2	0.00 (10.20)	0	No	0.00 (0.37)	No
Fosa 2	9.93 (9.94)	273	No	0.02 (0.03)	No
Pfteda 2	10.80 (10.80)	1742	No	0.69 (0.42)	No
PFHpS 2	0.00 (8.39)	0	No	0.00 (0.39)	No
NMeFOSE 2	0.00 (10.80)	0	No	0.00 (0.00)	No
NMeFOSA 2	0.00 (10.80)	0	No	0.00 (0.93)	No
NEtFOSE 2	0.00 (11.00)	0	No	0.00 (0.00)	No
NEtFOSA 2	11.00 (11.00)	1974	No	0.64 (0.70)	YES
PFTrDA 2	0.00 (10.50)	0	No	0.00 (0.32)	No
6_2-FTS 2	0.00 (8.30)	0	No	0.00 (1.35)	No
8_2-FTS 2	0.00 (9.41)	0	No	0.00 (0.12)	No

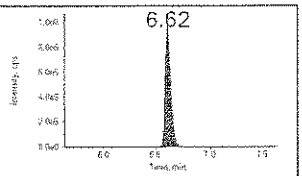
Quantitative Peak Review IB *No data for Sample ID*


Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

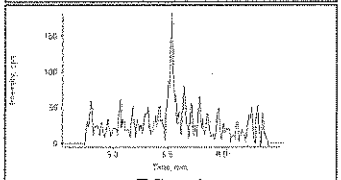


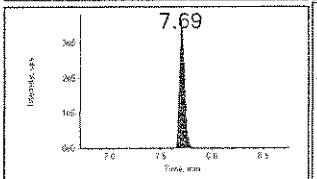
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak

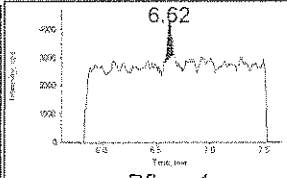


13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak

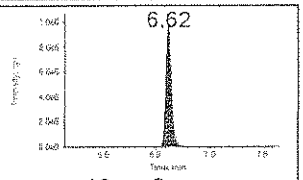

Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



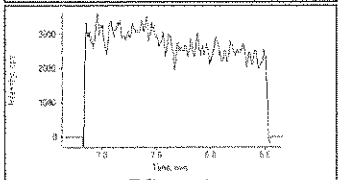
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak

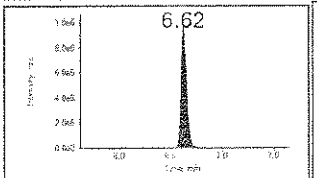


Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak

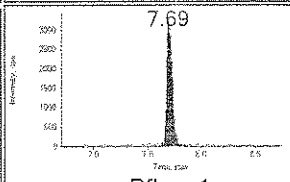


13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak

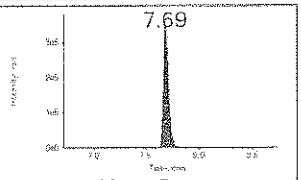

Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



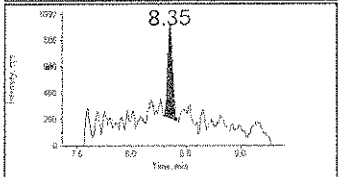
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



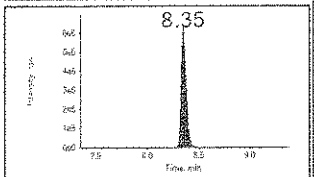
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



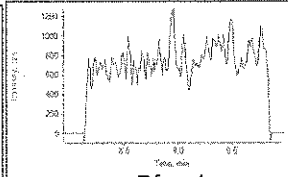
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak

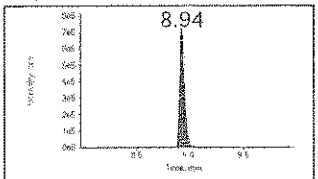


Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

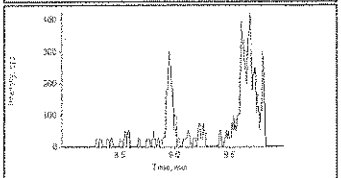


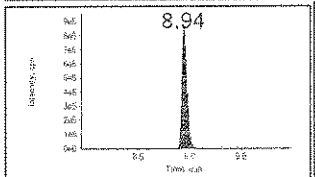
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak

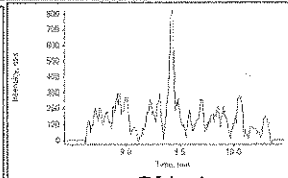


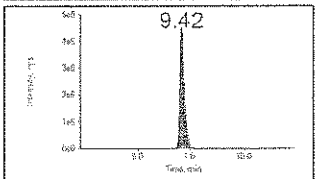
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak

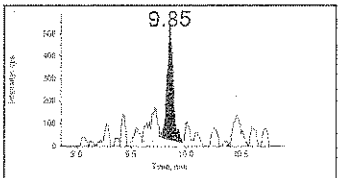


13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak

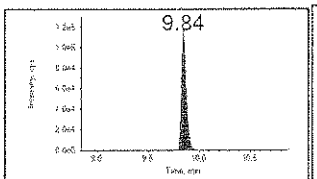

Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



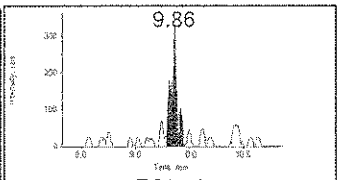
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



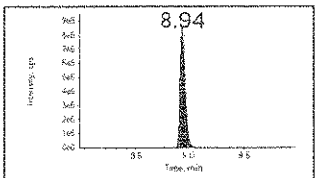
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



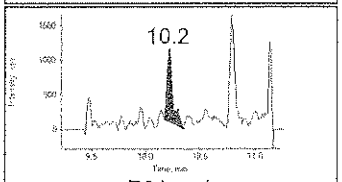
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



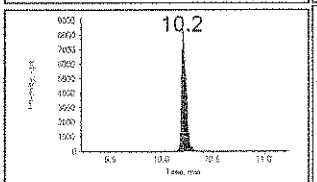
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



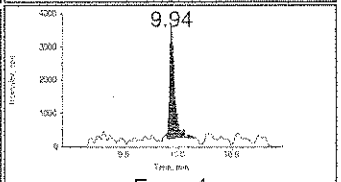
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



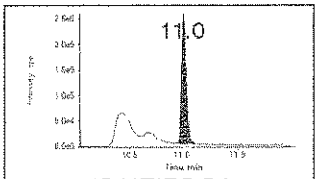
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



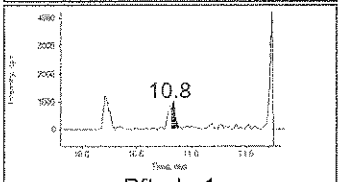
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



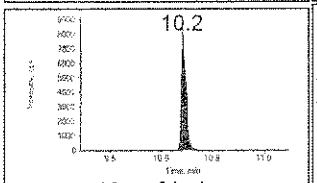
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



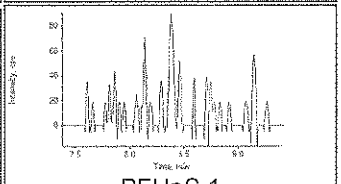
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

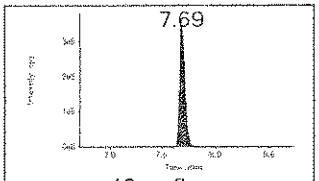


Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak

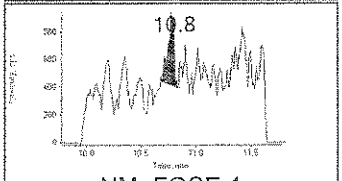


13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak

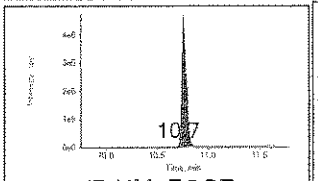

PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



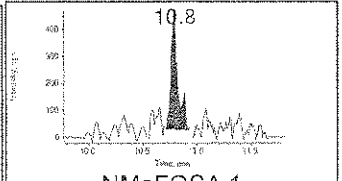
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



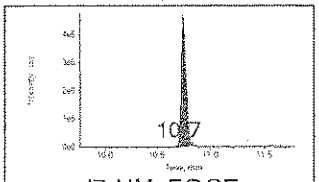
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



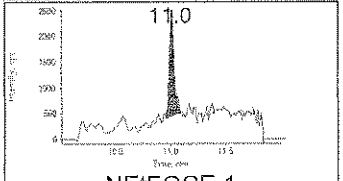
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



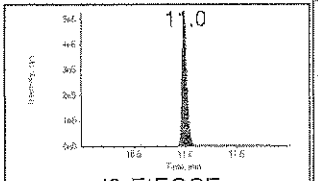
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



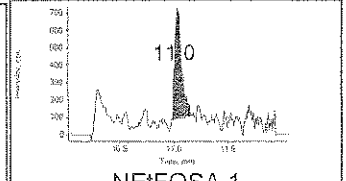
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



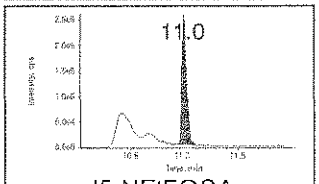
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



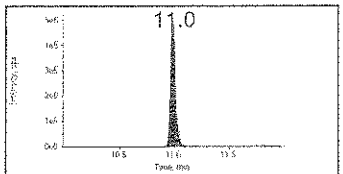
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



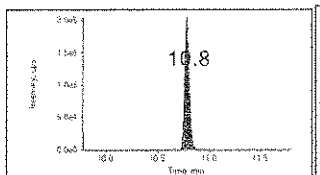
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



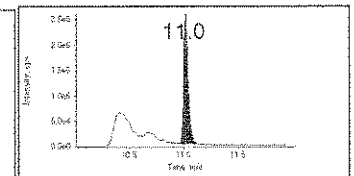
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



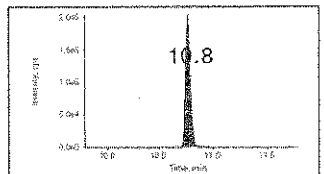
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



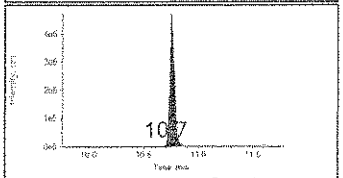
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



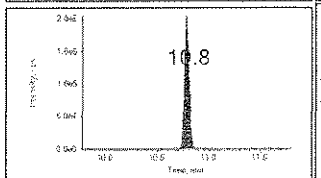
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



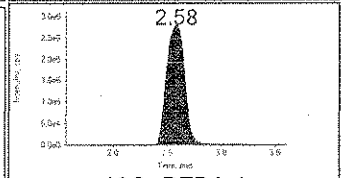
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



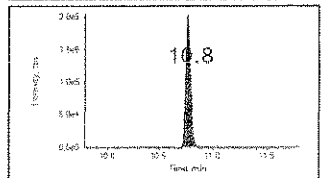
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



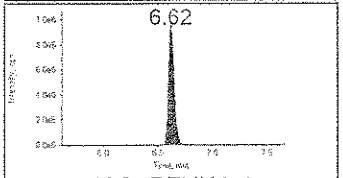
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



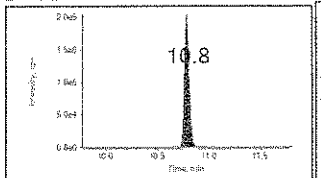
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



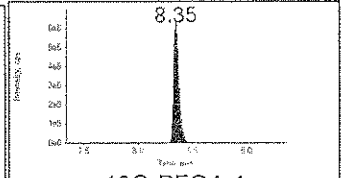
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



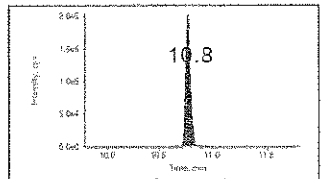
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



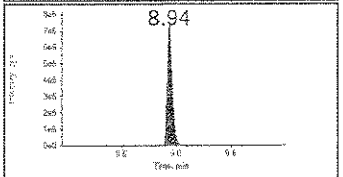
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



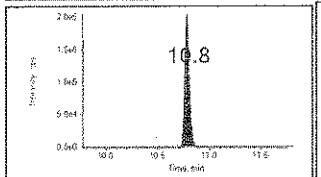
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



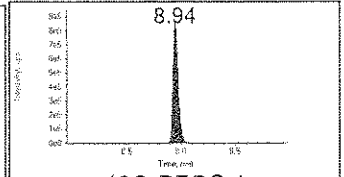
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



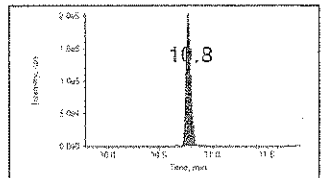
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



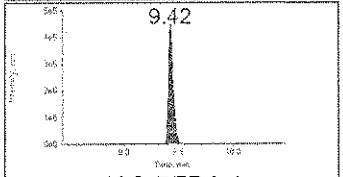
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



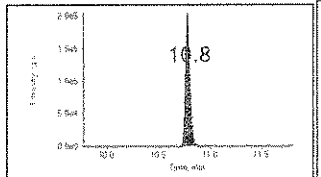
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



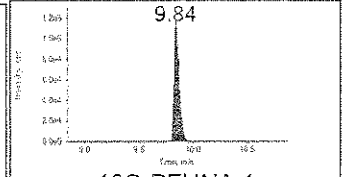
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



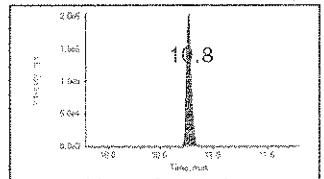
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



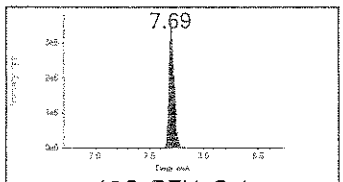
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



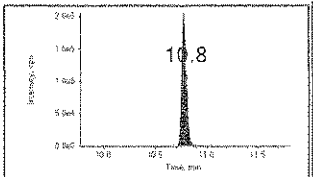
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



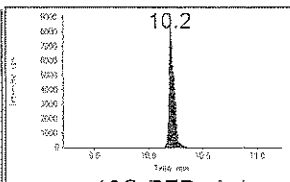
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



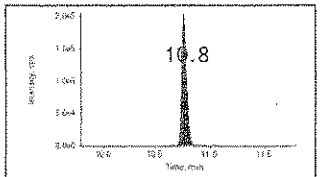
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



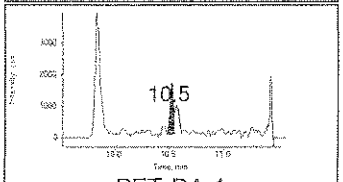
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



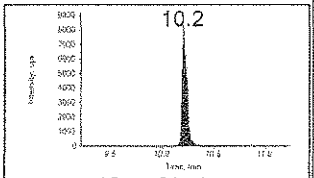
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



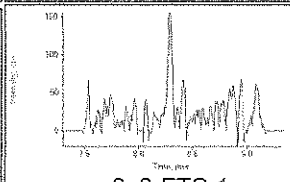
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



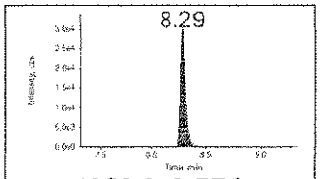
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



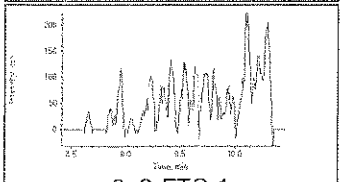
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



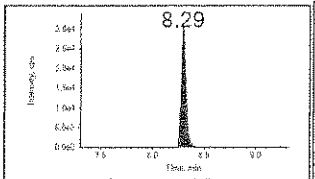
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



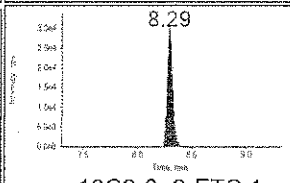
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



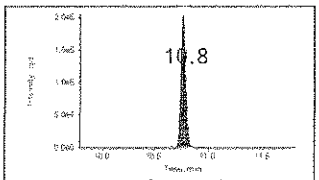
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

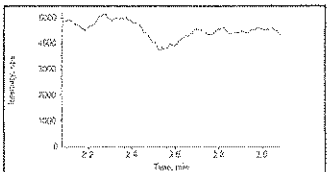


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

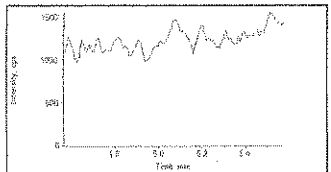


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

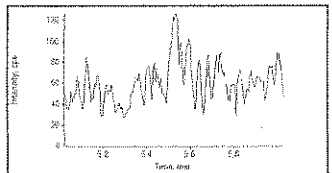
Ion Ratio Confirmation



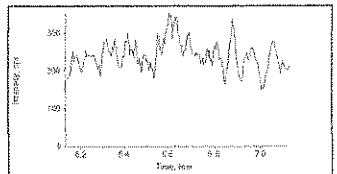
Pfba 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



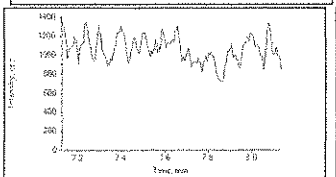
Pfpea 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



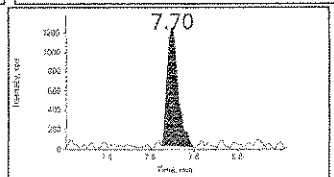
Pfbs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



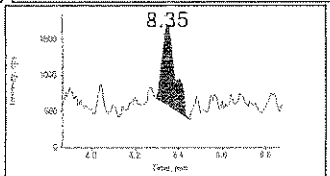
Pfhxa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



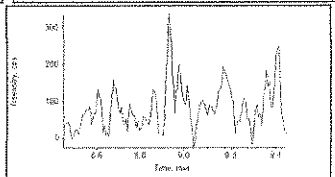
Pfhpa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



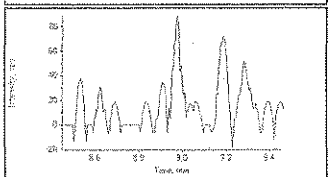
Pfhxs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



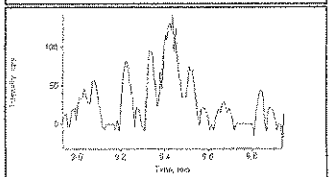
Pfoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



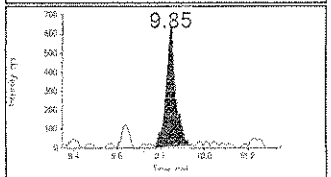
Pfna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



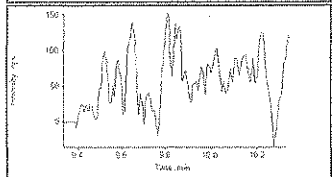
Pfos 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



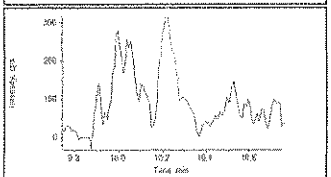
Pfda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



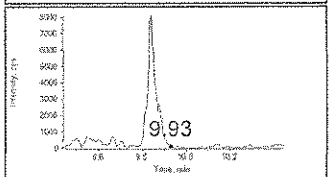
Pfuna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



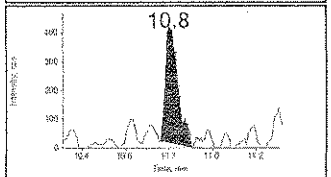
Pfds 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



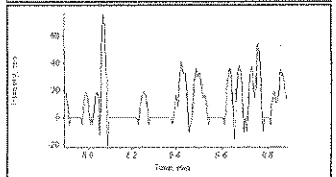
Pfdoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



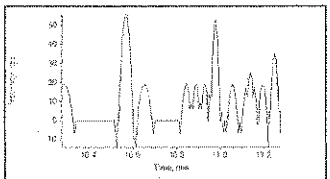
Fosa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



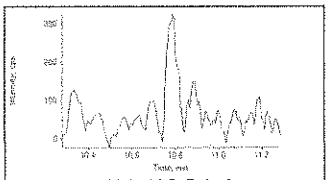
Pfteda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



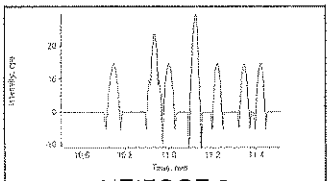
PFHpS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



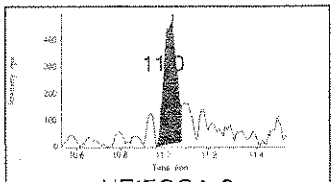
NMeFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



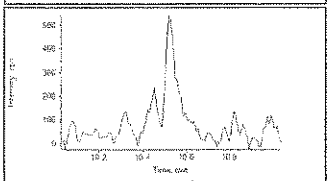
NMeFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



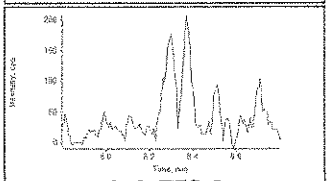
NEtFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



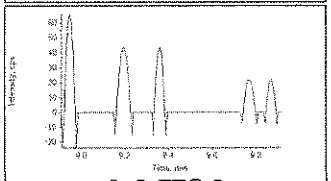
NEtFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

Quantitation Report

Data File:	033016\1019.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/30/16 14:54:42	**Vial:**	1
Run Type:	CCV	**Dilution:**	1
Lab ID:	KQ1603023-01	**Raw Units:**	ng/mL

Bottle ID:		**Tier:**	IV	**Matrix:**	Water
Prod Code:	PFOA	**Collect Date:**	3/15/16	**Receive Date:**	3/17/16

Analysis Lot:	490080	**Prep Lot:**		**Report Group:**	KQ1603023
Analysis Method:	PFC/537M	**Prep Method:**			
		Prep Date:			

Title:	Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS	**Calibration ID:**	KC1600038
		Report List ID:	14664

Internal Standard Compounds

Parameter Name	RT	Response	Solution Conc	Area Criteria
N-methyl-d3-perfluoro-1-octanesulfonamide	10.8	605594.85	5.00	OK

Surrogate Compounds

Parameter Name	RT	Response	Solution Conc	% Rec	% Rec Criteria
Perfluoro-n-[1,2,3,4-13C4] butanoic acid	2.60	3423515.94	5.098	5.10	
Perfluoro-n-[1,2-13C2] hexanoic acid	6.63	3831940.94	5.316	5.32	
Sodium perfluoro-1-hexane[18O2]sulfonate	7.72	1287462.24	5.356	5.36	
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	8.37	2211960.08	5.469	5.47	
Perfluoro-n-[1,2,3,4,5-13C5] nonanoic acid	8.96	2541686.22	5.458	5.46	
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulf	8.97	3124705.73	5.310	5.31	
Perfluoro-n-[1,2-13C2] decanoic acid	9.45	1577721.20	5.524	5.52	
Perfluoro-n-[1,2-13C2]undecanoic Acid	9.86	400686.56	4.958	4.96	
Perfluoro-n-[1,2-13C2]dodecanoic Acid	10.2	25345.95	4.869	4.87	
S_N-ethyl-d5-perfluoro-1-octanesulfonamide	11.0	807691.53	5.040	5.04	
d9-NEtFOSE (Surr)	11.0	1699340.40	5.663	5.66	
d7-N-MeFOSE (Surr)	10.8	1507043.40	5.295	5.30	
S_6:2 Fluorotelomer sulfonate-13C2	8.32	108065.64	4.870	4.87	

Target Compounds

Final Conc.Units: ng/mL

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorobutanoic Acid	2.61	1324765.25	2.436	2.44	
Perfluoropentanoic Acid	5.08	1103450.43	2.269	2.27	
Perfluorobutane Sulfonate	5.53	2201041.75	2.274	2.27	
Perfluorohexanoic Acid	6.63	1654748.75	2.250	2.25	
Perfluoroheptanoic Acid	7.64	1435793.77	2.270	2.27	
Perfluorohexane Sulfonate	7.72	1584344.39	2.263	2.26	
Perfluorooctanoic Acid	8.38	536798.94	2.248	2.25	
Perfluorononanoic Acid	8.97	1008777.70	2.146	2.15	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Printed: 3/31/16 14:48

\\alprews001\starlims$\LIMSReps\QuantValidation.rpt

Data File:	033016\1019.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/30/16 14:54:42	**Vial:**	1
Run Type:	CCV	**Dilution:**	1
Lab ID:	KQ1603023-01	**Raw Units:**	ng/mL

Target Compounds

Final Conc.Units: ng/mL

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorooctane Sulfonate	8.97	1292425.42	2.344	2.34	
Perfluorodecanoic Acid	9.45	735728.75	2.208	2.21	
Perfluoroundecanoic Acid	9.87	444924.03	2.352	2.35	
Perfluorodecane Sulfonate	9.85	1572521.95	2.276	2.28	
Perfluorododecanoic Acid	10.2	657488.32	2.306	2.31	
Perfluorooctylsulfonamide	9.96	1410503.18	2.170	2.17	
Perfluoro-n-tridecanoic acid	10.5	595508.94	2.118	2.12	
Perfluoro-n-tetradecanoic acid	10.8	233346.28	2.036	2.04	
Perfluoroheptane sulfonate	8.41	462212.00	2.088	2.09	
N-ethylperfluoro-1-octanesulfonamide	11.0	351998.64	2.397	2.40	
N-methylperfluoro-1-octanesulfonamide	10.8	237943.17	2.023	2.02	
2-(N-ethylperfluoro-1-octanesulfonamido)-eth	11.0	901402.09	2.195	2.20	
2-(N-methylperfluoro-1-octanesulfonamido)-e	10.8	693532.15	2.412	2.41	
6:2 Fluorotelomer sulfonate	8.32	332581.77	2.481	2.48	
8:2 Fluorotelomer sulfonate	9.43	308020.16	2.194	2.19	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Printed: 3/31/16 14:48

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Continuing Calibration Verification Summary

Calibration ID: KC1600038 **Spec Set:** #7001 v. 19

QAP Name: LAB QAP **List ID:** #14664

List Name: PFC Water Full List 12-29-15 **Signal ID:** 1

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perfluorobutanoic Acid	2.00	2.44	0.7943	0.9674	21.8		± 30%	Average RF
Perfluoropentanoic Acid	2.00	2.27	0.6345	0.7199	13.5		± 30%	Average RF
Perfluorobutane Sulfonate	2.00	2.27	3.759	4.274	13.7		± 30%	Average RF
Perfluorohexanoic Acid	2.00	2.25	0.9596	1.080	12.5		± 30%	Average RF
Perfluoroheptanoic Acid	2.00	2.27	0.8252	0.9367	13.5		± 30%	Average RF
Perfluorohexane Sulfonate	2.00	2.26	2.719	3.076	13.1		± 30%	Average RF
Perfluorooctanoic Acid	2.00	2.25	0.5398	0.6067	12.4		± 30%	Average RF
Perfluorononanoic Acid	2.00	2.15	0.9248	0.9922	7.3		± 30%	Average RF
Perfluorooctane Sulfonate	2.00	2.34	0.8823	1.034	17.2		± 30%	Average RF
Perfluorodecanoic Acid	2.00	2.21	1.056	1.166	10.4		± 30%	Average RF
Perfluoroundecanoic Acid	2.00	2.35	2.361	2.776	17.6		± 30%	Average RF
Perfluorodecane Sulfonate	2.00	2.28	1.105	1.258	13.8		± 30%	Average RF
Perfluorododecanoic Acid	2.00	2.31	56.24	64.85	15.3		± 30%	Average RF
Perfluorooctylsulfonamide	2.00	2.17	4.024	4.366	8.5		± 30%	Average RF
Perfluoro-n-tridecanoic acid	2.00	2.12	55.46	58.74	5.9		± 30%	Average RF
Perfluoro-n-tetradecanoic acid	2.00	2.04	20.71	23.02		1.8	± 30%	Quadratic
Perfluoroheptane sulfonate	2.00	2.09	0.8598	0.8975	4.4		± 30%	Average RF
N-ethylperfluoro-1-octanesulfonamide	2.00	2.40	0.9091	1.090	19.8		± 30%	Average RF
N-methylperfluoro-1-octanesulfonamide	2.00	2.02	0.3903	0.3947	1.1		± 30%	Average RF
2-(N-ethylperfluoro-1-octanesulfonamido	2.00	2.20	1.208	1.326	9.7		± 30%	Average RF
2-(N-methylperfluoro-1-octanesulfonamic	2.00	2.41	0.9538	1.150	20.6		± 30%	Average RF
6:2 Fluorotelomer sulfonate	2.00	2.48	6.203	7.694	24.0		± 30%	Average RF
8:2 Fluorotelomer sulfonate	2.00	2.19	6.497	7.126	9.7		± 30%	Average RF
Perfluoro-n-[1,2,3,4-13C4] butanoic acid	5.00	5.10	5.544	5.653	2.0		± 30%	Average RF
Perfluoro-n-[1,2-13C2] hexanoic acid	5.00	5.32	5.951	6.328	6.3		± 30%	Average RF
Sodium perfluoro-1-hexane[18O2]sulfon	5.00	5.36	1.985	2.126	7.1		± 30%	Average RF
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	5.00	5.47	3.339	3.653	9.4		± 30%	Average RF
Perfluoro-n-[1,2,3,4,5-13C5] nonanoic ac	5.00	5.46	3.845	4.197	9.2		± 30%	Average RF
Sodium perfluoro-1-[1,2,3,4-13C4] octan	5.00	5.31	4.859	5.160	6.2		± 30%	Average RF
Perfluoro-n-[1,2-13C2] decanoic acid	5.00	5.52	2.358	2.605	10.5		± 30%	Average RF
Perfluoro-n-[1,2-13C2]undecanoic Acid	5.00	4.96	0.6673	0.6616	-0.8		± 30%	Average RF
Perfluoro-n-[1,2-13C2]dodecanoic Acid	5.00	4.87	0.04298	0.04185	-2.6		± 30%	Average RF
S_N-ethyl-d5-perfluoro-1-octanesulfonan	5.00	5.04	1.323	1.334	0.8		± 30%	Average RF
d9-NEtFOSE (Surr)	5.00	5.66	2.478	2.806	13.3		± 30%	Average RF
d7-N-MeFOSE (Surr)	5.00	5.30	2.350	2.489	5.9		± 30%	Average RF
S_6:2 Fluorotelomer sulfonate-13C2	5.00	4.87	0.1832	0.1784	-2.6		± 30%	Average RF

Continuing Calibration Verification Summary

Calibration ID: KC1600038 **Spec Set:** #7001 v. 19

QAP Name: LAB QAP **List ID:** #9570

List Name: PFOA only **Signal ID:** 1

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perfluorooctanoic Acid	2.00	2.25	0.5398	0.6067	12.4		± 30%	Average RF
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	5.00	5.47	3.339	3.653	9.4		± 30%	Average RF

Continuing Calibration Verification Summary

Calibration ID: KC1600038 **Spec Set:** #85714 v. 6

QAP Name: DOD QSM v5.0 Kelso **List ID:** #14664

List Name: PFC Water Full List 12-29-15 **Signal ID:** 1

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perfluorobutanoic Acid	2.00	2.44	0.7943	0.9674	21.8		± 25%	Average RF
Perfluoropentanoic Acid	2.00	2.27	0.6345	0.7199	13.5		± 25%	Average RF
Perfluorobutane Sulfonate	2.00	2.27	3.759	4.274	13.7		± 25%	Average RF
Perfluorohexanoic Acid	2.00	2.25	0.9596	1.080	12.5		± 25%	Average RF
Perfluoroheptanoic Acid	2.00	2.27	0.8252	0.9367	13.5		± 25%	Average RF
Perfluorohexane Sulfonate	2.00	2.26	2.719	3.076	13.1		± 25%	Average RF
Perfluorooctanoic Acid	2.00	2.25	0.5398	0.6067	12.4		± 25%	Average RF
Perfluorononanoic Acid	2.00	2.15	0.9248	0.9922	7.3		± 25%	Average RF
Perfluorooctane Sulfonate	2.00	2.34	0.8823	1.034	17.2		± 25%	Average RF
Perfluorodecanoic Acid	2.00	2.21	1.056	1.166	10.4		± 25%	Average RF
Perfluoroundecanoic Acid	2.00	2.35	2.361	2.776	17.6		± 25%	Average RF
Perfluorodecane Sulfonate	2.00	2.28	1.105	1.258	13.8		± 25%	Average RF
Perfluorododecanoic Acid	2.00	2.31	56.24	64.85	15.3		± 25%	Average RF
Perfluorooctylsulfonamide	2.00	2.17	4.024	4.366	8.5		± 25%	Average RF
Perfluoro-n-tridecanoic acid	2.00	2.12	55.46	58.74	5.9		± 25%	Average RF
Perfluoro-n-tetradecanoic acid	2.00	2.04	20.71	23.02		1.8	± 25%	Quadratic
Perfluoroheptane sulfonate	2.00	2.09	0.8598	0.8975	4.4		± 25%	Average RF
N-ethylperfluoro-1-octanesulfonamide	2.00	2.40	0.9091	1.090	19.8		± 25%	Average RF
N-methylperfluoro-1-octanesulfonamide	2.00	2.02	0.3903	0.3947	1.1		± 25%	Average RF
2-(N-ethylperfluoro-1-octanesulfonamido	2.00	2.20	1.208	1.326	9.7		± 25%	Average RF
2-(N-methylperfluoro-1-octanesulfonami	2.00	2.41	0.9538	1.150	20.6		± 25%	Average RF
6:2 Fluorotelomer sulfonate	2.00	2.48	6.203	7.694	24.0		± 25%	Average RF
8:2 Fluorotelomer sulfonate	2.00	2.19	6.497	7.126	9.7		± 25%	Average RF
Perfluoro-n-[1,2,3,4-13C4] butanoic acid	5.00	5.10	5.544	5.653	2.0		± 25%	Average RF
Perfluoro-n-[1,2-13C2] hexanoic acid	5.00	5.32	5.951	6.328	6.3		± 25%	Average RF
Sodium perfluoro-1-hexane[18O2]sulfon	5.00	5.36	1.985	2.126	7.1		± 25%	Average RF
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	5.00	5.47	3.339	3.653	9.4		± 25%	Average RF
Perfluoro-n-[1,2,3,4,5-13C5] nonanoic ac	5.00	5.46	3.845	4.197	9.2		± 25%	Average RF
Sodium perfluoro-1-[1,2,3,4-13C4] octan	5.00	5.31	4.859	5.160	6.2		± 25%	Average RF
Perfluoro-n-[1,2-13C2] decanoic acid	5.00	5.52	2.358	2.605	10.5		± 25%	Average RF
Perfluoro-n-[1,2-13C2]undecanoic Acid	5.00	4.96	0.6673	0.6616	-0.8		± 25%	Average RF
Perfluoro-n-[1,2-13C2]dodecanoic Acid	5.00	4.87	0.04298	0.04185	-2.6		± 25%	Average RF
S_N-ethyl-d5-perfluoro-1-octanesulfonan	5.00	5.04	1.323	1.334	0.8		± 25%	Average RF
d9-NEtFOSE (Surr)	5.00	5.66	2.478	2.806	13.3		± 25%	Average RF
d7-N-MeFOSE (Surr)	5.00	5.30	2.350	2.489	5.9		± 25%	Average RF
S_6:2 Fluorotelomer sulfonate-13C2	5.00	4.87	0.1832	0.1784	-2.6		± 25%	Average RF

Continuing Calibration Verification Summary

Calibration ID: KC1600038 **Spec Set:** #85714 v. 6

QAP Name: DOD QSM v5.0 Kelso **List ID:** #14945

List Name: PFOA, PFOS, and PFBS only **Signal ID:** 1

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perfluorobutane Sulfonate	2.00	2.27	3.759	4.274	13.7		± 25%	Average RF
Perfluorooctanoic Acid	2.00	2.25	0.5398	0.6067	12.4		± 25%	Average RF
Perfluorooctane Sulfonate	2.00	2.34	0.8823	1.034	17.2		± 25%	Average RF
Sodium perfluoro-1-hexane[18O2]sulfon:	5.00	5.36	1.985	2.126	7.1		± 25%	Average RF
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	5.00	5.47	3.339	3.653	9.4		± 25%	Average RF
Sodium perfluoro-1-[1,2,3,4-13C4] octan	5.00	5.31	4.859	5.160	6.2		± 25%	Average RF

Continuing Calibration Verification Summary

Calibration ID: KC1600038 **Spec Set:** #97972 v. 4

QAP Name: CH2MHILL **List ID:** #14634

List Name: CH2MHILL with 6:2, 8:2 **Signal ID:** 1

Analyte Name	Expected	Result	Average RF	CCV RF	%D	%Drift	Criteria	Curve Fit
Perfluorobutane Sulfonate	2.00	2.27	3.759	4.274	13.7		± 25%	Average RF
Perfluoroheptanoic Acid	2.00	2.27	0.8252	0.9367	13.5		± 25%	Average RF
Perfluorohexane Sulfonate	2.00	2.26	2.719	3.076	13.1		± 25%	Average RF
Perfluorooctanoic Acid	2.00	2.25	0.5398	0.6067	12.4		± 25%	Average RF
Perfluorononanoic Acid	2.00	2.15	0.9248	0.9922	7.3		± 25%	Average RF
Perfluorooctane Sulfonate	2.00	2.34	0.8823	1.034	17.2		± 25%	Average RF
6:2 Fluorotelomer sulfonate	2.00	2.48	6.203	7.694	24.0		± 25%	Average RF
8:2 Fluorotelomer sulfonate	2.00	2.19	6.497	7.126	9.7		± 25%	Average RF
Perfluoro-n-[1,2-13C2] hexanoic acid	5.00	5.32	5.951	6.328	6.3		± 25%	Average RF
Sodium perfluoro-1-hexane[18O2]sulfon:	5.00	5.36	1.985	2.126	7.1		± 25%	Average RF
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	5.00	5.47	3.339	3.653	9.4		± 25%	Average RF
Perfluoro-n-[1,2,3,4,5-13C5] nonanoic ac	5.00	5.46	3.845	4.197	9.2		± 25%	Average RF
Sodium perfluoro-1-[1,2,3,4-13C4] octan	5.00	5.31	4.859	5.160	6.2		± 25%	Average RF
S_6:2 Fluorotelomer sulfonate-13C2	5.00	4.87	0.1832	0.1784	-2.6		± 25%	Average RF

Project	Ewan's Projects\PFCs	Result Table	033016.rdb
Data File	033016\1019.wiff	Algorithm Used	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	Instrument Name	LCMS02

Sample Name	PFC 2ppb ICV	Injection Vial	13
Acquisition Date	3/30/2016 2:54:42 PM	Injection Volume	10
Acquisition Method	PFC_090315 schedule mrm.dam	Sample Type	Quality Control
Sample ID	15-OLC-02-35M	Dilution Factor	1.00

Results Summary

Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
Pfba 1	2.61 (2.60)	13c_pfba	3423516	1324765	2.00	2.4360	122	No
Pfpea 1	5.08 (5.06)	13c_pfhxa	3831941	1103450	2.00	2.2690	113	No
Pfbs 1	5.53 (5.53)	18o-pfhs	1287462	2201042	2.00	2.2740	114	No
Pfhxa 1	6.63 (6.63)	13c_pfhxa	3831941	1654749	2.00	2.2500	113	No
Pfhpa 1	7.64 (7.64)	13c_pfhxa	3831941	1435794	2.00	2.2700	114	No
Pfhxs 1	7.72 (7.72)	18o-pfhs	1287462	1584344	2.00	2.2630	113	No
Pfoa 1	8.38 (8.36)	13c-pfoa	2211960	536799	2.00	2.2480	112	No
Pfna 1	8.97 (8.95)	13c-pfna	2541686	1008778	2.00	2.1460	107	No
Pfos 1	8.97 (8.96)	13c-pfos	3124706	1292425	2.00	2.3440	117	No
Pfda 1	9.45 (9.44)	13c-pfda	1577721	735729	2.00	2.2080	110	No
Pfuna 1	9.87 (9.86)	13c-pfuna	400687	444924	2.00	2.3520	118	No
Pfds 1	9.85 (9.84)	13c-pfos	3124706	1572522	2.00	2.2760	114	No
Pfdoa 1	10.20 (10.20)	13c-pfdoda	25346	657488	2.00	2.3060	115	No
Fosa 1	9.96 (9.94)	d5-NEtFOSA	807692	1410503	2.00	2.1700	109	No
Pfteda 1	10.80 (10.80)	13c-pfdoda	25346	233346	2.00	2.0360	102	No
PFHpS 1	8.41 (8.39)	18o-pfhs	1287462	462212	2.00	2.0880	104	No
NMeFOSE 1	10.80 (10.80)	d7-NMeFOSE	1507043	693532	2.00	2.4120	121	No
NMeFOSA 1	10.80 (10.80)	d7-NMeFOSE	1507043	237943	2.00	2.0230	101	No
NEtFOSE 1	11.00 (11.00)	d9-EtFOSE	1699340	901402	2.00	2.1950	110	No
NEtFOSA 1	11.00 (11.00)	d5-NEtFOSA	807692	351999	2.00	2.3970	120	No
d9-EtFOSE 1	11.00 (11.00)	N_mefosa d3	605595	1699340	5.00	5.6630	113	No
d5-NEtFOSA 1	11.00 (11.00)	N_mefosa d3	605595	807692	5.00	5.0400	101	No
d7-NMeFOSE 1	10.80 (10.80)	N_mefosa d3	605595	1507043	5.00	5.2950	106	No

APR 6 2016

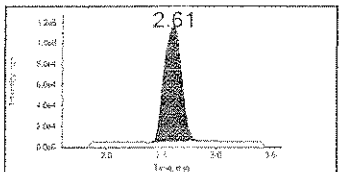
Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
13C_PFBA 1	2.60 (2.58)	N_mefosa d3	605595	3423516	5.00	5.0980	102	No
13C_PFHXA 1	6.63 (6.63)	N_mefosa d3	605595	3831941	5.00	5.3160	106	No
13C-PFOA 1	8.37 (8.35)	N_mefosa d3	605595	2211960	5.00	5.4690	109	No
13C-PFNA 1	8.96 (8.96)	N_mefosa d3	605595	2541686	5.00	5.4580	109	No
13C-PFOS 1	8.97 (8.95)	N_mefosa d3	605595	3124706	5.00	5.3100	106	No
13C-PFDA 1	9.45 (9.45)	N_mefosa d3	605595	1577721	5.00	5.5240	110	No
13C-PFUNA 1	9.86 (9.85)	N_mefosa d3	605595	400687	5.00	4.9580	99	No
18O-PFHxS 1	7.72 (7.72)	N_mefosa d3	605595	1287462	5.00	5.3560	107	No
13C-PFDoA 1	10.20 (10.20)	N_mefosa d3	605595	25346	5.00	4.8690	97	No
PFTrDA 1	10.50 (10.50)	13c-pfdoda	25346	595509	2.00	2.1180	106	No
6_2-FTS 1	8.32 (8.31)	13C2-6_2-FTS	108066	332582	2.00	2.4810	124	No
8_2-FTS 1	9.43 (9.42)	13C2-6_2-FTS	108066	308020	2.00	2.1940	110	No
13C2-6_2-FTS 1	8.32 (8.31)	N_mefosa d3	605595	108066	5.00	4.8700	97	No

IRC Summary

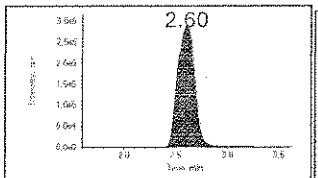
Analyte Peak Name	RT (Exp RT)	Area	Modified?	Ratio Confirms ID
Pfba 2	2.60 (2.58)	1316925	No	YES
Pfpea 2	5.08 (5.07)	1114027	No	YES
Pfbs 2	5.53 (5.52)	1015031	No	YES
Pfhxa 2	6.63 (6.63)	136765	No	YES
Pfhpa 2	7.64 (7.63)	602423	No	YES
Pfhxs 2	7.72 (7.72)	615975	No	YES
Pfoa 2	8.38 (8.36)	982459	No	YES
Pfna 2	8.97 (8.95)	345387	No	YES
Pfos 2	8.97 (8.95)	465599	No	YES
Pfda 2	9.45 (9.44)	198610	No	YES
Pfuna 2	9.86 (9.85)	210955	No	YES
Pfds 2	9.84 (9.84)	550339	No	YES
Pfdoa 2	10.20 (10.20)	244803	No	YES

Analyte Peak Name	RT (Exp RT)	Area	Modified?	Ratio Confirms ID
Fosa 2	9.96 (9.94)	28108	No	No
Pfteda 2	10.80 (10.80)	113197	No	YES
PFHpS 2	8.41 (8.39)	179779	No	YES
NMeFOSE 2	10.80 (10.80)	3109	No	YES
NMeFOSA 2	10.80 (10.80)	222937	No	YES
NEtFOSE 2	11.00 (11.00)	2043	No	YES
NEtFOSA 2	11.00 (11.00)	244314	No	YES
PFTrDA 2	10.50 (10.50)	209527	No	YES
6_2-FTS 2	8.32 (8.30)	449664	No	YES
8_2-FTS 2	9.43 (9.41)	36017	No	YES

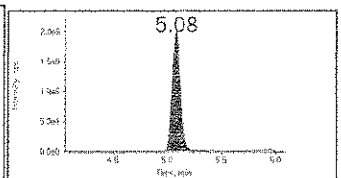
Quantitative Peak Review — PFC 2ppb ICV 15-OLC-02-35M



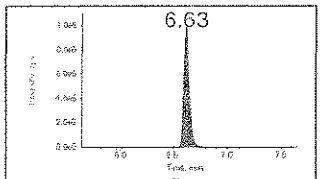
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



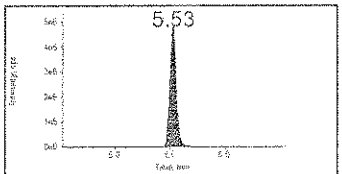
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



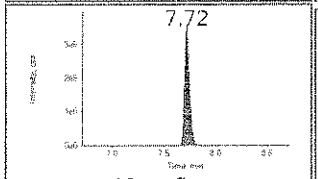
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



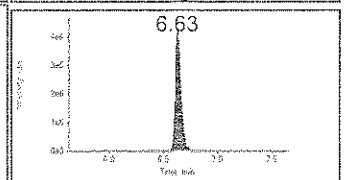
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



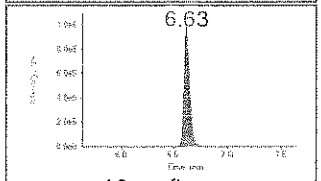
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



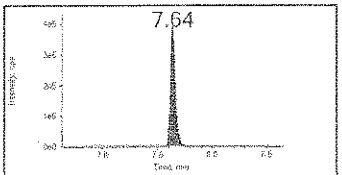
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



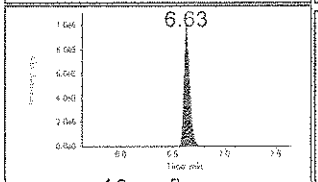
Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak



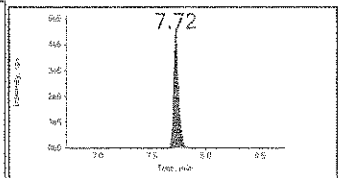
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



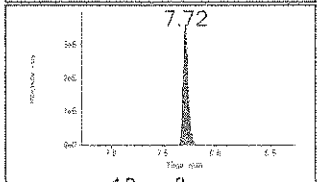
Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



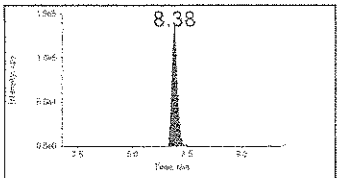
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



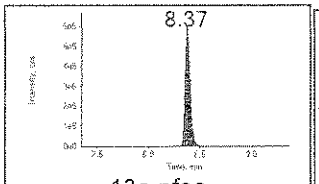
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



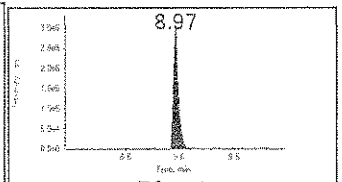
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



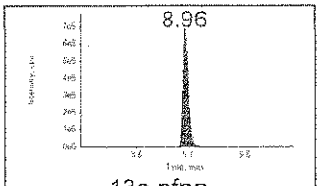
Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



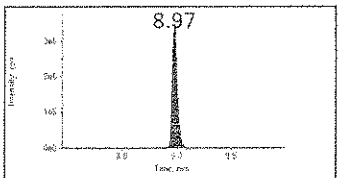
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



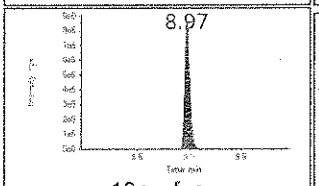
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



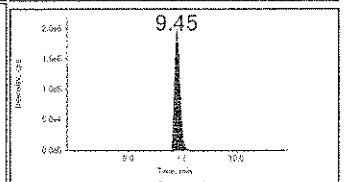
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



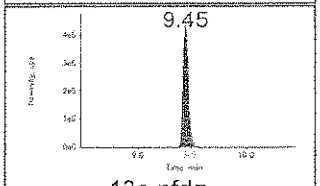
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



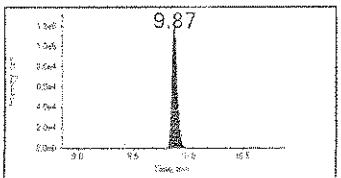
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



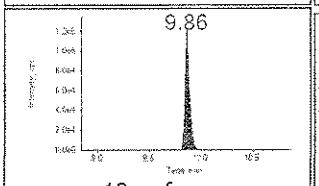
Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



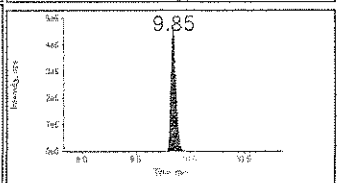
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



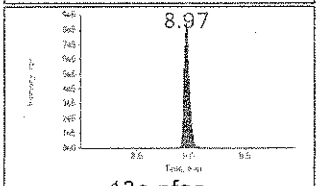
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



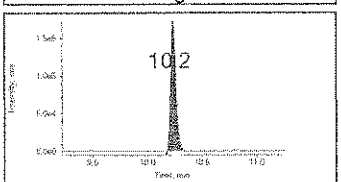
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



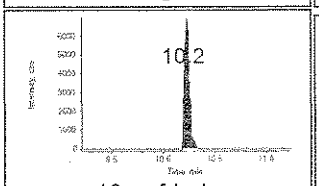
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



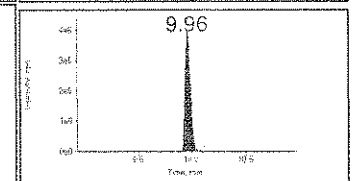
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



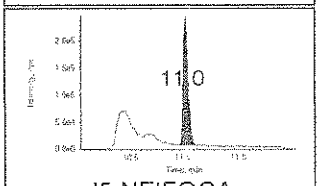
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



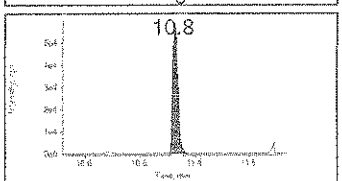
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



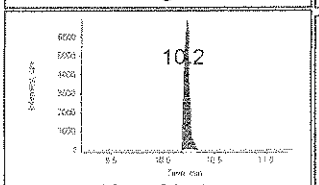
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



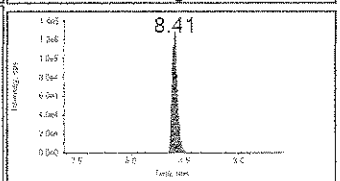
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



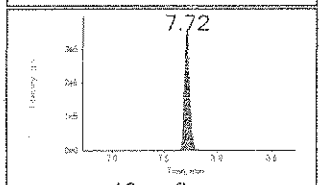
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



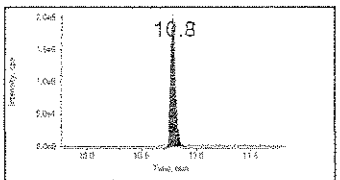
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



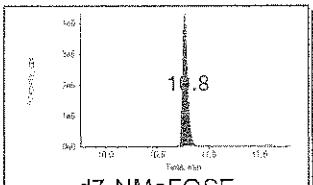
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



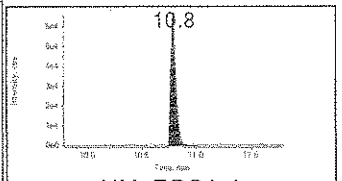
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



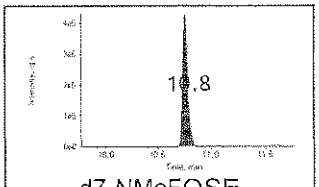
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



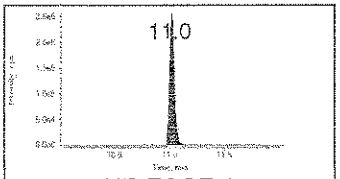
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



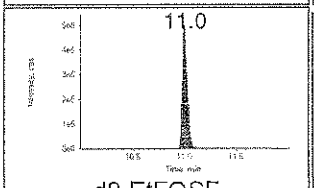
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



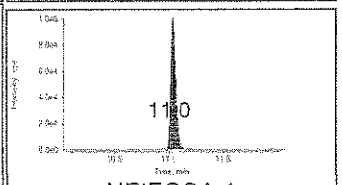
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



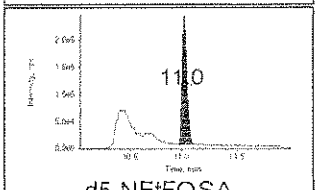
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



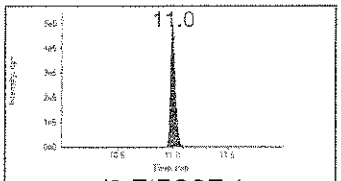
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



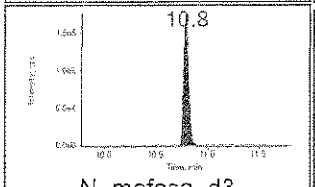
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



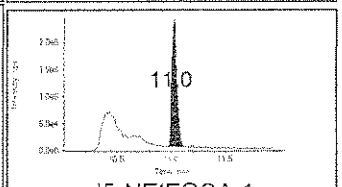
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



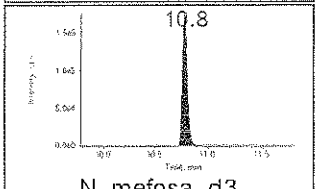
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



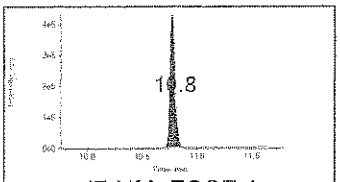
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



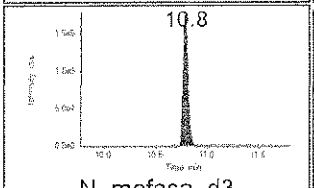
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



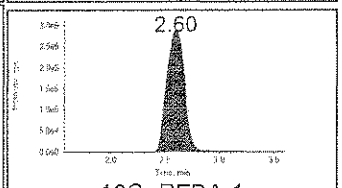
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



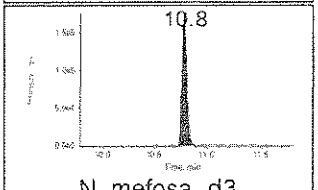
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



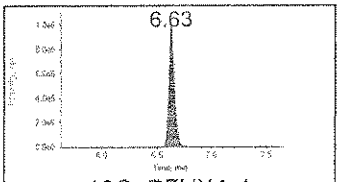
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



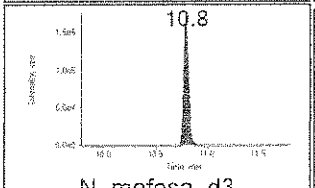
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



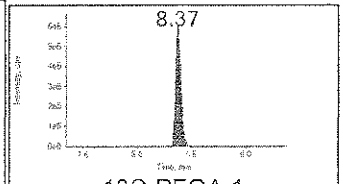
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



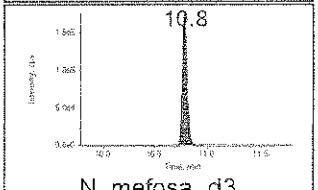
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



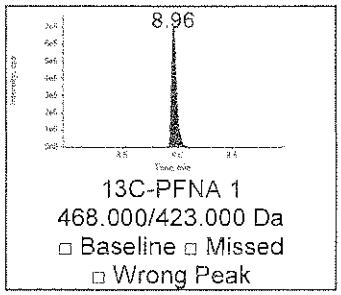
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



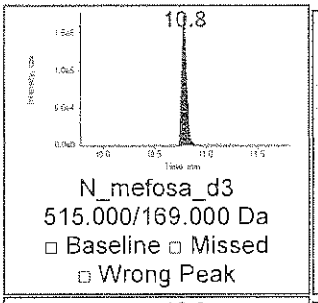
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



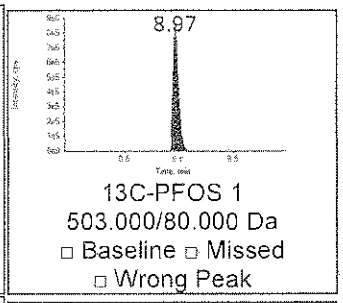
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



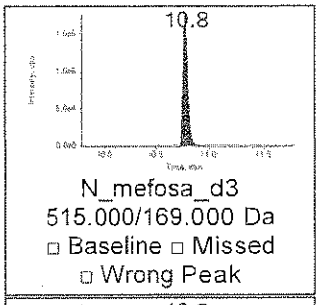
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



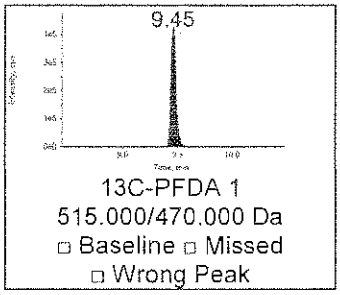
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



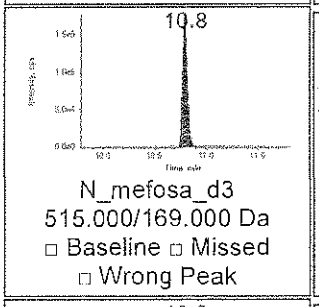
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



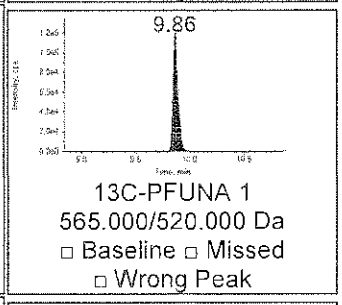
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



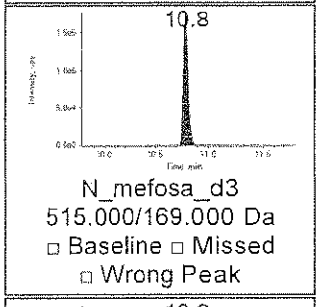
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



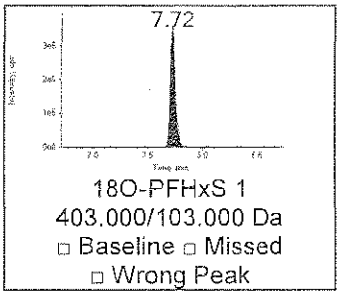
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



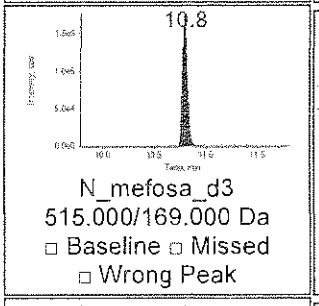
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



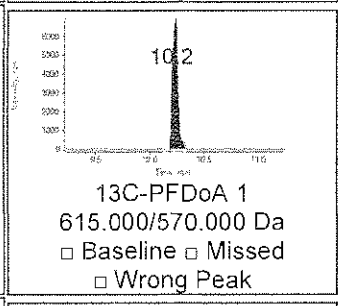
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



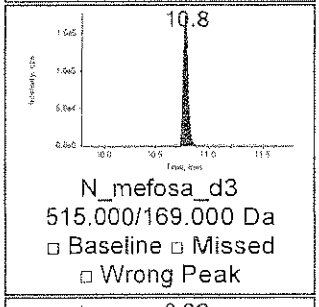
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



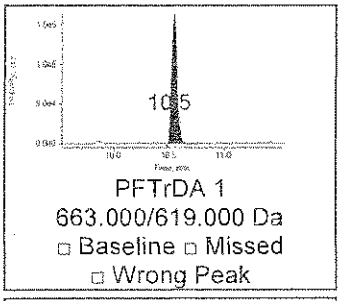
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



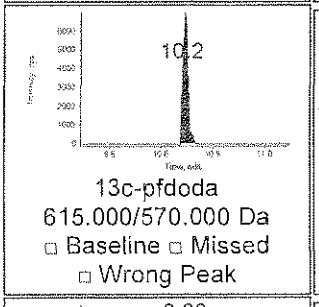
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



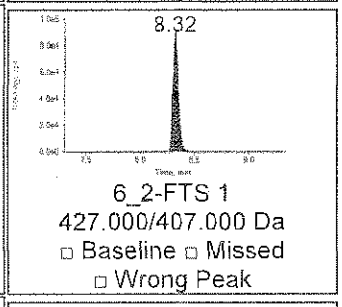
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



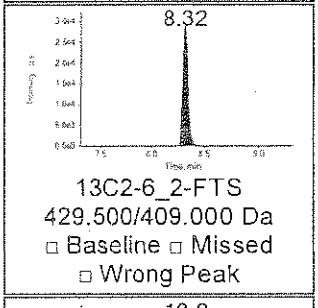
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



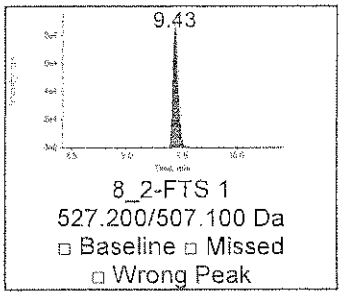
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



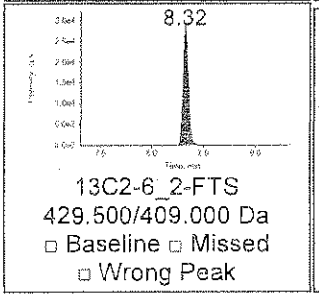
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



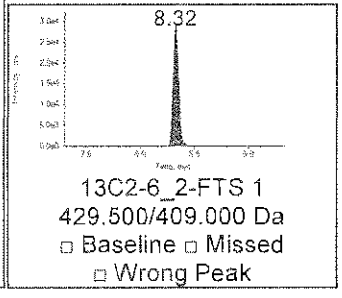
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



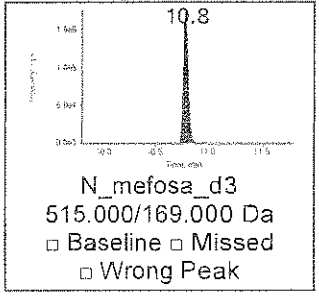
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

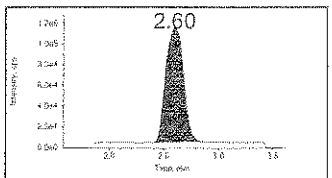


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

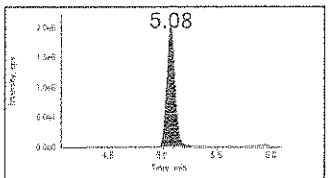


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

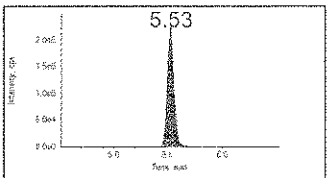
Ion Ratio Confirmation



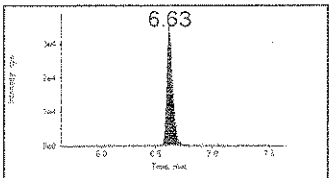
Pfba 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



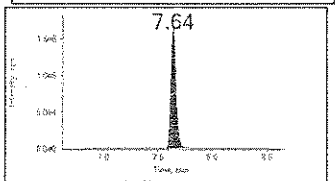
Pfpea 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



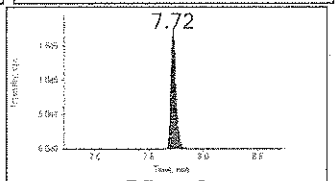
Pfbs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



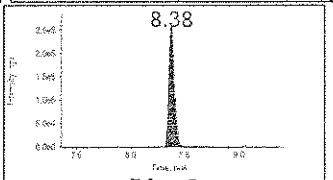
Pfhxa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



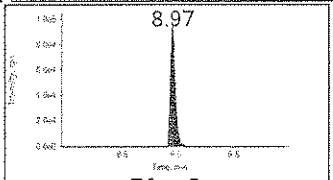
Pfhpa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



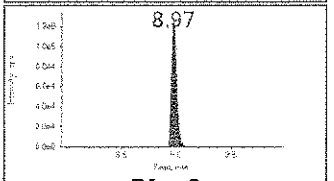
Pfhxs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



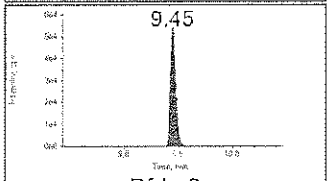
Pfoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



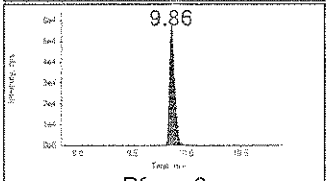
Pfna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



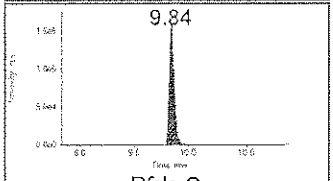
Pfos 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



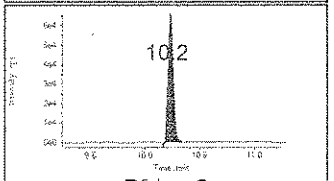
Pfda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



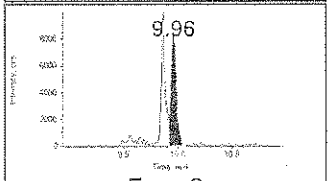
Pfuna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



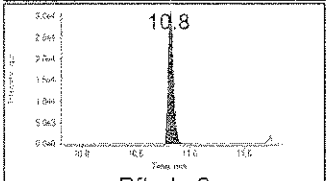
Pfds 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



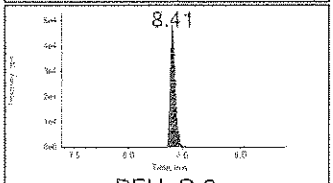
Pfdoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



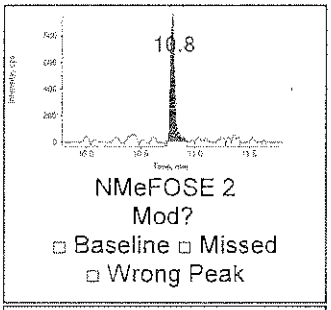
Fosa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



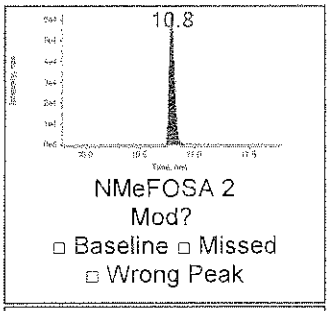
Pfteda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



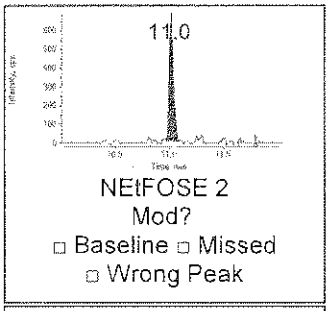
PFHpS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



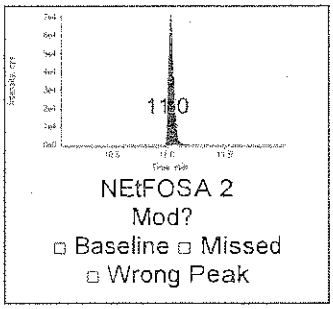
NMeFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



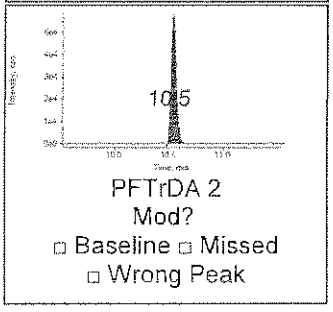
NMeFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



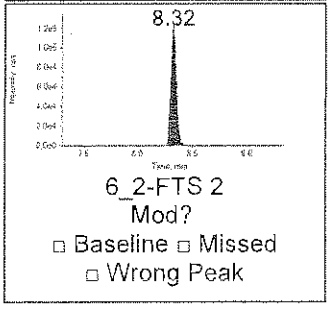
NEtFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



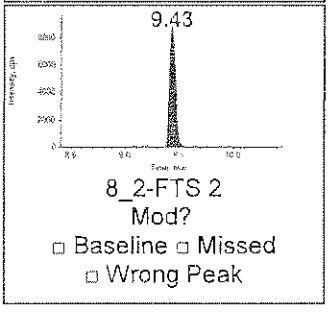
NEtFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak

Project	Ewan's Projects\PFCs
Data File	033016\1020.wiff
Result Table	033016.rdb
Instrument Name	LCMS02

Sample Name	IB	Injection Volume	10
Acquisition Date	3/30/2016 3:14:01 PM	Sample Type	Unknown
Acquisition Method	PFC_090315 schedule mrm.dam	Dilution Factor	1.00
Injection Vial	2	Weight to Volume	0.00

Results Summary

Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
Pfba 1	13c_pfba	3403755	0.00 (2.60)	0	N/A	Yes
Pfpea 1	13c_pfhxa	3774294	0.00 (5.06)	0	N/A	No
Pfbs 1	18o-pfhs	1233390	0.00 (5.53)	0	N/A	No
Pfhxa 1	13c_pfhxa	3774294	6.63 (6.63)	3654	0.0050	No
Pfhpa 1	13c_pfhxa	3774294	0.00 (7.64)	0	N/A	No
Pfhxs 1	18o-pfhs	1233390	7.71 (7.72)	11831	0.0180	No
Pfoa 1	13c-pfoa	2175464	8.36 (8.36)	2893	0.0120	No
Pfna 1	13c-pfna	2563824	0.00 (8.95)	0	N/A	No
Pfos 1	13c-pfos	3173852	0.00 (8.96)	0	N/A	No
Pfda 1	13c-pfda	1648390	0.00 (9.44)	0	N/A	No
Pfuna 1	13c-pfuna	443922	9.86 (9.86)	3248	0.0150	No
Pfds 1	13c-pfos	3173852	0.00 (9.84)	0	N/A	No
Pfdoa 1	13c-pfdoda	26508	0.00 (10.20)	0	N/A	No
Fosa 1	d5-NEtFOSA	823659	9.96 (9.94)	4116	0.0060	No
Pfteda 1	13c-pfdoda	26508	0.00 (10.80)	0	N/A	No
PFHpS 1	18o-pfhs	1233390	0.00 (8.39)	0	N/A	No
NMeFOSE 1	d7-NMeFOSE	1625871	0.00 (10.80)	0	N/A	No
NMeFOSA 1	d7-NMeFOSE	1625871	0.00 (10.80)	0	N/A	No
NEtFOSE 1	d9-EtFOSE	1812705	0.00 (11.00)	0	N/A	No
NEtFOSA 1	d5-NEtFOSA	823659	0.00 (11.00)	0	N/A	No

APR 01 2016

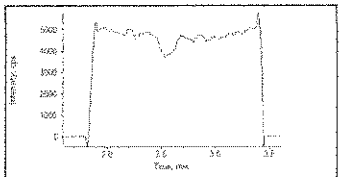
Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
d9-EtFOSE 1	N_mefosa_d3	697123	11.00 (11.00)	1812705	5.2470	No
d5-NEtFOSA 1	N_mefosa_d3	697123	11.00 (11.00)	823659	4.4650	No
d7-NMeFOSE 1	N_mefosa_d3	697123	10.80 (10.80)	1625871	4.9630	No
13C_PFBA 1	N_mefosa_d3	697123	2.57 (2.58)	3403755	4.4030	No
13C_PFHXA 1	N_mefosa_d3	697123	6.63 (6.63)	3774294	4.5490	No
13C-PFOA 1	N_mefosa_d3	697123	8.36 (8.35)	2175464	4.6730	No
13C-PFNA 1	N_mefosa_d3	697123	8.95 (8.96)	2563824	4.7830	No
13C-PFOS 1	N_mefosa_d3	697123	8.96 (8.95)	3173852	4.6850	No
13C-PFDA 1	N_mefosa_d3	697123	9.44 (9.45)	1648390	5.0140	No
13C-PFUNA 1	N_mefosa_d3	697123	9.86 (9.85)	443922	4.7720	No
18O-PFHxS 1	N_mefosa_d3	697123	7.71 (7.72)	1233390	4.4570	No
13C-PFDoA 1	N_mefosa_d3	697123	10.20 (10.20)	26508	4.4240	No
PFTrDA 1	13c-pfdoda	26508	0.00 (10.50)	0	N/A	No
6_2-FTS 1	13C2-6_2-FTS	110093	0.00 (8.31)	0	N/A	No
8_2-FTS 1	13C2-6_2-FTS	110093	0.00 (9.42)	0	N/A	No
13C2-6_2-FTS 1	N_mefosa_d3	697123	8.31 (8.31)	110093	4.3100	No

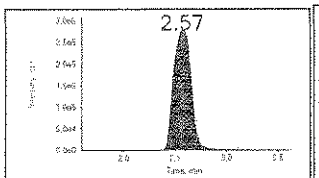
IRC Summary

Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfba 2	0.00 (2.58)	0	No	0.00 (0.98)	No
Pfpea 2	0.00 (5.07)	0	No	0.00 (1.01)	No
Pfbs 2	0.00 (5.52)	0	No	0.00 (0.48)	No
Pfhxa 2	0.00 (6.63)	0	No	0.00 (0.09)	No
Pfhpa 2	0.00 (7.63)	0	No	0.00 (0.44)	No
Pfhxs 2	7.72 (7.72)	5219	No	0.44 (0.40)	YES
Pfoa 2	8.36 (8.36)	3705	No	1.28 (1.81)	No
Pfna 2	0.00 (8.95)	0	Yes	0.00 (0.33)	No

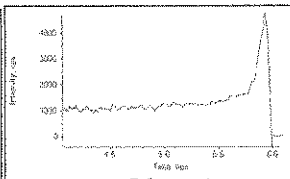
Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfos 2	0.00 (8.95)	0	No	0.00 (0.36)	No
Pfda 2	0.00 (9.44)	0	No	0.00 (0.26)	No
Pfuna 2	9.86 (9.85)	1424	No	0.44 (0.50)	YES
Pfds 2	0.00 (9.84)	0	No	0.00 (0.36)	No
Pfdoa 2	0.00 (10.20)	0	No	0.00 (0.37)	No
Fosa 2	9.96 (9.94)	309	No	0.08 (0.03)	No
Pfteda 2	0.00 (10.80)	0	Yes	0.00 (0.42)	No
PFHpS 2	0.00 (8.39)	0	No	0.00 (0.39)	No
NMeFOSE 2	0.00 (10.80)	0	No	0.00 (0.00)	No
NMeFOSA 2	0.00 (10.80)	0	No	0.00 (0.93)	No
NEtFOSE 2	0.00 (11.00)	0	No	0.00 (0.00)	No
NEtFOSA 2	0.00 (11.00)	0	No	0.00 (0.70)	No
PFTrDA 2	0.00 (10.50)	0	No	0.00 (0.32)	No
6_2-FTS 2	0.00 (8.30)	0	No	0.00 (1.35)	No
8_2-FTS 2	0.00 (9.41)	0	No	0.00 (0.12)	No

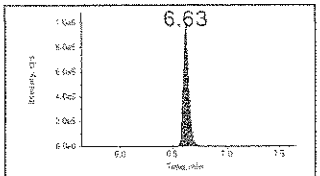
Quantitative Peak Review IB *No data for Sample ID*


Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

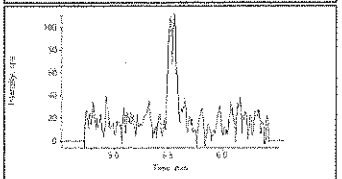


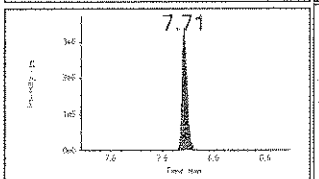
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak

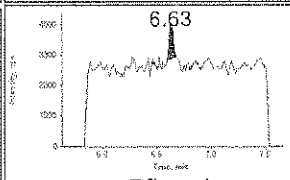


13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak

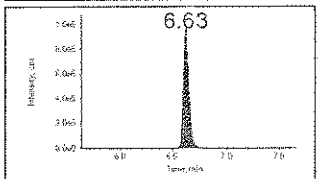

Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



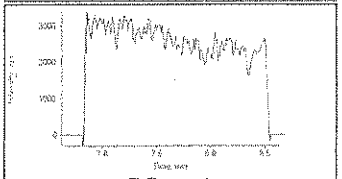
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak

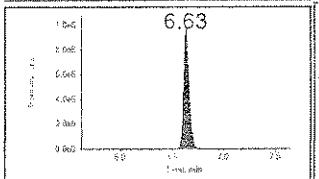


Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak

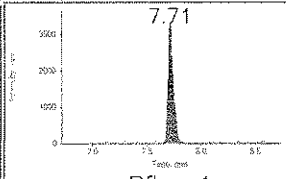


13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak

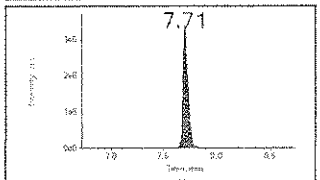

Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



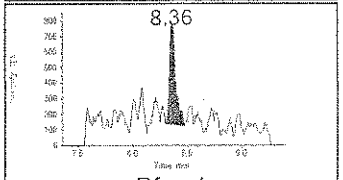
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



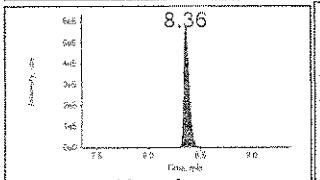
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



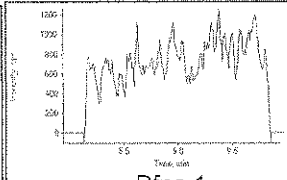
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak

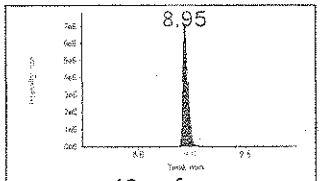


Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

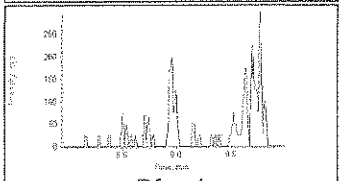


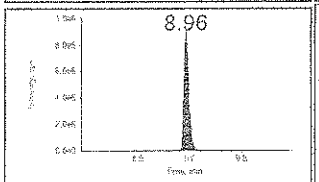
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak

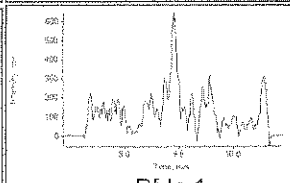


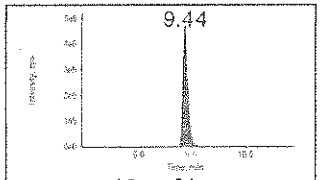
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak

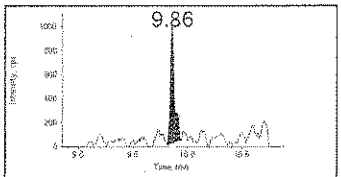


13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak

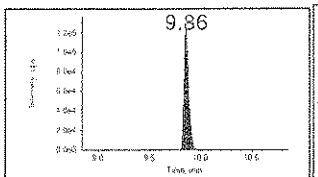

Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



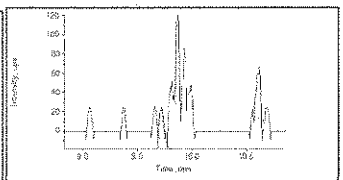
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



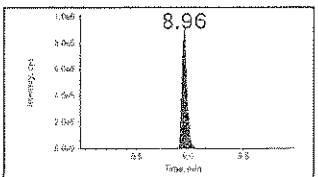
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



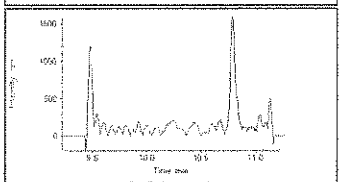
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



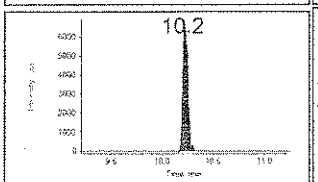
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



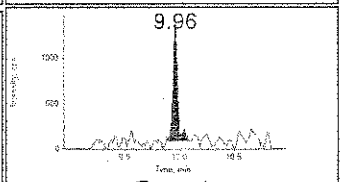
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



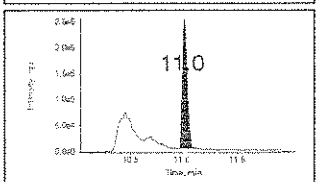
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



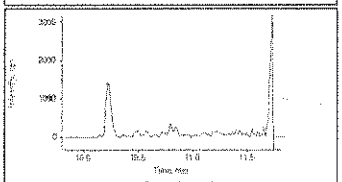
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



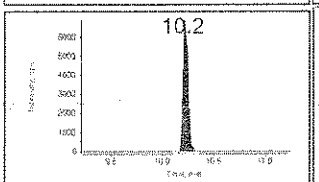
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



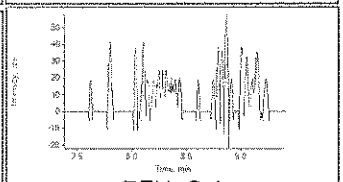
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



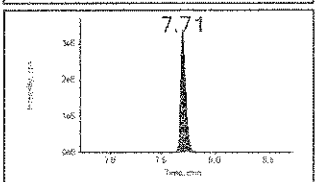
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



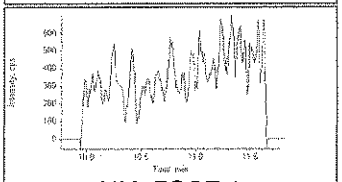
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



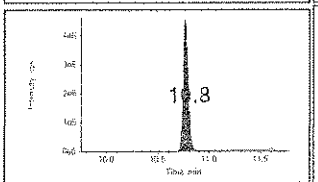
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



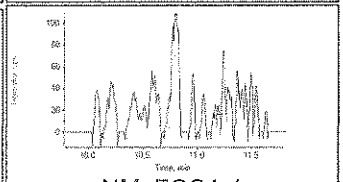
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



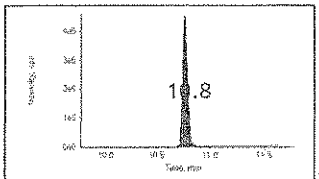
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



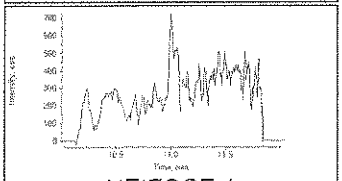
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



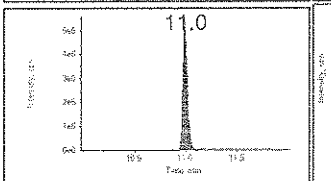
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



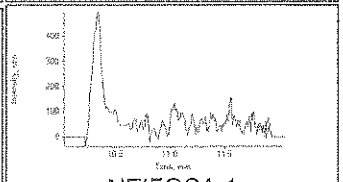
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



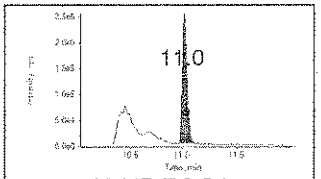
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



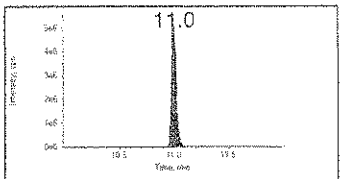
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



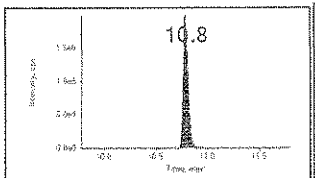
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



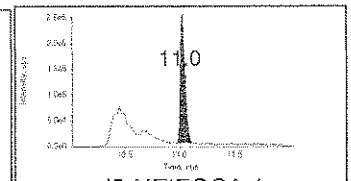
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



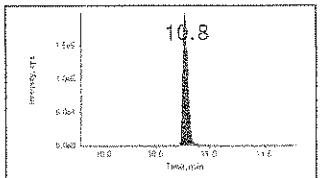
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



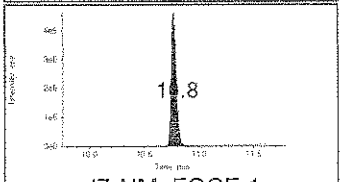
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



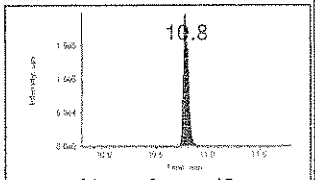
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



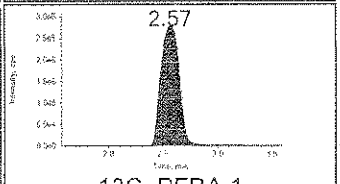
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



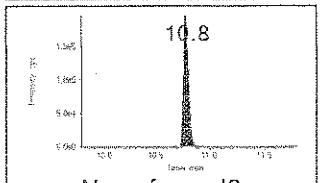
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



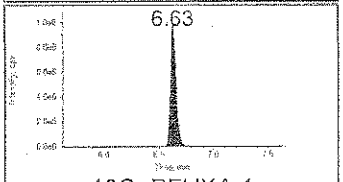
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



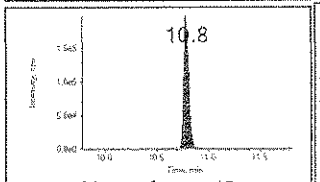
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



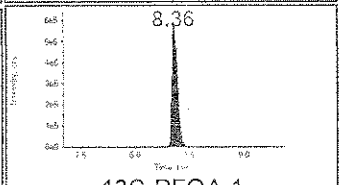
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



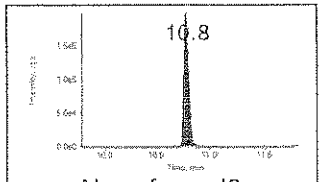
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



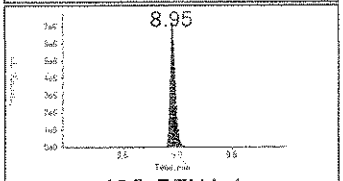
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



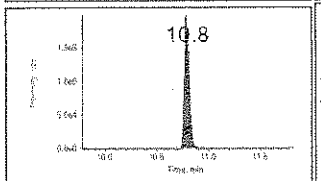
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



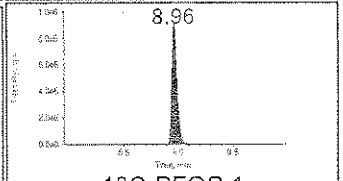
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



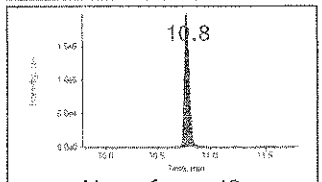
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



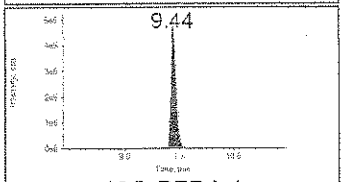
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



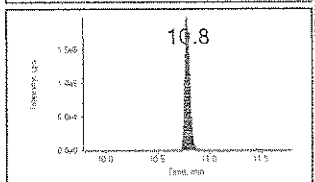
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



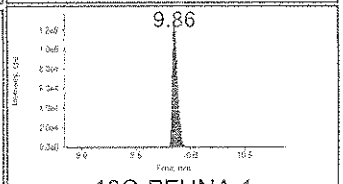
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



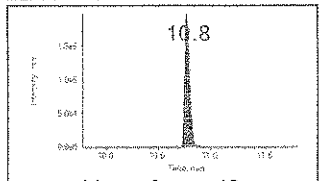
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



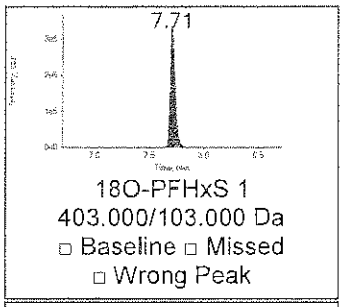
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



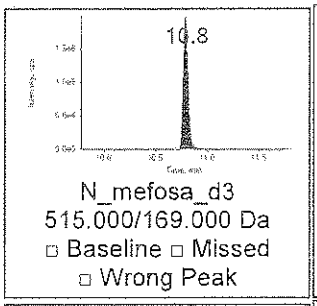
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



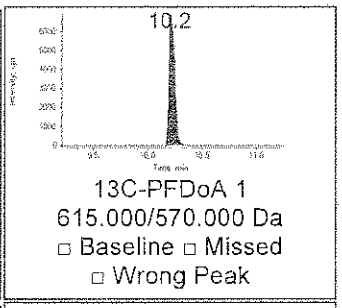
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



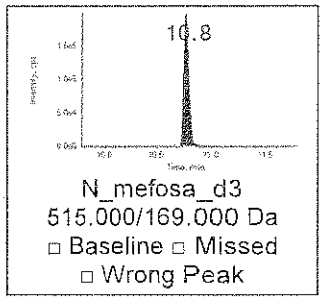
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



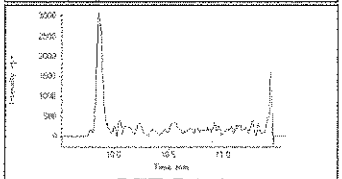
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



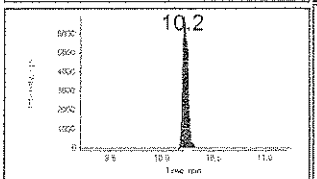
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



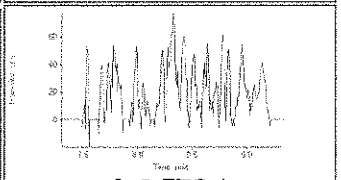
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



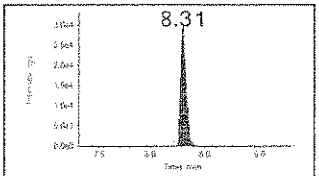
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



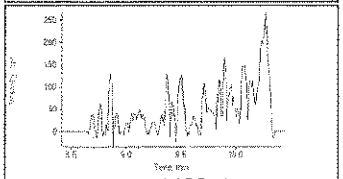
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



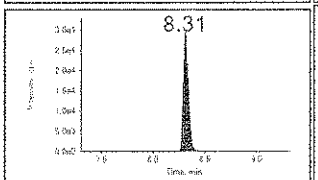
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



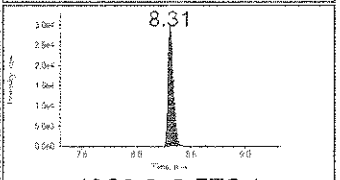
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



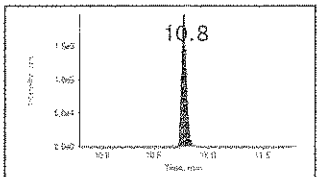
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

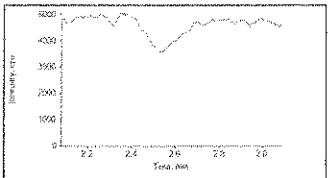


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

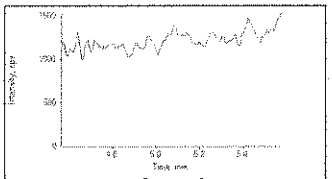


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

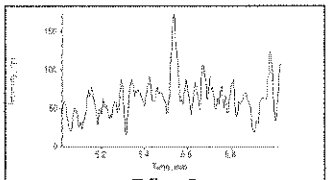
Ion Ratio Confirmation



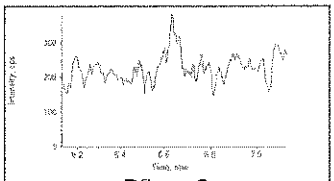
Pfba 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



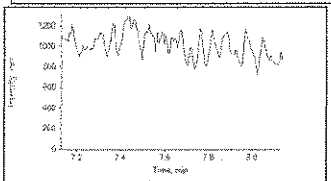
Pfpea 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



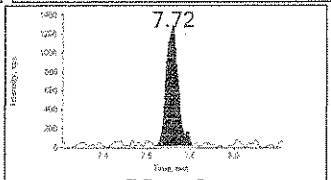
Pfbs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



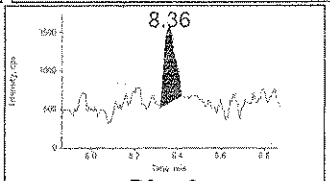
Pfhxa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



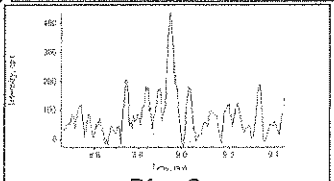
Pfhpa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



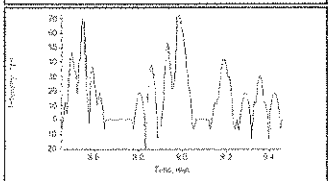
Pfhxs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



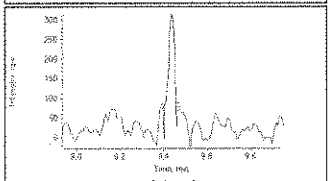
Pfoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



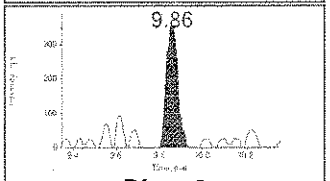
Pfna 2
Mod? Yes
□ Baseline □ Missed
□ Wrong Peak



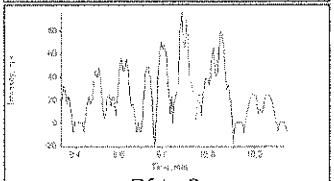
Pfos 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



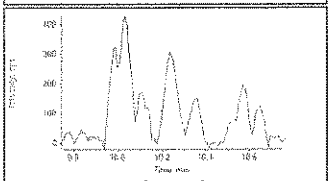
Pfda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



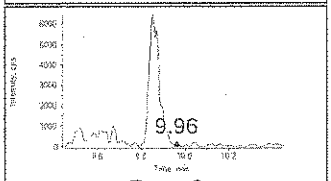
Pfuna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



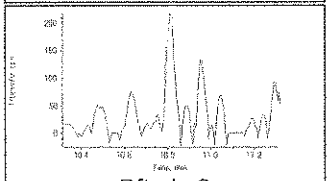
Pfds 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



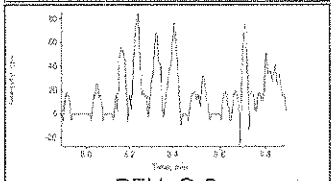
Pfdoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



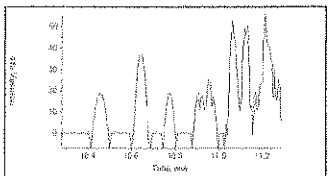
Fosa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



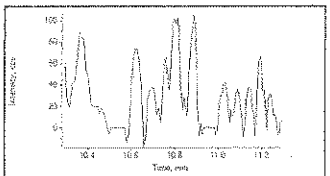
Pfteda 2
Mod? Yes
□ Baseline □ Missed
□ Wrong Peak



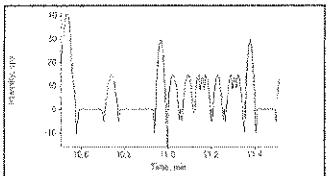
PFHpS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



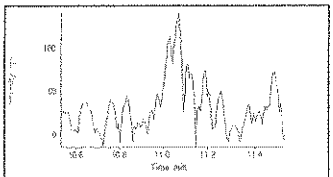
NMeFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



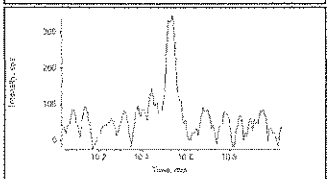
NMeFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



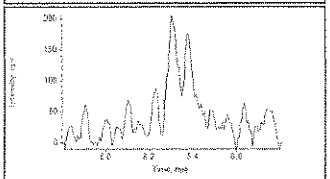
NEtFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



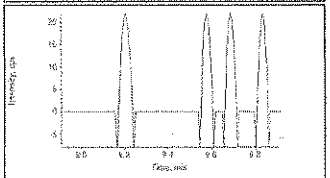
NEtFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

Quantitation Report

Data File:	033016\1031.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/30/16 18:46:36	**Vial:**	12
Run Type:	CCV	**Dilution:**	1
Lab ID:	KQ1603023-02	**Raw Units:**	ng/mL

Bottle ID:		**Tier:**	V	**Matrix:**	Water
Prod Code:	PFOA	**Collect Date:**	3/16/16	**Receive Date:**	3/18/16

Analysis Lot:	490080	**Prep Lot:**		**Report Group:**	KQ1603023
Analysis Method:	PFC/537M	**Prep Method:**			
		Prep Date:			

Title:	Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS	**Calibration ID:**	KC1600038
		Report List ID:	14664

Internal Standard Compounds

Parameter Name	RT	Response	Solution Conc	Area Criteria
N-methyl-d3-perfluoro-1-octanesulfonamide	10.8	622491.57	5.00	OK

Surrogate Compounds

Parameter Name	RT	Response	Solution Conc	% Rec	% Rec Criteria
Perfluoro-n-[1,2,3,4-13C4] butanoic acid	2.56	3663324.45	5.307	5.31	
Perfluoro-n-[1,2-13C2] hexanoic acid	6.61	4073658.15	5.498	5.50	
Sodium perfluoro-1-hexane[18O2]sulfonate	7.70	1312844.19	5.313	5.31	
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	8.34	2248304.71	5.408	5.41	
Perfluoro-n-[1,2,3,4,5-13C5] nonanoic acid	8.94	2613377.15	5.460	5.46	
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulf	8.94	3371005.22	5.573	5.57	
Perfluoro-n-[1,2-13C2] decanoic acid	9.42	1685626.14	5.742	5.74	
Perfluoro-n-[1,2-13C2]undecanoic Acid	9.85	433883.09	5.223	5.22	
Perfluoro-n-[1,2-13C2]dodecanoic Acid	10.2	26275.67	4.911	4.91	
S_N-ethyl-d5-perfluoro-1-octanesulfonamide	11.0	881753.93	5.353	5.35	
d9-NEtFOSE (Surr)	11.0	1871122.91	6.066	6.07	
d7-N-MeFOSE (Surr)	10.8	1515862.43	5.182	5.18	
S_6:2 Fluorotelomer sulfonate-13C2	8.29	107095.65	4.696	4.70	

Target Compounds

Final Conc.Units: ng/mL

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorobutanoic Acid	2.58	659852.65	1.134	1.13	
Perfluoropentanoic Acid	5.05	550850.91	1.066	1.07	
Perfluorobutane Sulfonate	5.50	1068080.29	1.082	1.08	
Perfluorohexanoic Acid	6.62	823727.96	1.054	1.05	
Perfluoroheptanoic Acid	7.62	698672.56	1.039	1.04	
Perfluorohexane Sulfonate	7.69	744939.53	1.043	1.04	
Perfluorooctanoic Acid	8.35	260327.04	1.072	1.07	
Perfluorononanoic Acid	8.94	517666.82	1.071	1.07	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Printed: 3/31/16 14:48

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Data File:	033016\1031.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/30/16 18:46:36	**Vial:**	12
Run Type:	CCV	**Dilution:**	1
Lab ID:	KQ1603023-02	**Raw Units:**	ng/mL

Target Compounds

Final Conc.Units: ng/mL

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorooctane Sulfonate	8.95	642742.54	1.081	1.08	
Perfluorodecanoic Acid	9.43	380850.37	1.070	1.07	
Perfluoroundecanoic Acid	9.85	231998.46	1.133	1.13	
Perfluorodecane Sulfonate	9.83	744632.91	0.999	0.999	
Perfluorododecanoic Acid	10.2	339916.69	1.150	1.15	
Perfluorooctylsulfonamide	9.95	711331.91	1.002	1.00	
Perfluoro-n-tridecanoic acid	10.5	324937.01	1.115	1.12	
Perfluoro-n-tetradecanoic acid	10.8	142490.54	1.186	1.19	
Perfluoroheptane sulfonate	8.38	222896.46	0.987	0.987	
N-ethylperfluoro-1-octanesulfonamide	11.0	165551.93	1.033	1.03	
N-methylperfluoro-1-octanesulfonamide	10.8	123469.22	1.044	1.04	
2-(N-ethylperfluoro-1-octanesulfonamido)-eth	11.0	444158.93	0.982	0.982	
2-(N-methylperfluoro-1-octanesulfonamido)-e	10.8	337459.83	1.167	1.17	
6:2 Fluorotelomer sulfonate	8.30	159911.98	1.204	1.20	
8:2 Fluorotelomer sulfonate	9.41	172520.58	1.240	1.24	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

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Project	Ewan's Projects\PFCs	Result Table	033016.rdb
Data File	033016\1031.wiff	Algorithm Used	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	Instrument Name	LCMS02

Sample Name	PFC 1.0ppb	Injection Vial	8
Acquisition Date	3/30/2016 6:46:36 PM	Injection Volume	10
Acquisition Method	PFC_090315 schedule mrm.dam	Sample Type	Quality Control
Sample ID	15-OLC-02-35F	Dilution Factor	1.00

Results Summary

Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
Pfba 1	2.58 (2.60)	13c_pfba	3663324	659853	1.00	1.1340	113	No
Pfpea 1	5.05 (5.06)	13c_pfhxa	4073658	550851	1.00	1.0660	107	No
Pfbs 1	5.50 (5.53)	18o-pfhs	1312844	1068080	1.00	1.0820	108	No
Pfhxa 1	6.62 (6.63)	13c_pfhxa	4073658	823728	1.00	1.0540	105	No
Pfhpa 1	7.62 (7.64)	13c_pfhxa	4073658	698673	1.00	1.0390	104	No
Pfhxs 1	7.69 (7.72)	18o-pfhs	1312844	744940	1.00	1.0430	104	No
Pfoa 1	8.35 (8.36)	13c-pfoa	2248305	260327	1.00	1.0720	107	No
Pfna 1	8.94 (8.95)	13c-pfna	2613377	517667	1.00	1.0710	107	No
Pfos 1	8.95 (8.96)	13c-pfos	3371005	642743	1.00	1.0810	108	No
Pfda 1	9.43 (9.44)	13c-pfda	1685626	380850	1.00	1.0700	107	No
Pfuna 1	9.85 (9.86)	13c-pfuna	433883	231998	1.00	1.1330	113	No
Pfds 1	9.83 (9.84)	13c-pfos	3371005	744633	1.00	0.9990	100	No
Pfdoa 1	10.20 (10.20)	13c-pfdoda	26276	339917	1.00	1.1500	115	No
Fosa 1	9.95 (9.94)	d5-NEtFOSA	881754	711332	1.00	1.0020	100	No
Pfteda 1	10.80 (10.80)	13c-pfdoda	26276	142491	1.00	1.1860	119	No
PFHpS 1	8.38 (8.39)	18o-pfhs	1312844	222896	1.00	0.9870	99	No
NMeFOSE 1	10.80 (10.80)	d7-NMeFOSE	1515862	337460	1.00	1.1670	117	No
NMeFOSA 1	10.80 (10.80)	d7-NMeFOSE	1515862	123469	1.00	1.0440	104	No
NEtFOSE 1	11.00 (11.00)	d9-EtFOSE	1871123	444159	1.00	0.9820	98	No
NEtFOSA 1	11.00 (11.00)	d5-NEtFOSA	881754	165552	1.00	1.0330	103	No
d9-EtFOSE 1	11.00 (11.00)	N_mefosa d3	622492	1871123	5.00	6.0660	121	No
d5-NEtFOSA 1	11.00 (11.00)	N_mefosa d3	622492	881754	5.00	5.3530	107	No
d7-NMeFOSE 1	10.80 (10.80)	N_mefosa d3	622492	1515862	5.00	5.1820	104	No

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Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
13C_PFBA 1	2.56 (2.58)	N_mefosa d3	622492	3663324	5.00	5.3070	106	No
13C_PFHXA 1	6.61 (6.63)	N_mefosa d3	622492	4073658	5.00	5.4980	110	No
13C-PFOA 1	8.34 (8.35)	N_mefosa d3	622492	2248305	5.00	5.4080	108	No
13C-PFNA 1	8.94 (8.96)	N_mefosa d3	622492	2613377	5.00	5.4600	109	No
13C-PFOS 1	8.94 (8.95)	N_mefosa d3	622492	3371005	5.00	5.5730	111	No
13C-PFDA 1	9.42 (9.45)	N_mefosa d3	622492	1685626	5.00	5.7420	115	No
13C-PFUNA 1	9.85 (9.85)	N_mefosa d3	622492	433883	5.00	5.2230	104	No
18O-PFHxS 1	7.70 (7.72)	N_mefosa d3	622492	1312844	5.00	5.3130	106	No
13C-PFDoA 1	10.20 (10.20)	N_mefosa d3	622492	26276	5.00	4.9110	98	No
PFTrDA 1	10.50 (10.50)	13c-pfdoda	26276	324937	1.00	1.1150	111	No
6_2-FTS 1	8.30 (8.31)	13C2-6_2-FTS	107096	159912	1.00	1.2040	120	No
8_2-FTS 1	9.41 (9.42)	13C2-6_2-FTS	107096	172521	1.00	1.2400	124	No
13C2-6_2-FTS 1	8.29 (8.31)	N_mefosa d3	622492	107096	5.00	4.6960	94	No

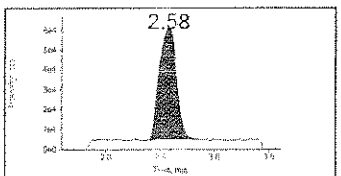
IRC Summary

Analyte Peak Name	RT (Exp RT)	Area	Modified?	Ratio Confirms ID
Pfba 2	2.57 (2.58)	651121	No	YES
Pfpea 2	5.05 (5.07)	562290	No	YES
Pfbs 2	5.50 (5.52)	498526	No	YES
Pfhxa 2	6.61 (6.63)	68919	No	YES
Pfhpa 2	7.62 (7.63)	298550	No	YES
Pfhxs 2	7.70 (7.72)	288950	No	YES
Pfoa 2	8.35 (8.36)	482184	No	YES
Pfna 2	8.94 (8.95)	169812	No	YES
Pfos 2	8.95 (8.95)	223632	No	YES
Pfda 2	9.43 (9.44)	98491	No	YES
Pfuna 2	9.85 (9.85)	97714	No	YES
Pfds 2	9.83 (9.84)	258407	No	YES
Pfdoa 2	10.20 (10.20)	109574	No	YES

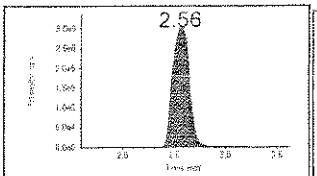
Analyte Peak Name	RT (Exp RT)	Area	Modified?	Ratio Confirms ID
Fosa 2	9.94 (9.94)	16477	No	No
Pfteda 2	10.80 (10.80)	53299	No	YES
PFHpS 2	8.38 (8.39)	92626	No	YES
NMeFOSE 2	10.80 (10.80)	1811	No	YES
NMeFOSA 2	10.80 (10.80)	117471	No	YES
NEtFOSE 2	11.00 (11.00)	1190	No	YES
NEtFOSA 2	11.00 (11.00)	116451	No	YES
PFTrDA 2	10.50 (10.50)	99969	No	YES
6_2-FTS 2	8.30 (8.30)	211150	No	YES
8_2-FTS 2	9.40 (9.41)	18324	No	YES

Quantitative Peak Review

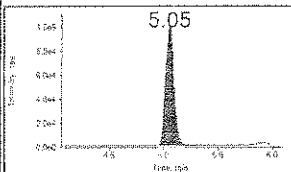
PFC 1.0ppb 15-OLC-02-35F



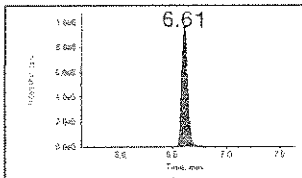
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



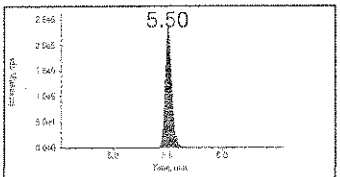
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



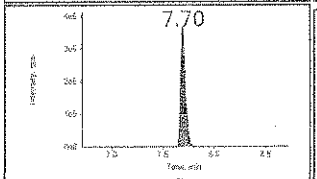
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



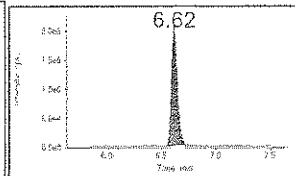
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



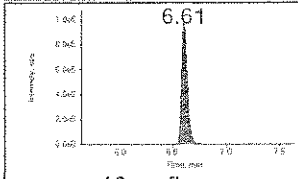
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



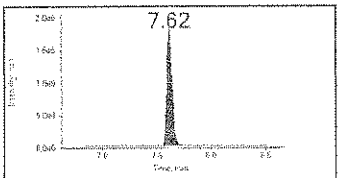
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



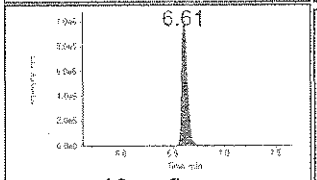
Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak



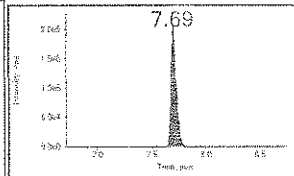
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



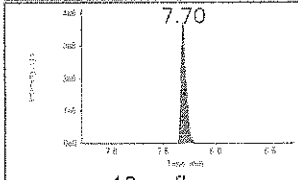
Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



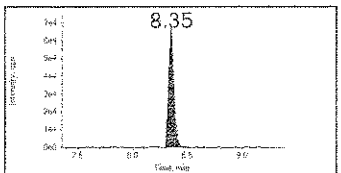
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



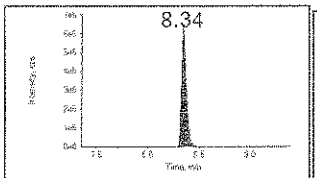
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



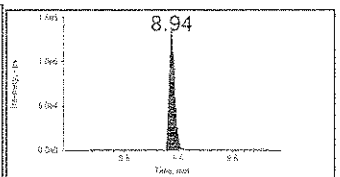
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



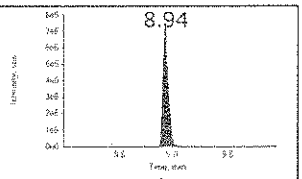
Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



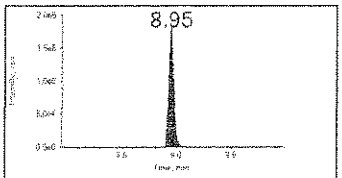
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



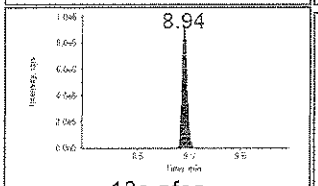
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



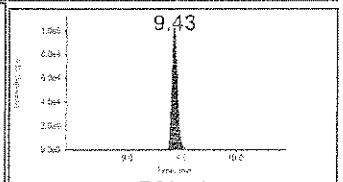
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



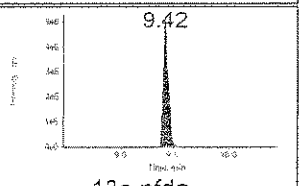
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



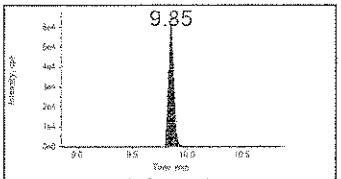
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



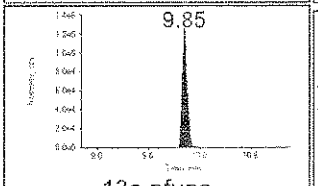
Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



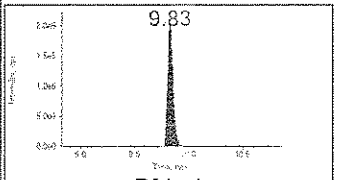
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



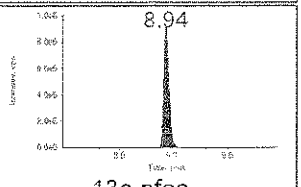
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



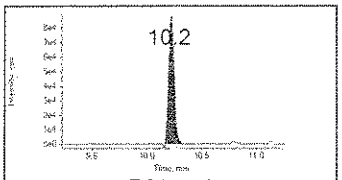
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



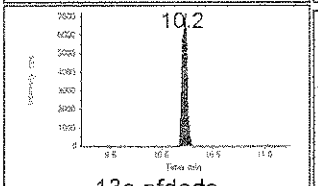
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



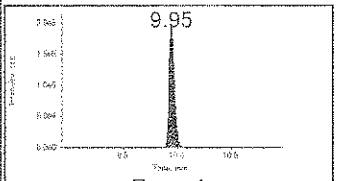
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



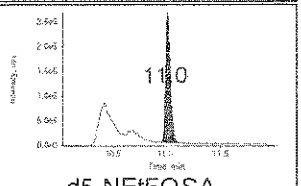
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



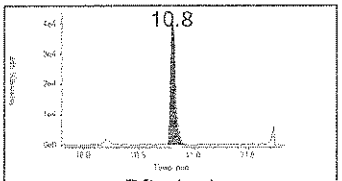
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



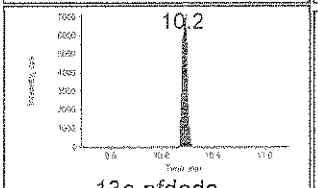
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



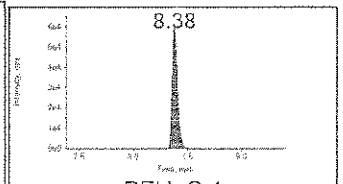
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



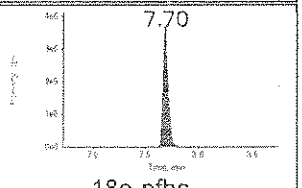
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



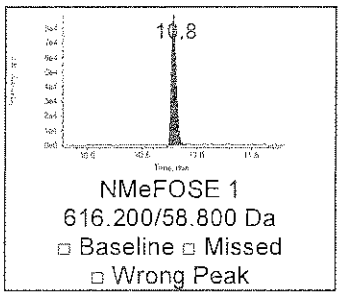
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



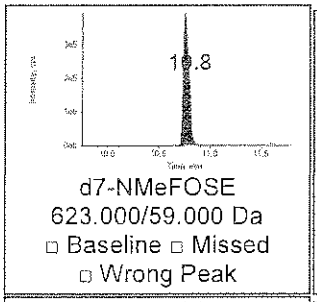
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



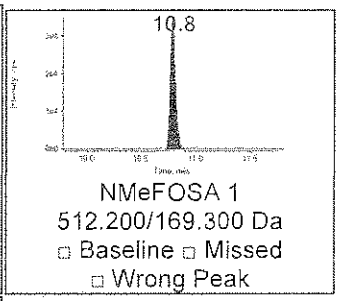
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



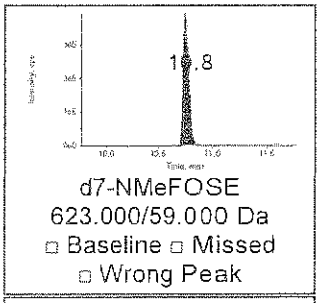
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



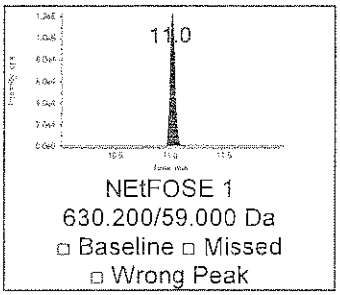
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



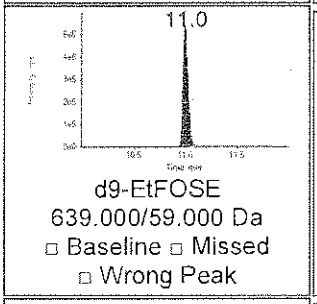
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



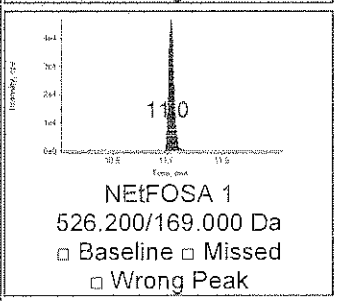
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



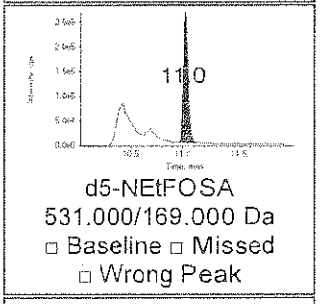
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



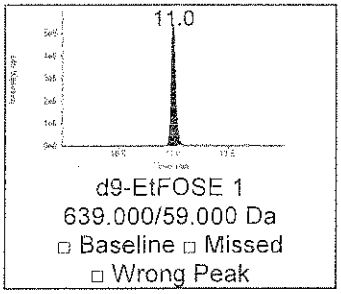
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



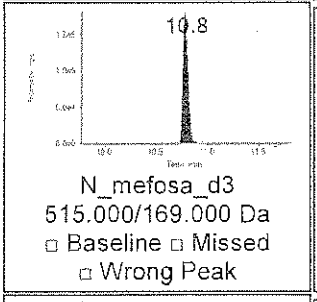
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



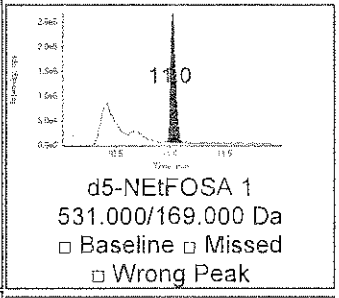
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



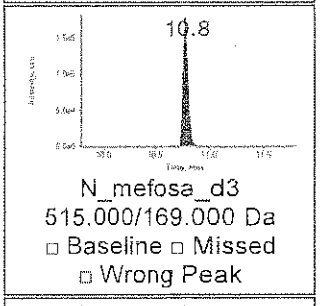
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



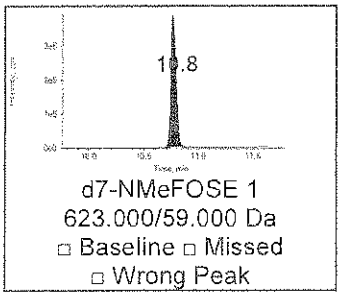
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



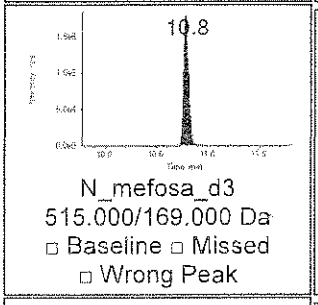
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



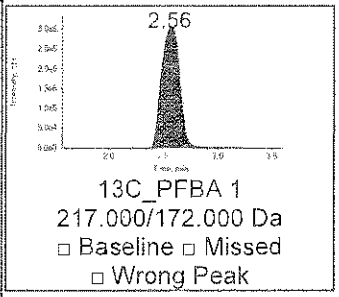
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



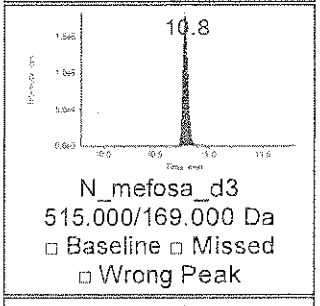
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



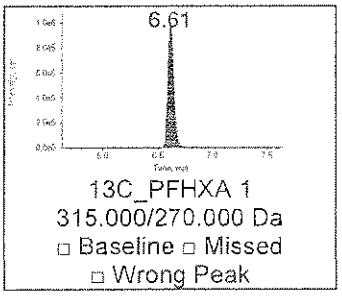
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



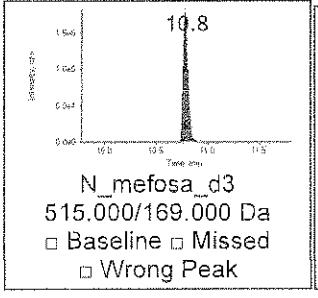
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



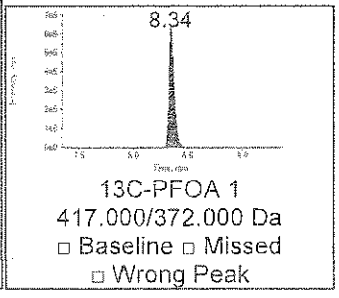
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



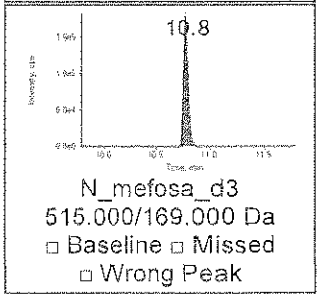
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



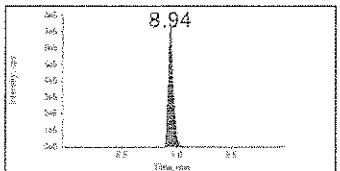
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



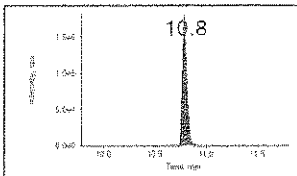
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



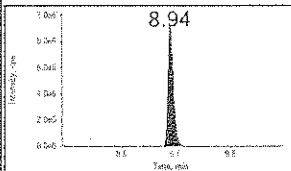
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



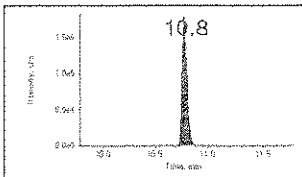
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



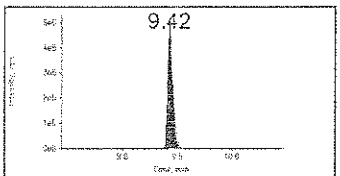
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



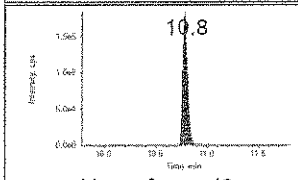
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



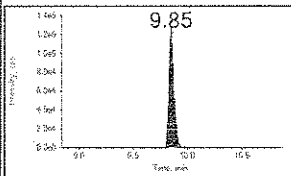
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



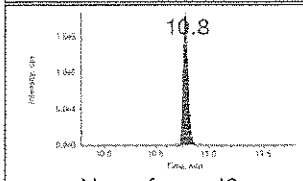
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



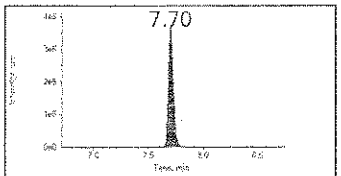
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



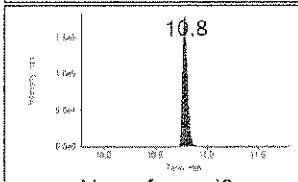
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



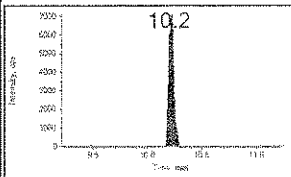
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



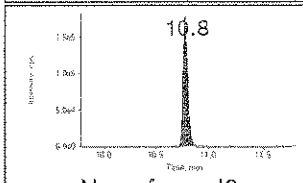
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



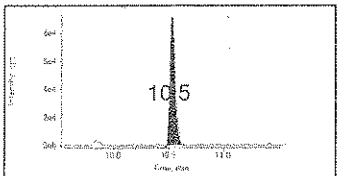
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



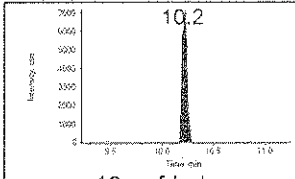
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



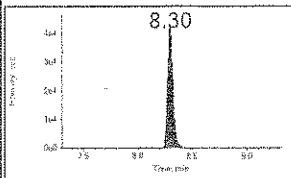
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



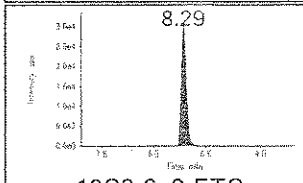
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



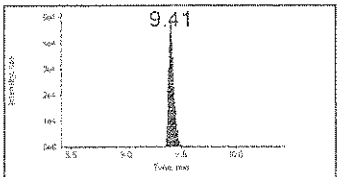
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



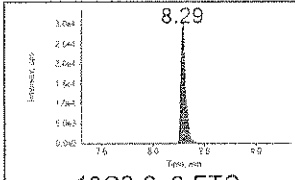
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



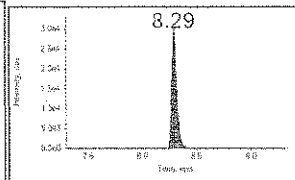
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



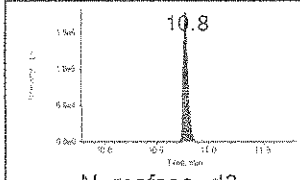
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

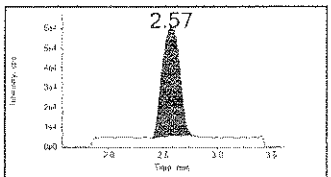


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

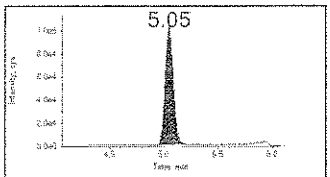


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

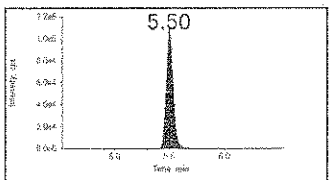
Ion Ratio Confirmation



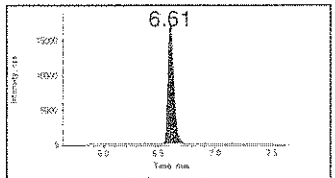
Pfba 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



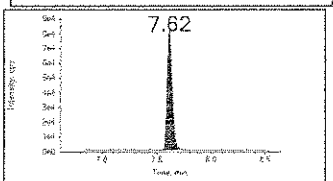
Pfpea 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



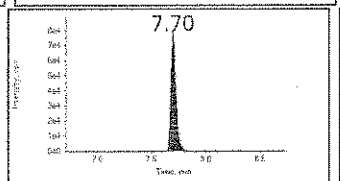
Pfbs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



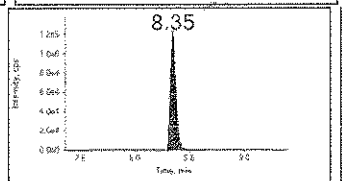
Pfhxa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



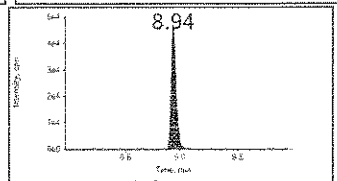
Pfhpa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



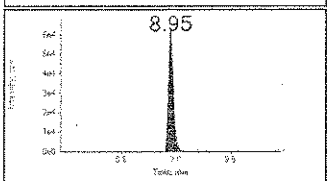
Pfhxs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



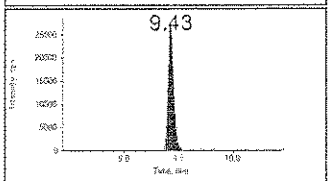
Pfoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



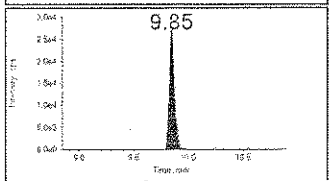
Pfna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



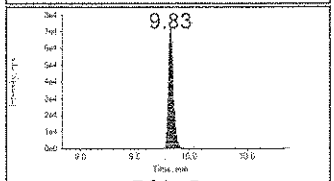
Pfos 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



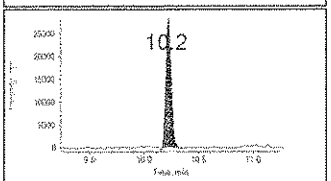
Pfda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



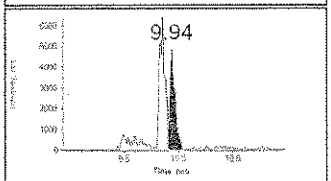
Pfuna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



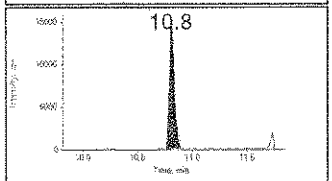
Pfds 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



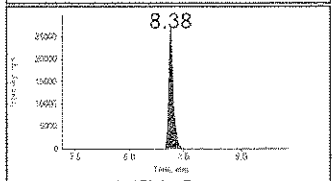
Pfdoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



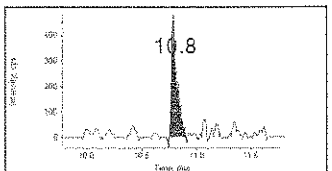
Fosa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



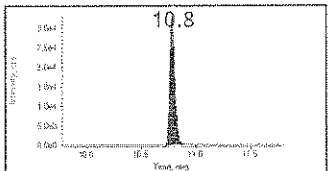
Pfteda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



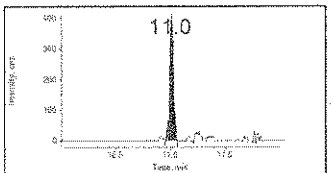
PFHpS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



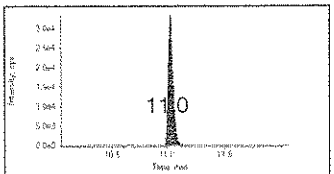
NMeFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



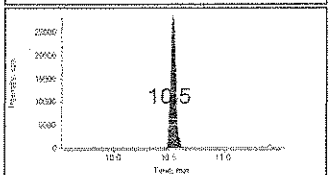
NMeFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



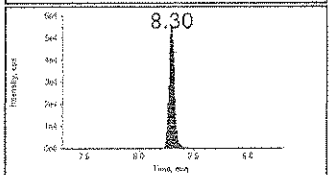
NEtFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



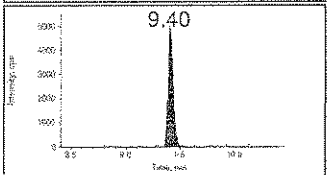
NEtFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak

Project	Ewan's Projects\PFCs
Data File	033016\1032.wiff
Result Table	033016.rdb
Instrument Name	LCMS02

Sample Name	IB	Injection Volume	10
Acquisition Date	3/30/2016 7:05:56 PM	Sample Type	Unknown
Acquisition Method	PFC_090315 schedule mrm.dam	Dilution Factor	1.00
Injection Vial	2	Weight to Volume	0.00

Results Summary

Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
Pfba 1	13c_pfba	3340654	0.00 (2.60)	0	N/A	Yes
Pfpea 1	13c_pfhxa	3764535	0.00 (5.06)	0	N/A	No
Pfbs 1	18o-pfhs	1241769	0.00 (5.53)	0	N/A	No
Pfhxa 1	13c_pfhxa	3764535	6.61 (6.63)	5497	0.0080	No
Pfhpa 1	13c_pfhxa	3764535	0.00 (7.64)	0	N/A	No
Pfhxs 1	18o-pfhs	1241769	7.69 (7.72)	11160	0.0170	No
Pfoa 1	13c-pfoa	2195483	8.34 (8.36)	2898	0.0120	No
Pfna 1	13c-pfna	2620050	0.00 (8.95)	0	N/A	No
Pfos 1	13c-pfos	3103470	0.00 (8.96)	0	N/A	No
Pfda 1	13c-pfda	1653401	0.00 (9.44)	0	N/A	No
Pfuna 1	13c-pfuna	432685	9.83 (9.86)	3556	0.0170	No
Pfds 1	13c-pfos	3103470	0.00 (9.84)	0	N/A	No
Pfdoa 1	13c-pfdoda	26318	10.20 (10.20)	1816	0.0060	No
Fosa 1	d5-NEtFOSA	821599	9.94 (9.94)	2131	0.0030	No
Pfteda 1	13c-pfdoda	26318	0.00 (10.80)	0	N/A	No
PFHpS 1	18o-pfhs	1241769	0.00 (8.39)	0	N/A	No
NMeFOSE 1	d7-NMeFOSE	1602419	0.00 (10.80)	0	N/A	No
NMeFOSA 1	d7-NMeFOSE	1602419	0.00 (10.80)	0	N/A	No
NEtFOSE 1	d9-EtFOSE	1630555	0.00 (11.00)	0	N/A	No
NEtFOSA 1	d5-NEtFOSA	821599	0.00 (11.00)	0	N/A	No

APR 0 1 2016

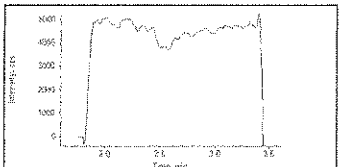
Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
d9-EtFOSE 1	N_mefosa_d3	707108	11.00 (11.00)	1630555	4.6530	No
d5-NEtFOSA 1	N_mefosa_d3	707108	11.00 (11.00)	821599	4.3910	No
d7-NMeFOSE 1	N_mefosa_d3	707108	10.70 (10.80)	1602419	4.8220	No
13C_PFBA 1	N_mefosa_d3	707108	2.56 (2.58)	3340654	4.2610	No
13C_PFHXA 1	N_mefosa_d3	707108	6.61 (6.63)	3764535	4.4730	No
13C-PFOA 1	N_mefosa_d3	707108	8.34 (8.35)	2195483	4.6490	No
13C-PFNA 1	N_mefosa_d3	707108	8.93 (8.96)	2620050	4.8190	No
13C-PFOS 1	N_mefosa_d3	707108	8.94 (8.95)	3103470	4.5170	No
13C-PFDA 1	N_mefosa_d3	707108	9.41 (9.45)	1653401	4.9580	No
13C-PFUNA 1	N_mefosa_d3	707108	9.84 (9.85)	432685	4.5850	No
18O-PFHxS 1	N_mefosa_d3	707108	7.69 (7.72)	1241769	4.4240	No
13C-PFDoA 1	N_mefosa_d3	707108	10.20 (10.20)	26318	4.3300	No
PFTrDA 1	13c-pfdoda	26318	0.00 (10.50)	0	N/A	No
6_2-FTS 1	13C2-6_2-FTS	111194	0.00 (8.31)	0	N/A	No
8_2-FTS 1	13C2-6_2-FTS	111194	0.00 (9.42)	0	N/A	No
13C2-6_2-FTS 1	N_mefosa_d3	707108	8.29 (8.31)	111194	4.2920	No

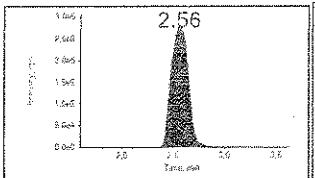
IRC Summary

Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfba 2	0.00 (2.58)	0	No	0.00 (0.98)	No
Pfpea 2	0.00 (5.07)	0	No	0.00 (1.01)	No
Pfbs 2	0.00 (5.52)	0	No	0.00 (0.48)	No
Pfhxa 2	0.00 (6.63)	0	No	0.00 (0.09)	No
Pfhpa 2	0.00 (7.63)	0	No	0.00 (0.44)	No
Pfhxs 2	7.69 (7.72)	4632	No	0.42 (0.40)	YES
Pfoa 2	8.34 (8.36)	3010	No	1.04 (1.81)	No
Pfna 2	0.00 (8.95)	0	No	0.00 (0.33)	No

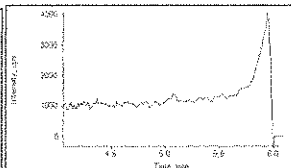
Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfos 2	0.00 (8.95)	0	No	0.00 (0.36)	No
Pfda 2	0.00 (9.44)	0	No	0.00 (0.26)	No
Pfuna 2	9.82 (9.85)	1171	No	0.33 (0.50)	No
Pfds 2	0.00 (9.84)	0	No	0.00 (0.36)	No
Pfdoa 2	0.00 (10.20)	0	No	0.00 (0.37)	No
Fosa 2	9.92 (9.94)	408	No	0.19 (0.03)	No
Pfteda 2	0.00 (10.80)	0	No	0.00 (0.42)	No
PFHpS 2	0.00 (8.39)	0	No	0.00 (0.39)	No
NMeFOSE 2	0.00 (10.80)	0	No	0.00 (0.00)	No
NMeFOSA 2	0.00 (10.80)	0	No	0.00 (0.93)	No
NEtFOSE 2	0.00 (11.00)	0	No	0.00 (0.00)	No
NEtFOSA 2	0.00 (11.00)	0	No	0.00 (0.70)	No
PFTrDA 2	0.00 (10.50)	0	No	0.00 (0.32)	No
6_2-FTS 2	0.00 (8.30)	0	Yes	0.00 (1.35)	No
8_2-FTS 2	0.00 (9.41)	0	No	0.00 (0.12)	No

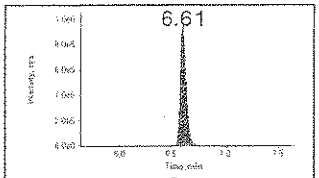
Quantitative Peak Review IB *No data for Sample ID*


Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

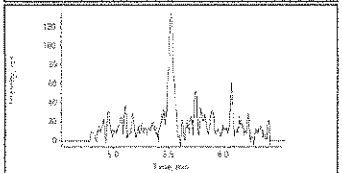


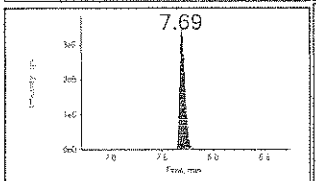
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak

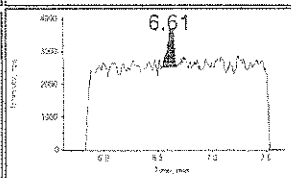


13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak

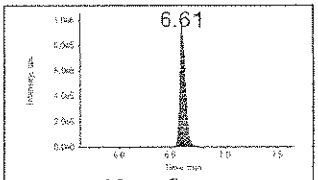

Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



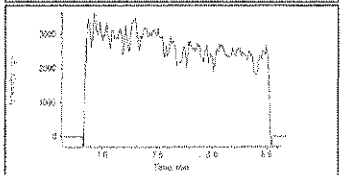
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak

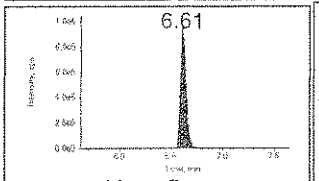


Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak

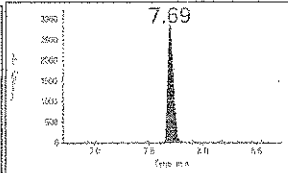


13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak

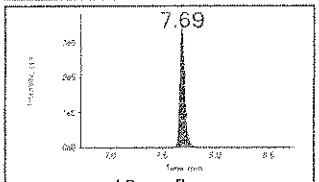

Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



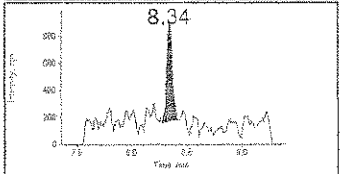
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



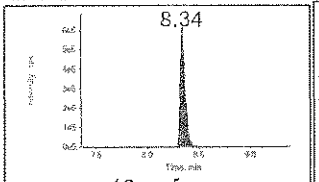
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



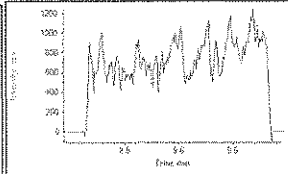
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak

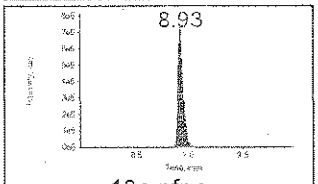


Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

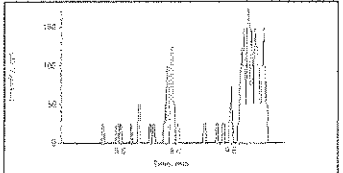


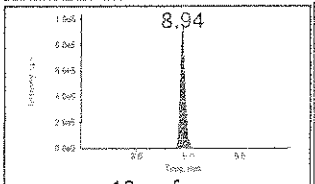
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak

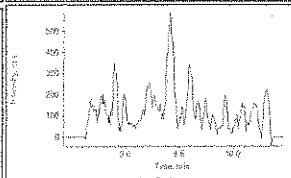


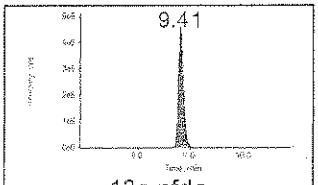
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak

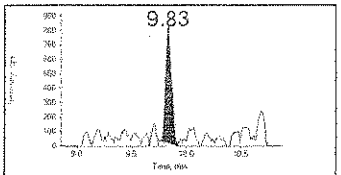


13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak

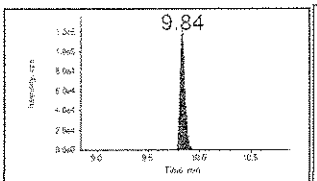

Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



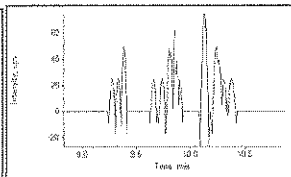
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



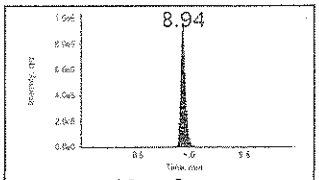
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



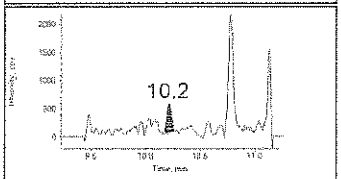
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



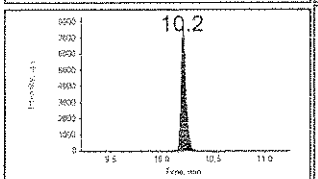
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



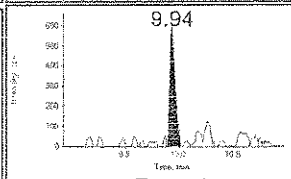
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



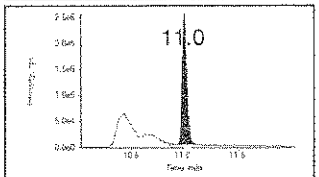
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



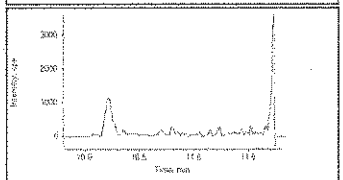
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



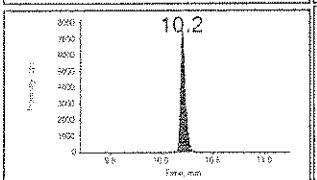
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



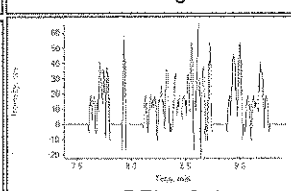
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



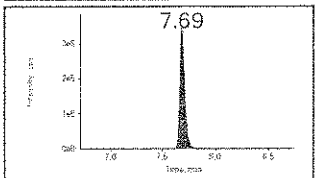
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



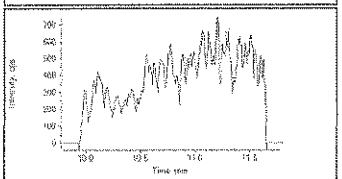
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



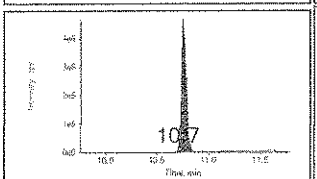
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



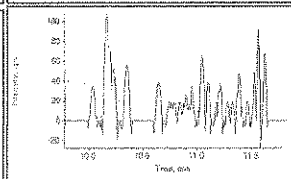
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



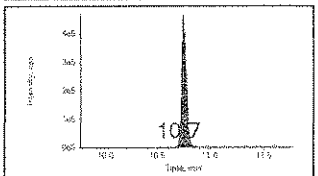
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



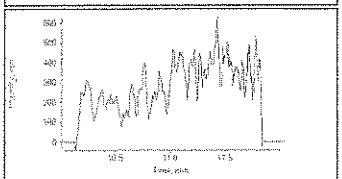
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



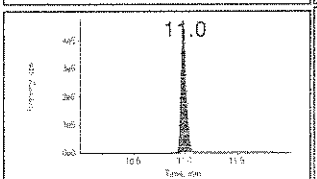
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



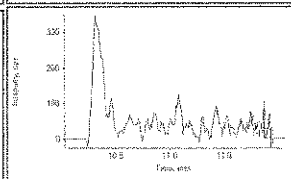
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



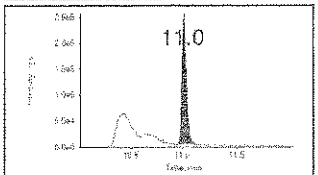
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



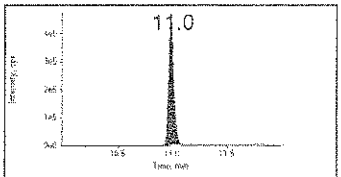
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



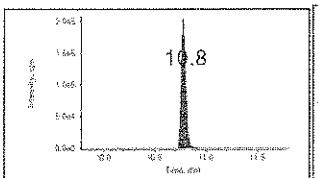
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



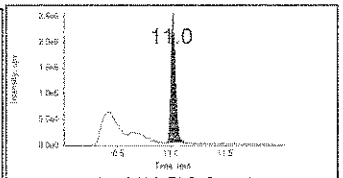
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



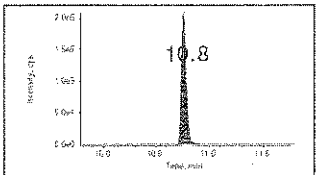
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



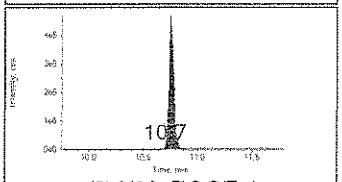
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



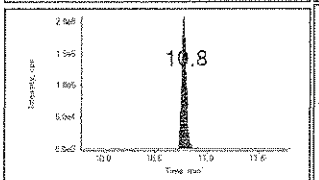
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



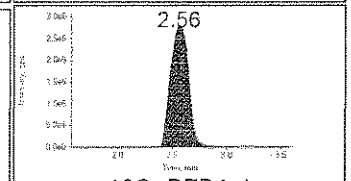
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



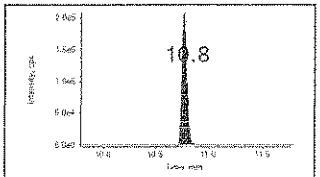
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



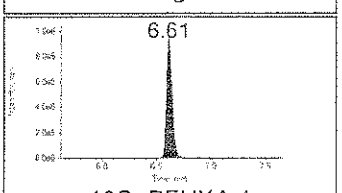
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



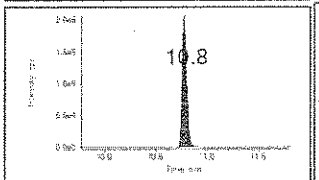
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



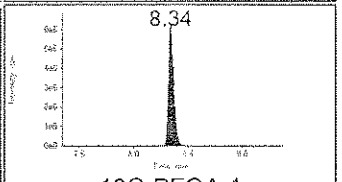
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



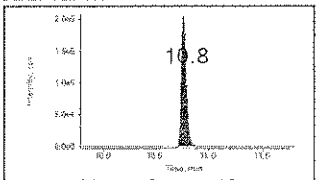
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



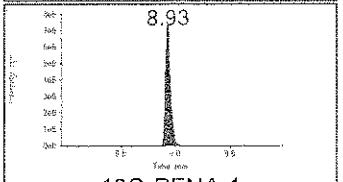
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



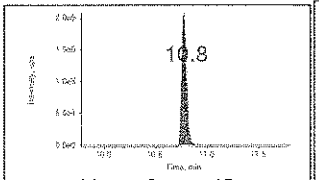
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



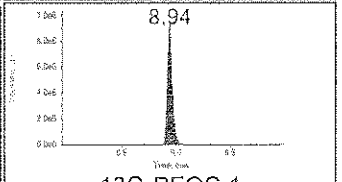
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



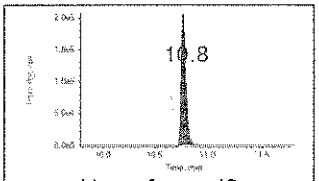
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



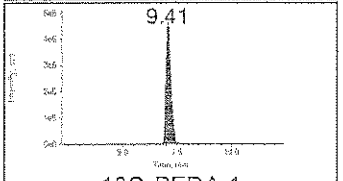
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



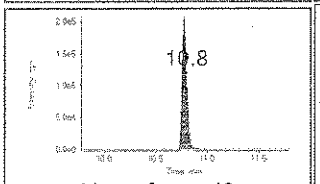
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



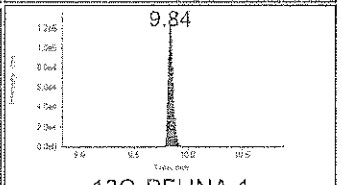
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



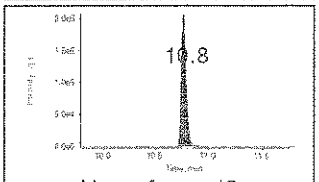
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



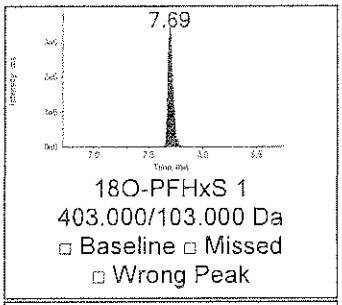
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



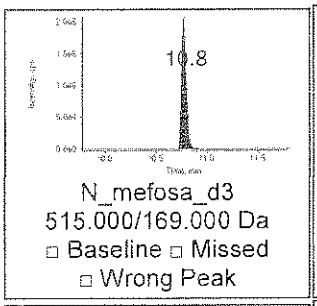
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



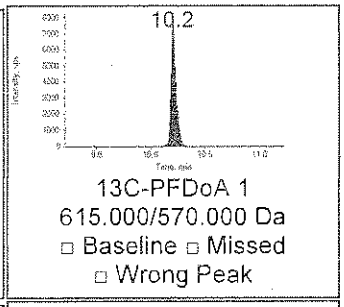
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



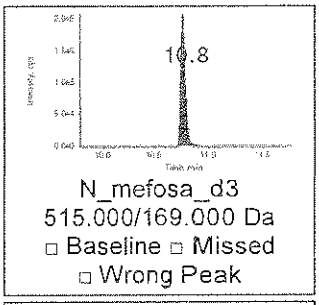
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



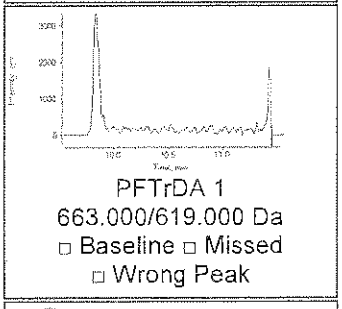
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



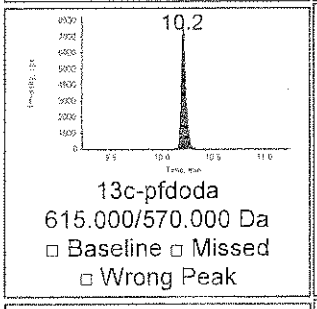
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



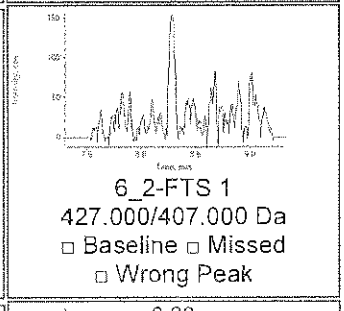
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



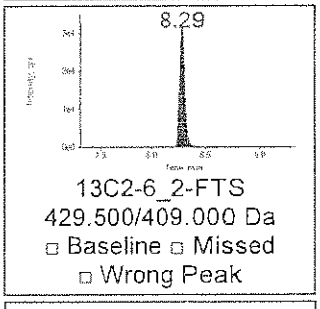
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



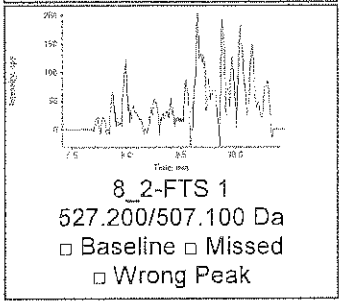
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



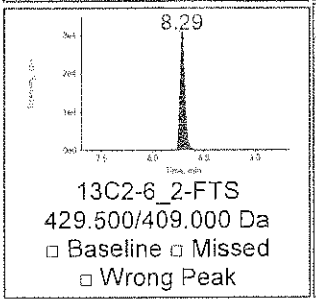
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



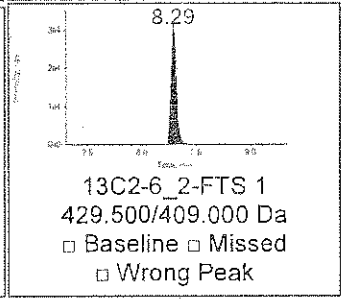
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



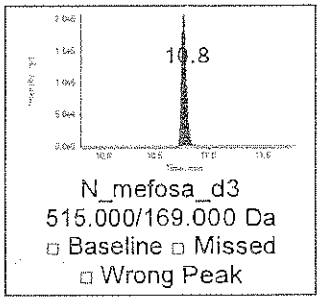
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

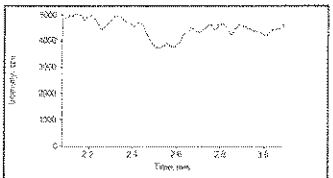


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

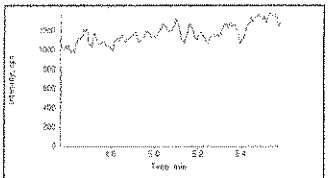


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

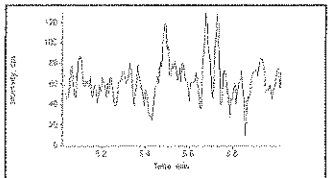
Ion Ratio Confirmation



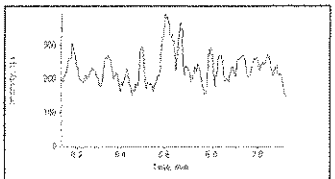
Pfba 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



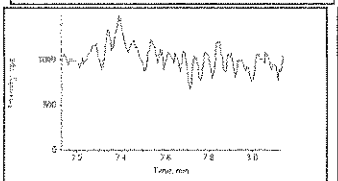
Pfpea 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



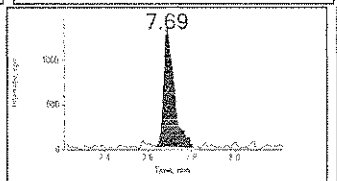
Pfbs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



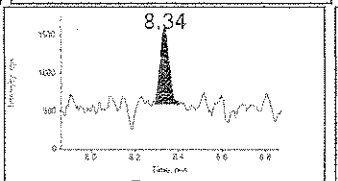
Pfhxa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



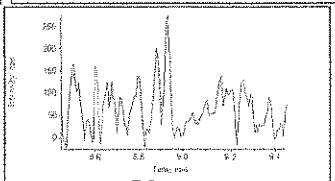
Pfhpa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



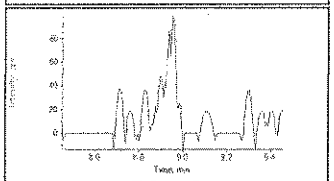
Pfhxs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



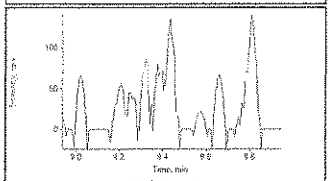
Pfoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



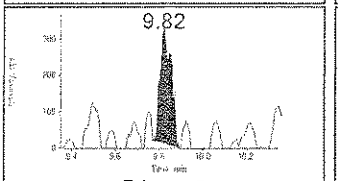
Pfna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



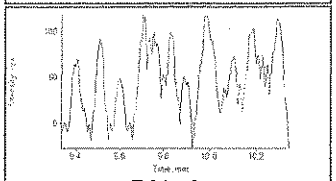
Pfos 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



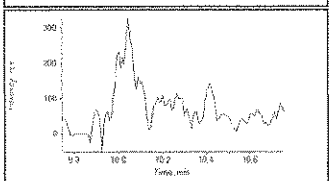
Pfda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



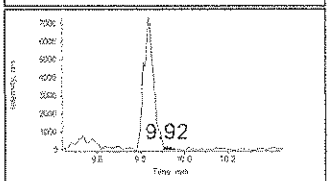
Pfuna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



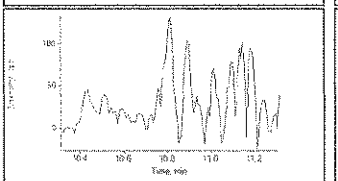
Pfds 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



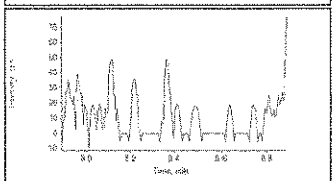
Pfdoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



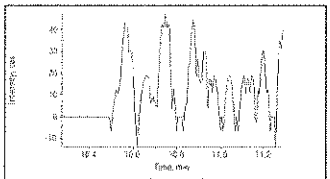
Fosa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



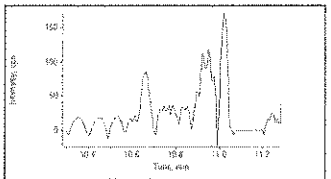
Pfteda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



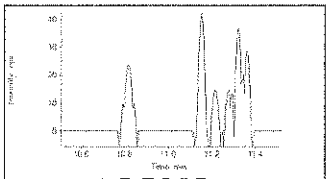
PFHpS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



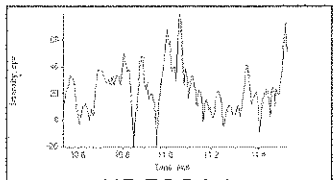
NMeFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



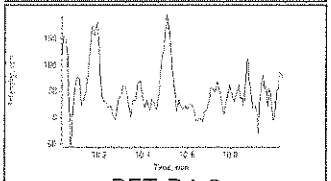
NMeFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



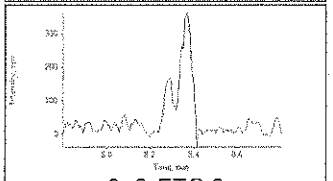
NEtFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



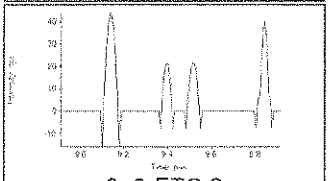
NEtFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod? Yes
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

Quantitation Report

Data File:	033016\1043.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/30/16 22:38:29	**Vial:**	23
Run Type:	CCV	**Dilution:**	1
Lab ID:	KQ1603023-03	**Raw Units:**	ng/mL

Bottle ID:		**Tier:**	I	**Matrix:**	Drinking Water
Prod Code:	PFOA	**Collect Date:**	3/22/16	**Receive Date:**	3/23/16

Analysis Lot:	490080	**Prep Lot:**		**Report Group:**	KQ1603023
Analysis Method:	PFC/537M	**Prep Method:**			
		Prep Date:			

Title:	Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS	**Calibration ID:**	KC1600038
		Report List ID:	14664

Internal Standard Compounds

Parameter Name	RT	Response	Solution Conc	Area Criteria
N-methyl-d3-perfluoro-1-octanesulfonamide	10.8	610114.48	5.00	OK

Surrogate Compounds

Parameter Name	RT	Response	Solution Conc	% Rec	% Rec Criteria
Perfluoro-n-[1,2,3,4-13C4] butanoic acid	2.57	3649708.92	5.395	5.40	
Perfluoro-n-[1,2-13C2] hexanoic acid	6.62	3992365.07	5.498	5.50	
Sodium perfluoro-1-hexane[18O2]sulfonate	7.71	1356651.60	5.602	5.60	
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	8.36	2135024.94	5.240	5.24	
Perfluoro-n-[1,2,3,4,5-13C5] nonanoic acid	8.95	2507099.45	5.344	5.34	
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulf	8.96	3300506.55	5.567	5.57	
Perfluoro-n-[1,2-13C2] decanoic acid	9.44	1512146.06	5.256	5.26	
Perfluoro-n-[1,2-13C2]undecanoic Acid	9.86	398754.11	4.897	4.90	
Perfluoro-n-[1,2-13C2]dodecanoic Acid	10.2	21361.87	4.073	4.07	
S_N-ethyl-d5-perfluoro-1-octanesulfonamide	11.0	830794.91	5.146	5.15	
d9-NEtFOSE (Surr)	11.0	1531649.85	5.066	5.07	
d7-N-MeFOSE (Surr)	10.8	1543821.99	5.384	5.38	
S_6:2 Fluorotelomer sulfonate-13C2	8.31	104736.62	4.685	4.69	

Target Compounds

Final Conc.Units: ng/mL

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorobutanoic Acid	2.58	652787.19	1.126	1.13	
Perfluoropentanoic Acid	5.06	539685.04	1.065	1.07	
Perfluorobutane Sulfonate	5.51	1093793.51	1.072	1.07	
Perfluorohexanoic Acid	6.63	805647.52	1.051	1.05	
Perfluoroheptanoic Acid	7.63	687943.49	1.044	1.04	
Perfluorohexane Sulfonate	7.71	763396.07	1.035	1.04	
Perfluorooctanoic Acid	8.37	261044.80	1.132	1.13	
Perfluorononanoic Acid	8.95	512432.09	1.105	1.11	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

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\\alprews001\starlims$\LIMSReps\QuantValidation.rpt

Data File:	033016\1043.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/30/16 22:38:29	**Vial:**	23
Run Type:	CCV	**Dilution:**	1
Lab ID:	KQ1603023-03	**Raw Units:**	ng/mL

Target Compounds

Final Conc.Units: ng/mL

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorooctane Sulfonate	8.96	608918.60	1.046	1.05	
Perfluorodecanoic Acid	9.44	338056.44	1.059	1.06	
Perfluoroundecanoic Acid	9.86	193494.20	1.028	1.03	
Perfluorodecane Sulfonate	9.84	737306.07	1.010	1.01	
Perfluorododecanoic Acid	10.2	292547.93	1.218	1.22	
Perfluorooctylsulfonamide	9.96	708912.58	1.060	1.06	
Perfluoro-n-tridecanoic acid	10.5	241288.59	1.018	1.02	
Perfluoro-n-tetradecanoic acid	10.8	107255.19	1.097	1.10	
Perfluoroheptane sulfonate	8.40	219395.87	0.940	0.940	
N-ethylperfluoro-1-octanesulfonamide	11.0	163342.76	1.081	1.08	
N-methylperfluoro-1-octanesulfonamide	10.8	120486.01	1.000	1.00	
2-(N-ethylperfluoro-1-octanesulfonamido)-eth	11.0	377925.98	1.021	1.02	
2-(N-methylperfluoro-1-octanesulfonamido)-e	10.8	290128.75	0.985	0.985	
6:2 Fluorotelomer sulfonate	8.31	152775.37	1.176	1.18	
8:2 Fluorotelomer sulfonate	9.42	160704.88	1.181	1.18	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

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Project	Ewan's Projects\PFCs	Result Table	033016.rdb
Data File	033016\1043.wiff	Algorithm Used	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	Instrument Name	LCMS02

Sample Name	PFC 1.0ppb	Injection Vial	8
Acquisition Date	3/30/2016 10:38:29 PM	Injection Volume	10
Acquisition Method	PFC_090315 schedule mrm.dam	Sample Type	Quality Control
Sample ID	15-OLC-02-35F	Dilution Factor	1.00

Results Summary

Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
Pfba 1	2.58 (2.60)	13c_pfba	3649709	652787	1.00	1.1260	113	No
Pfpea 1	5.06 (5.06)	13c_pfhxa	3992365	539685	1.00	1.0650	107	No
Pfbs 1	5.51 (5.53)	18o-pfhs	1356652	1093794	1.00	1.0720	107	No
Pfhxa 1	6.63 (6.63)	13c_pfhxa	3992365	805648	1.00	1.0510	105	No
Pfhpa 1	7.63 (7.64)	13c_pfhxa	3992365	687943	1.00	1.0440	104	No
Pfhxs 1	7.71 (7.72)	18o-pfhs	1356652	763396	1.00	1.0350	103	No
Pfoa 1	8.37 (8.36)	13c-pfoa	2135025	261045	1.00	1.1320	113	No
Pfna 1	8.95 (8.95)	13c-pfna	2507099	512432	1.00	1.1050	111	No
Pfos 1	8.96 (8.96)	13c-pfos	3300507	608919	1.00	1.0460	105	No
Pfda 1	9.44 (9.44)	13c-pfda	1512146	338056	1.00	1.0590	106	No
Pfuna 1	9.86 (9.86)	13c-pfuna	398754	193494	1.00	1.0280	103	No
Pfds 1	9.84 (9.84)	13c-pfos	3300507	737306	1.00	1.0100	101	No
Pfdoa 1	10.20 (10.20)	13c-pfdoda	21362	292548	1.00	1.2180	122	No
Fosa 1	9.96 (9.94)	d5-NEtFOSA	830795	708913	1.00	1.0600	106	No
Pfteda 1	10.80 (10.80)	13c-pfdoda	21362	107255	1.00	1.0970	110	No
PFHpS 1	8.40 (8.39)	18o-pfhs	1356652	219396	1.00	0.9400	94	No
NMeFOSE 1	10.80 (10.80)	d7-NMeFOSE	1543822	290129	1.00	0.9850	99	No
NMeFOSA 1	10.80 (10.80)	d7-NMeFOSE	1543822	120486	1.00	1.0000	100	No
NEtFOSE 1	11.00 (11.00)	d9-EtFOSE	1531650	377926	1.00	1.0210	102	No
NEtFOSA 1	11.00 (11.00)	d5-NEtFOSA	830795	163343	1.00	1.0810	108	No
d9-EtFOSE 1	11.00 (11.00)	N_mefosa d3	610114	1531650	5.00	5.0660	101	No
d5-NEtFOSA 1	11.00 (11.00)	N_mefosa d3	610114	830795	5.00	5.1460	103	No
d7-NMeFOSE 1	10.80 (10.80)	N_mefosa d3	610114	1543822	5.00	5.3840	108	No

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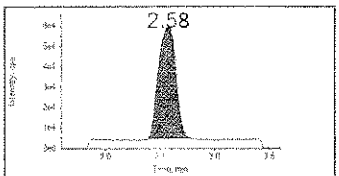
Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
13C_PFBA 1	2.57 (2.58)	N_mefosa d3	610114	3649709	5.00	5.3950	108	No
13C_PFHXA 1	6.62 (6.63)	N_mefosa d3	610114	3992365	5.00	5.4980	110	No
13C-PFOA 1	8.36 (8.35)	N_mefosa d3	610114	2135025	5.00	5.2400	105	No
13C-PFNA 1	8.95 (8.96)	N_mefosa d3	610114	2507099	5.00	5.3440	107	No
13C-PFOS 1	8.96 (8.95)	N_mefosa d3	610114	3300507	5.00	5.5670	111	No
13C-PFDA 1	9.44 (9.45)	N_mefosa d3	610114	1512146	5.00	5.2560	105	No
13C-PFUNA 1	9.86 (9.85)	N_mefosa d3	610114	398754	5.00	4.8970	98	No
18O-PFHxS 1	7.71 (7.72)	N_mefosa d3	610114	1356652	5.00	5.6020	112	No
13C-PFDoA 1	10.20 (10.20)	N_mefosa d3	610114	21362	5.00	4.0730	82	No
PFTrDA 1	10.50 (10.50)	13c-pfdoda	21362	241289	1.00	1.0180	102	No
6_2-FTS 1	8.31 (8.31)	13C2-6_2-FTS	104737	152775	1.00	1.1760	118	No
8_2-FTS 1	9.42 (9.42)	13C2-6_2-FTS	104737	160705	1.00	1.1810	118	No
13C2-6_2-FTS 1	8.31 (8.31)	N_mefosa d3	610114	104737	5.00	4.6850	94	No

IRC Summary

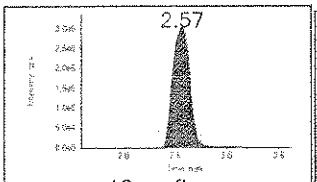
Analyte Peak Name	RT (Exp RT)	Area	Modified?	Ratio Confirms ID
Pfba 2	2.58 (2.58)	647434	No	YES
Pfpea 2	5.06 (5.07)	546289	No	YES
Pfbs 2	5.51 (5.52)	510256	No	YES
Pfhxa 2	6.62 (6.63)	66279	No	YES
Pfhpa 2	7.63 (7.63)	292822	No	YES
Pfhxs 2	7.71 (7.72)	302949	No	YES
Pfoa 2	8.36 (8.36)	461619	No	YES
Pfna 2	8.95 (8.95)	161361	No	YES
Pfos 2	8.96 (8.95)	217356	No	YES
Pfda 2	9.44 (9.44)	91562	No	YES
Pfuna 2	9.86 (9.85)	91328	No	YES
Pfds 2	9.84 (9.84)	253266	No	YES
Pfdoa 2	10.20 (10.20)	101072	No	YES

Analyte Peak Name	RT (Exp RT)	Area	Modified?	Ratio Confirms ID
Fosa 2	9.96 (9.94)	16358	No	No
Pfteda 2	10.80 (10.80)	42653	No	YES
PFHpS 2	8.40 (8.39)	91499	No	YES
NMeFOSE 2	10.80 (10.80)	1918	No	No
NMeFOSA 2	10.80 (10.80)	117584	No	YES
NEtFOSE 2	11.00 (11.00)	1328	No	No
NEtFOSA 2	11.00 (11.00)	113641	No	YES
PFTrDA 2	10.50 (10.50)	88844	No	YES
6_2-FTS 2	8.31 (8.30)	205377	No	YES
8_2-FTS 2	9.42 (9.41)	17676	No	YES

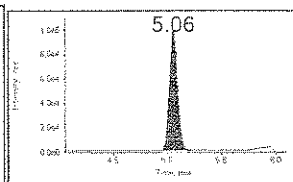
Quantitative Peak Review — PFC 1.0ppb 15-OLC-02-35F



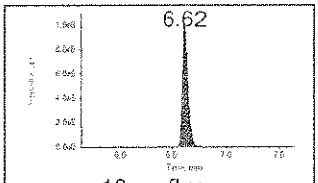
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



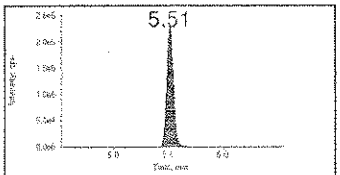
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



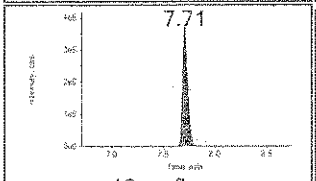
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



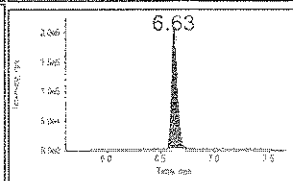
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



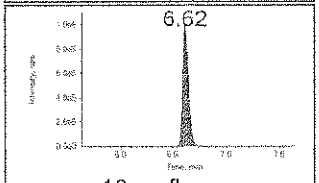
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



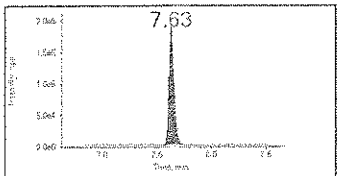
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



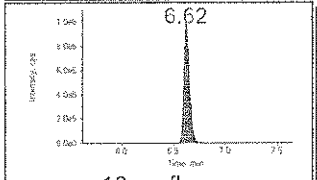
Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak



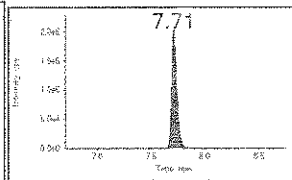
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



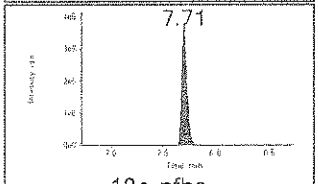
Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



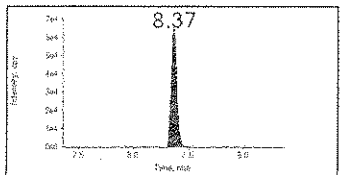
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



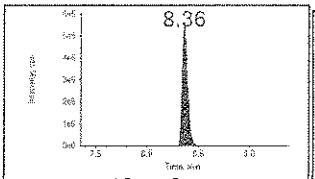
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



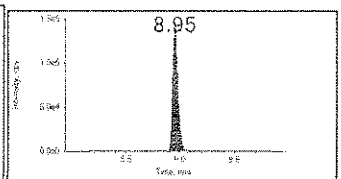
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



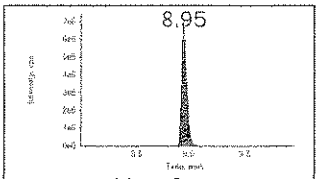
Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



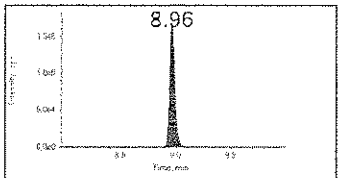
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



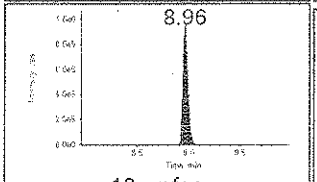
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



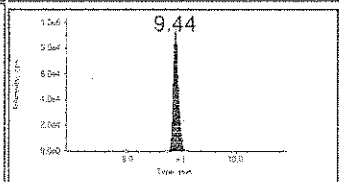
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



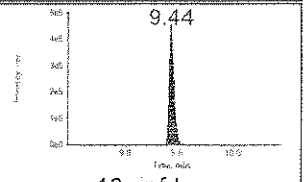
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



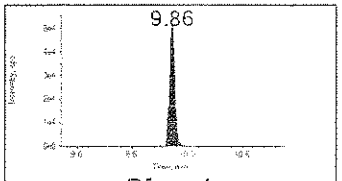
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



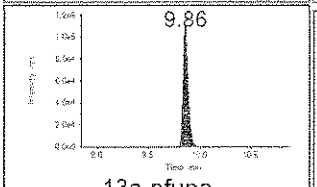
Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



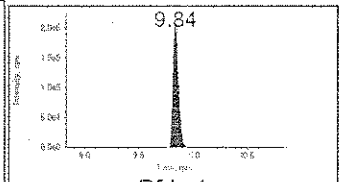
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



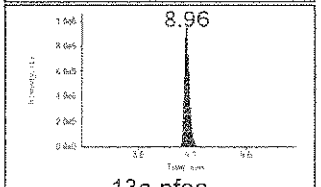
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



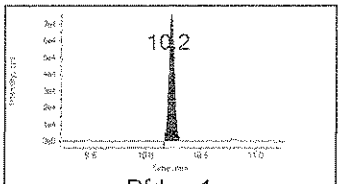
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



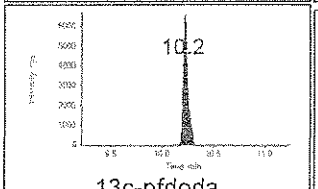
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



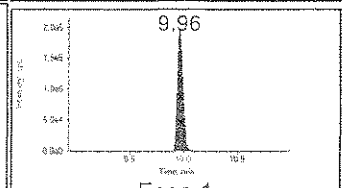
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



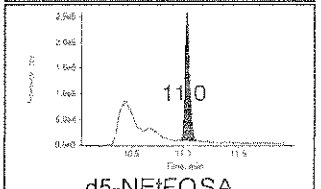
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



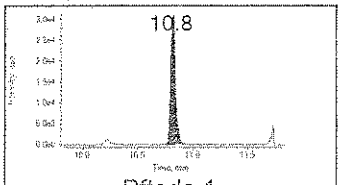
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



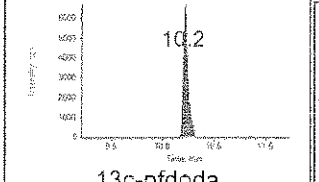
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



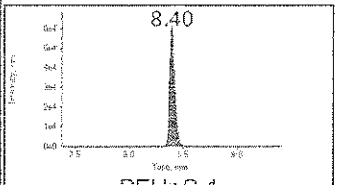
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



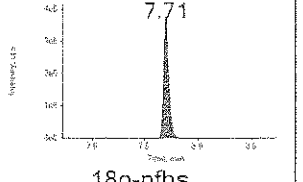
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



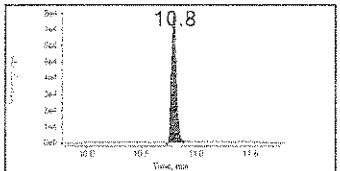
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



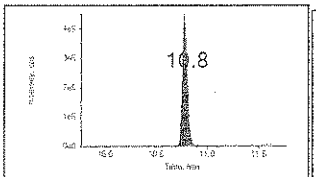
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



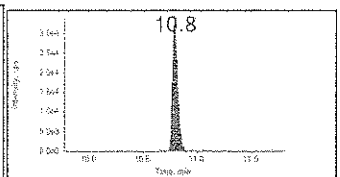
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



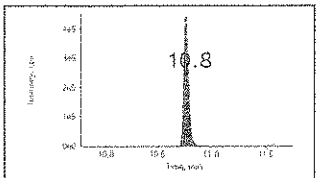
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



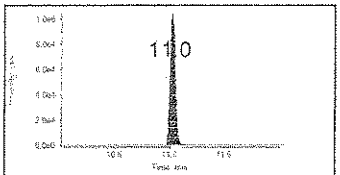
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



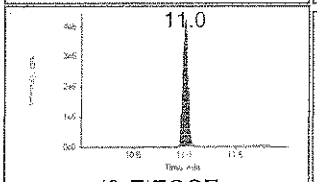
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



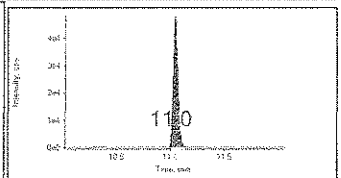
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



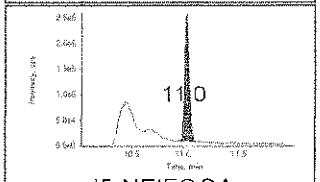
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



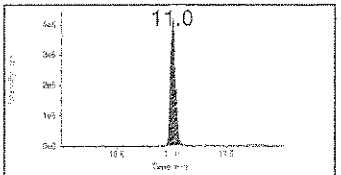
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



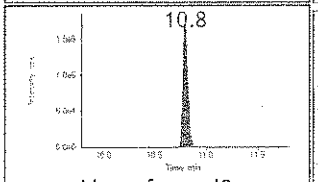
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



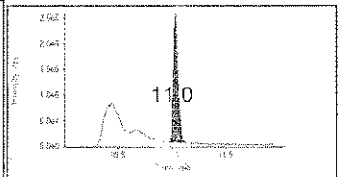
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



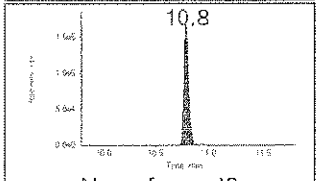
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



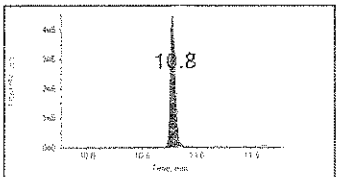
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



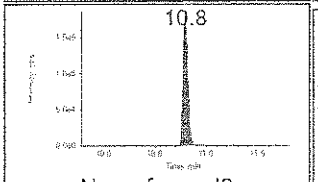
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



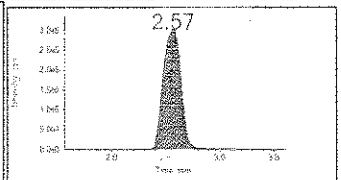
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



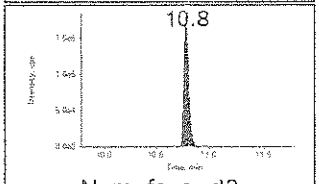
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



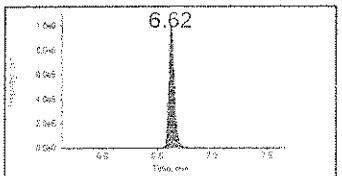
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



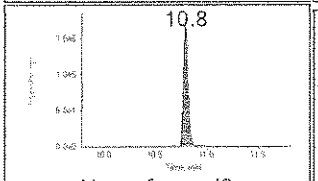
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



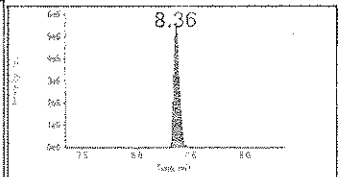
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



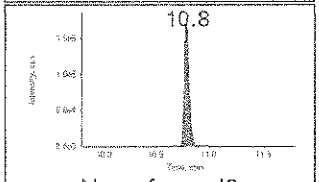
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



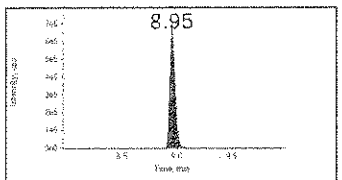
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



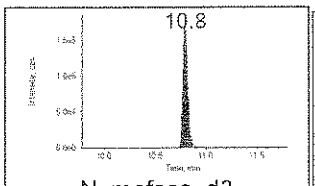
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



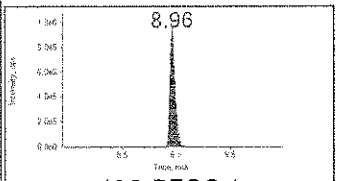
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



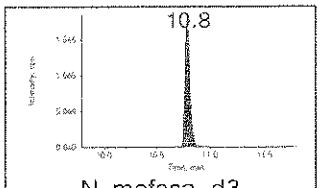
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



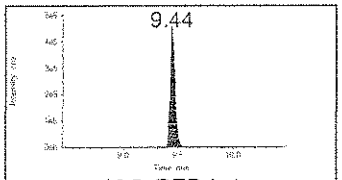
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



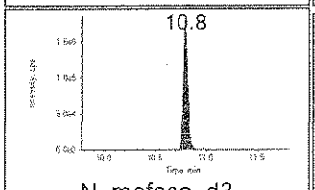
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



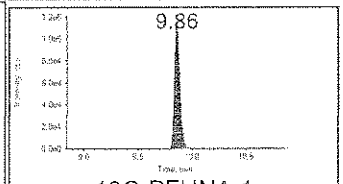
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



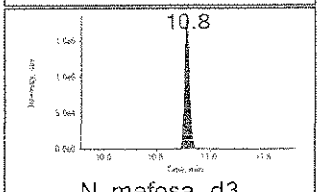
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



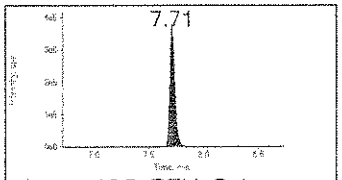
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



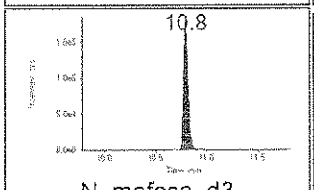
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



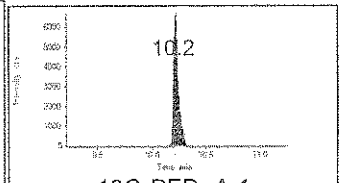
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



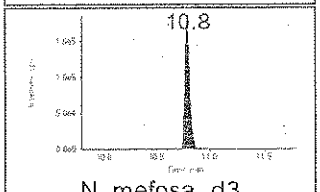
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



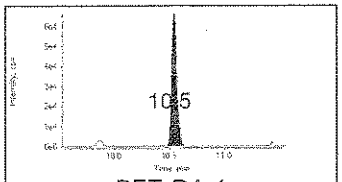
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



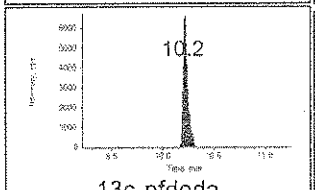
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



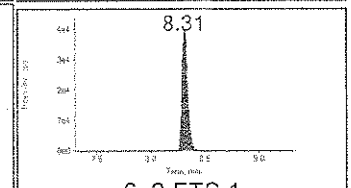
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



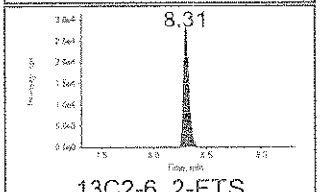
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



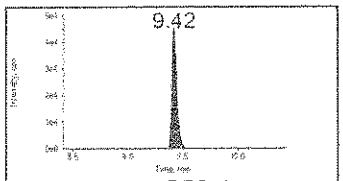
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



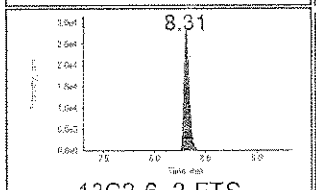
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



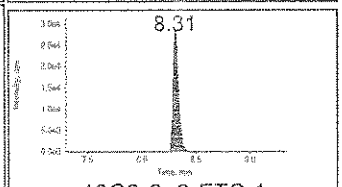
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



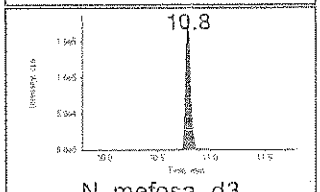
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

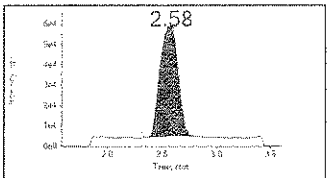


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

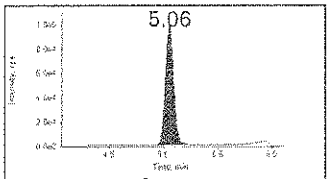


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

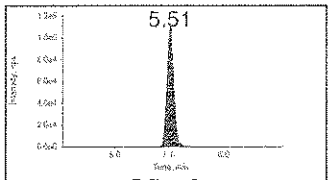
Ion Ratio Confirmation



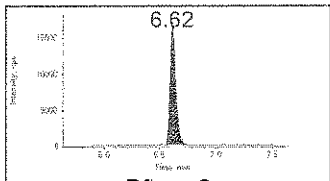
Pfba 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



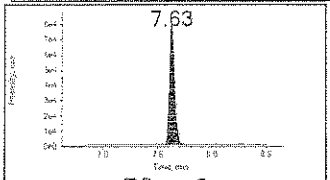
Pfpea 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



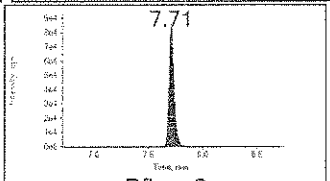
Pfbs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



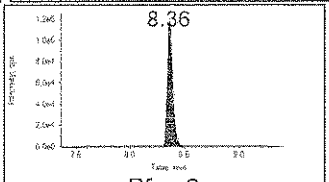
Pfhxa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



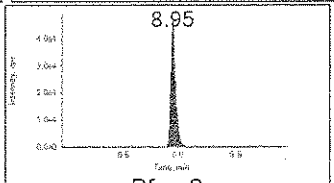
Pfhpa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



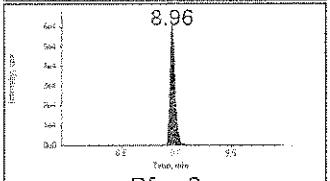
Pfhxs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



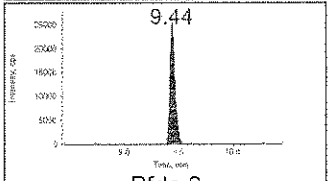
Pfoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



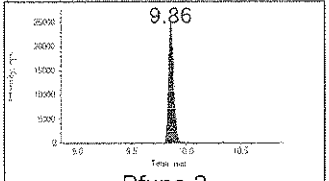
Pfna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



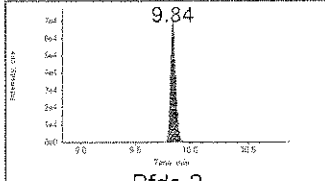
Pfos 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



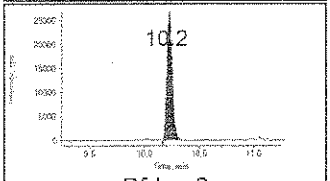
Pfda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



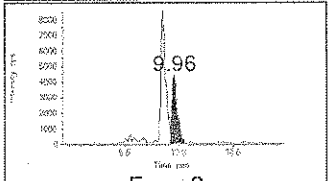
Pfuna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



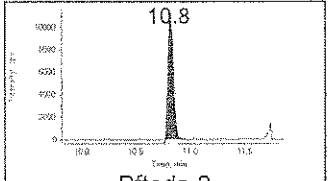
Pfds 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



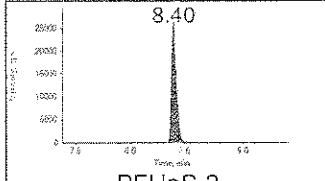
Pfdoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



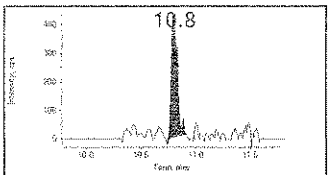
Fosa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



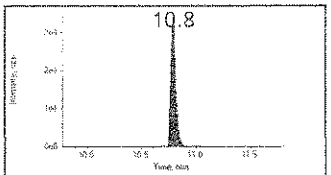
Pfteda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



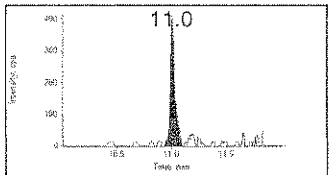
PFHpS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



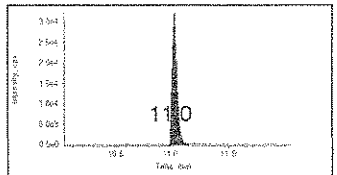
NMeFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



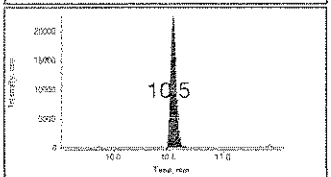
NMeFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



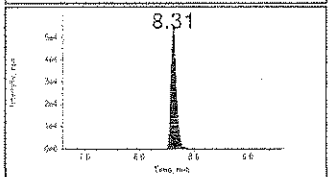
NEtFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



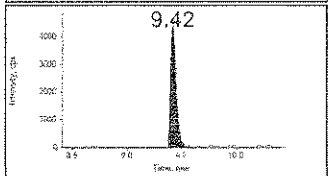
NEtFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak

Project	Ewan's Projects\PFCs
Data File	033016\1044.wiff
Result Table	033016.rdb
Instrument Name	LCMS02

Sample Name	IB	Injection Volume	10
Acquisition Date	3/30/2016 10:57:50 PM	Sample Type	Unknown
Acquisition Method	PFC_090315 schedule mrm.dam	Dilution Factor	1.00
Injection Vial	2	Weight to Volume	0.00

Results Summary

Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
Pfba 1	13c_pfba	3297033	0.00 (2.60)	0	N/A	Yes
Pfpea 1	13c_pfhxa	3747332	0.00 (5.06)	0	N/A	No
Pfbs 1	18o-pfhs	1242059	0.00 (5.53)	0	N/A	No
Pfhxa 1	13c_pfhxa	3747332	6.63 (6.63)	4043	0.0060	No
Pfhpa 1	13c_pfhxa	3747332	0.00 (7.64)	0	N/A	No
Pfhxs 1	18o-pfhs	1242059	7.72 (7.72)	12470	0.0180	No
Pfoa 1	13c-pfoa	2198392	8.36 (8.36)	2469	0.0100	No
Pfna 1	13c-pfna	2503620	0.00 (8.95)	0	N/A	No
Pfos 1	13c-pfos	3131765	0.00 (8.96)	0	N/A	No
Pfda 1	13c-pfda	1532843	0.00 (9.44)	0	N/A	No
Pfuna 1	13c-pfuna	391059	9.87 (9.86)	2763	0.0150	No
Pfds 1	13c-pfos	3131765	0.00 (9.84)	0	N/A	No
Pfdoa 1	13c-pfdoda	25557	10.20 (10.20)	2196	0.0080	No
Fosa 1	d5-NEtFOSA	797708	9.96 (9.94)	2999	0.0050	No
Pfteda 1	13c-pfdoda	25557	0.00 (10.80)	0	N/A	No
PFHpS 1	18o-pfhs	1242059	0.00 (8.39)	0	N/A	No
NMeFOSE 1	d7-NMeFOSE	1407908	0.00 (10.80)	0	N/A	No
NMeFOSA 1	d7-NMeFOSE	1407908	0.00 (10.80)	0	N/A	No
NEtFOSE 1	d9-EtFOSE	1679513	0.00 (11.00)	0	N/A	No
NEtFOSA 1	d5-NEtFOSA	797708	0.00 (11.00)	0	N/A	No

APR 01 2016

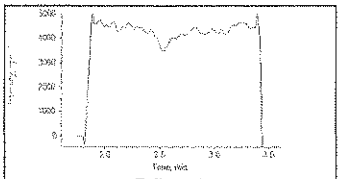
Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
d9-EtFOSE 1	N_mefosa_d3	671633	11.00 (11.00)	1679513	5.0460	No
d5-NEtFOSA 1	N_mefosa_d3	671633	11.00 (11.00)	797708	4.4880	No
d7-NMeFOSE 1	N_mefosa_d3	671633	10.80 (10.80)	1407908	4.4600	No
13C_PFBA 1	N_mefosa_d3	671633	2.59 (2.58)	3297033	4.4270	No
13C_PFHXA 1	N_mefosa_d3	671633	6.63 (6.63)	3747332	4.6880	No
13C-PFOA 1	N_mefosa_d3	671633	8.36 (8.35)	2198392	4.9010	No
13C-PFNA 1	N_mefosa_d3	671633	8.95 (8.96)	2503620	4.8480	No
13C-PFOS 1	N_mefosa_d3	671633	8.96 (8.95)	3131765	4.7980	No
13C-PFDA 1	N_mefosa_d3	671633	9.44 (9.45)	1532843	4.8400	No
13C-PFUNA 1	N_mefosa_d3	671633	9.86 (9.85)	391059	4.3630	No
18O-PFHxS 1	N_mefosa_d3	671633	7.71 (7.72)	1242059	4.6590	No
13C-PFDoA 1	N_mefosa_d3	671633	10.20 (10.20)	25557	4.4270	No
PFTrDA 1	13c-pfdoda	25557	0.00 (10.50)	0	N/A	No
6_2-FTS 1	13C2-6_2-FTS	106645	0.00 (8.31)	0	N/A	No
8_2-FTS 1	13C2-6_2-FTS	106645	0.00 (9.42)	0	N/A	No
13C2-6_2-FTS 1	N_mefosa_d3	671633	8.31 (8.31)	106645	4.3340	No

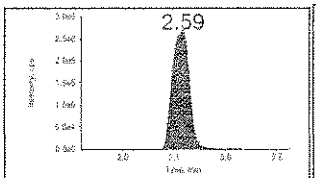
IRC Summary

Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfba 2	0.00 (2.58)	0	No	0.00 (0.98)	No
Pfpea 2	0.00 (5.07)	0	No	0.00 (1.01)	No
Pfbs 2	0.00 (5.52)	0	No	0.00 (0.48)	No
Pfhxa 2	0.00 (6.63)	0	No	0.00 (0.09)	No
Pfhpa 2	0.00 (7.63)	0	No	0.00 (0.44)	No
Pfhxs 2	7.72 (7.72)	4679	No	0.38 (0.40)	YES
Pfoa 2	8.37 (8.36)	4606	No	1.87 (1.81)	YES
Pfna 2	0.00 (8.95)	0	No	0.00 (0.33)	No

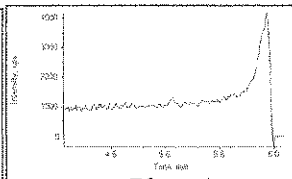
Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfos 2	0.00 (8.95)	0	No	0.00 (0.36)	No
Pfda 2	0.00 (9.44)	0	No	0.00 (0.26)	No
Pfuna 2	9.85 (9.85)	1698	No	0.61 (0.50)	No
Pfds 2	0.00 (9.84)	0	No	0.00 (0.36)	No
Pfdoa 2	0.00 (10.20)	0	No	0.00 (0.37)	No
Fosa 2	0.00 (9.94)	0	No	0.00 (0.03)	No
Pfteda 2	0.00 (10.80)	0	No	0.00 (0.42)	No
PFHpS 2	0.00 (8.39)	0	No	0.00 (0.39)	No
NMeFOSE 2	0.00 (10.80)	0	No	0.00 (0.00)	No
NMeFOSA 2	0.00 (10.80)	0	No	0.00 (0.93)	No
NEtFOSE 2	0.00 (11.00)	0	No	0.00 (0.00)	No
NEtFOSA 2	0.00 (11.00)	0	No	0.00 (0.70)	No
PFTrDA 2	0.00 (10.50)	0	No	0.00 (0.32)	No
6_2-FTS 2	0.00 (8.30)	0	No	0.00 (1.35)	No
8_2-FTS 2	0.00 (9.41)	0	No	0.00 (0.12)	No

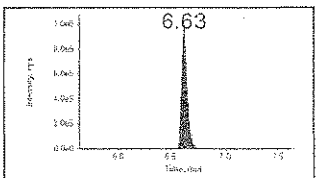
Quantitative Peak Review IB *No data for Sample ID*


Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

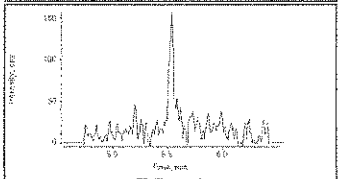


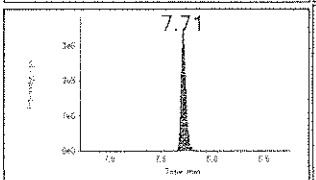
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak

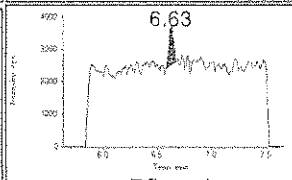


13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak

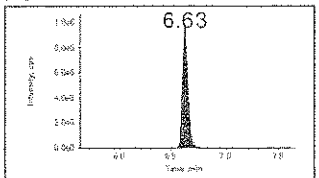

Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



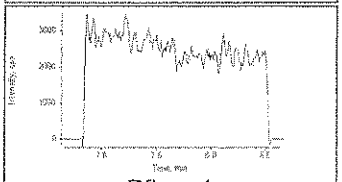
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak

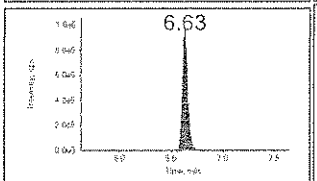


Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak

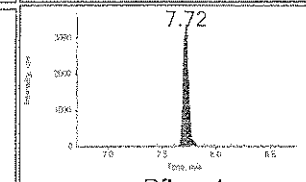


13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak

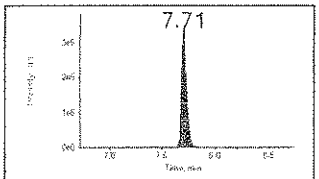

Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



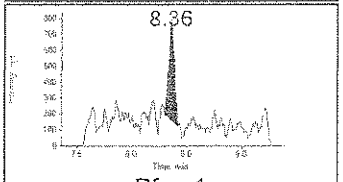
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



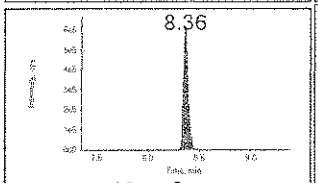
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



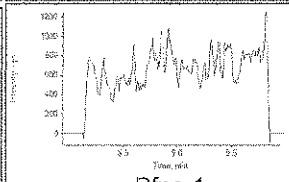
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak

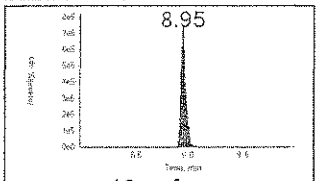


Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

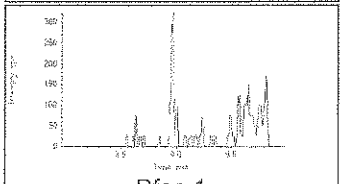


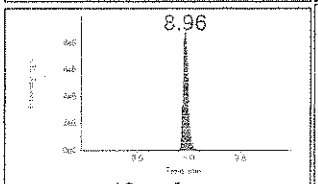
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak

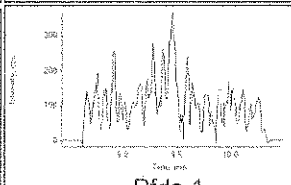


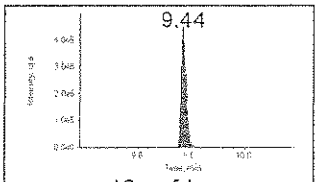
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak

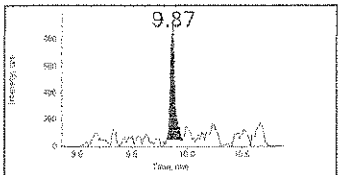


13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak

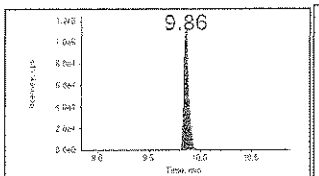

Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



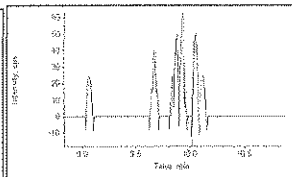
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



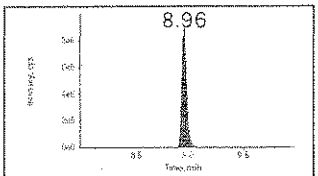
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



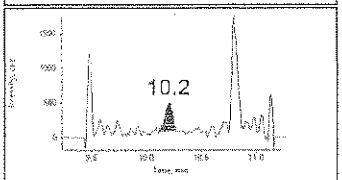
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



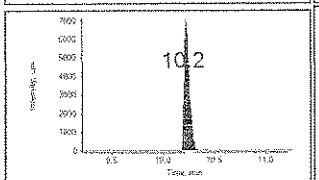
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



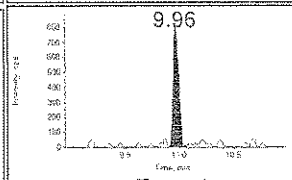
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



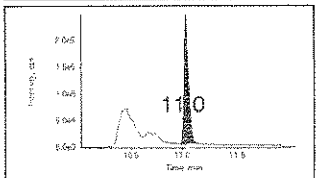
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



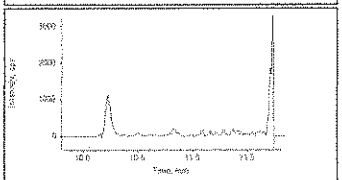
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



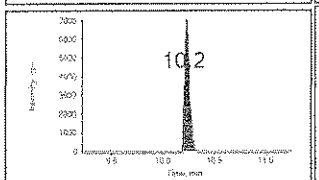
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



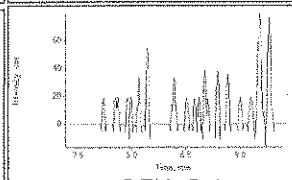
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



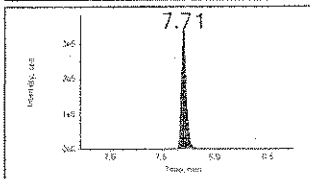
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



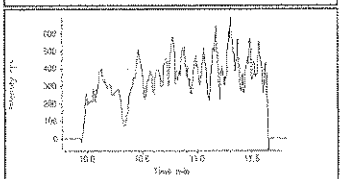
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



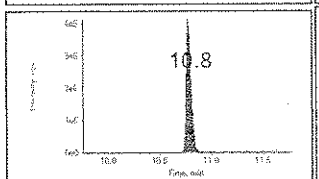
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



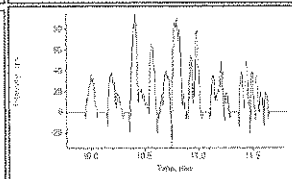
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



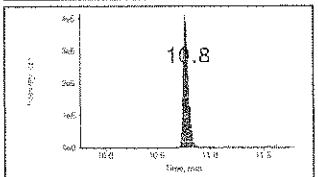
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



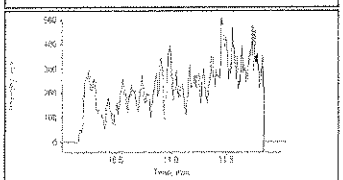
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



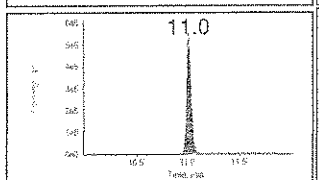
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



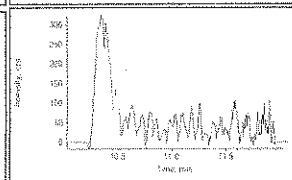
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



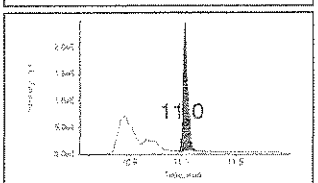
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



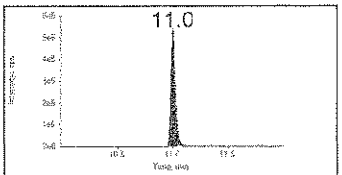
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



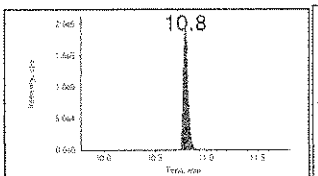
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



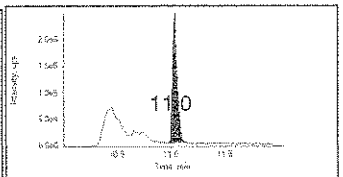
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



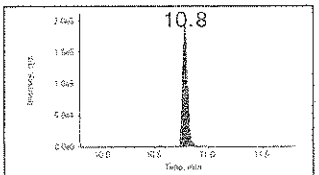
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



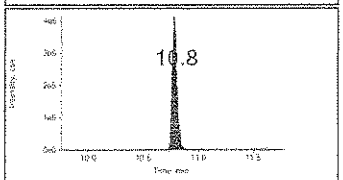
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



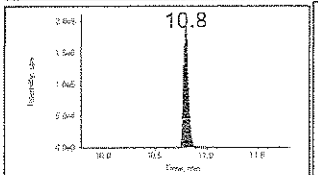
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



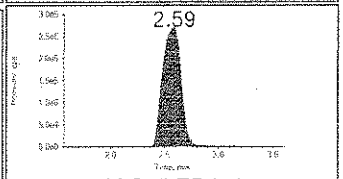
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



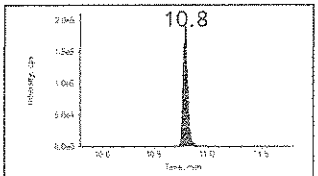
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



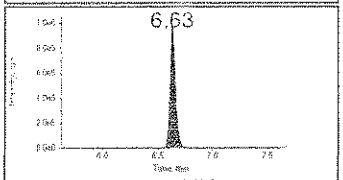
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



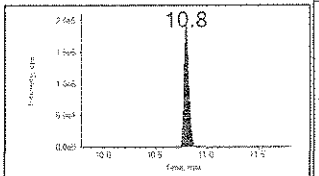
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



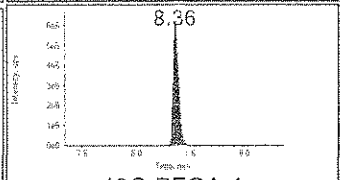
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



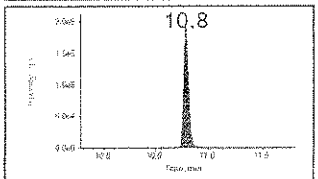
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



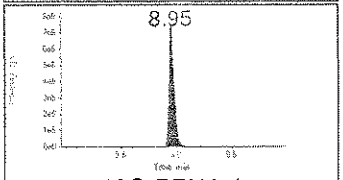
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



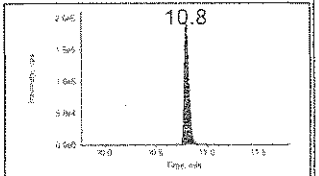
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



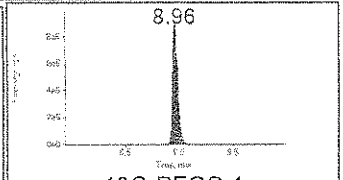
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



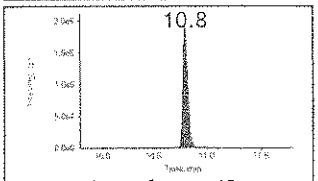
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



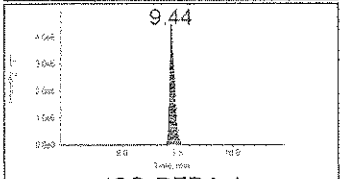
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



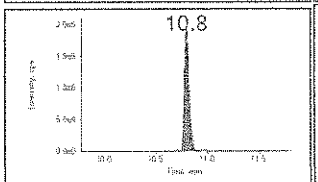
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



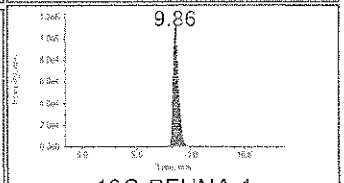
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



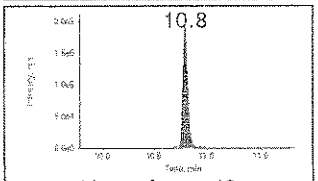
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



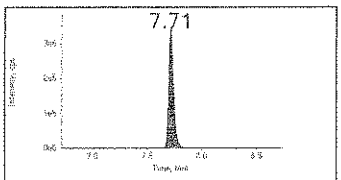
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



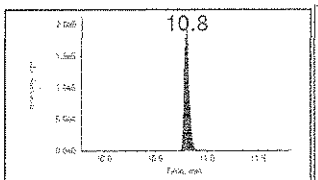
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



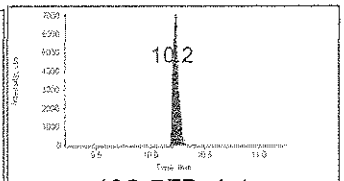
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



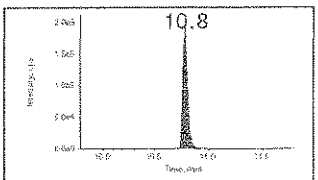
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



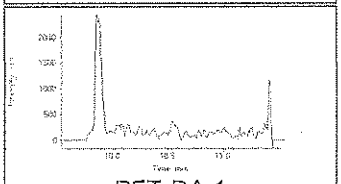
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



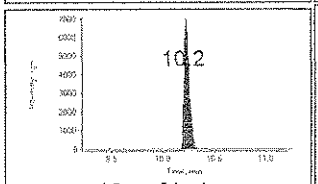
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



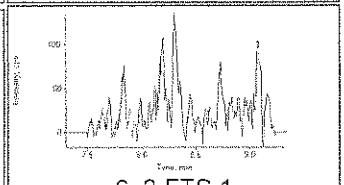
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



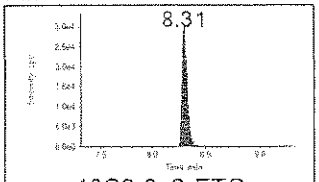
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



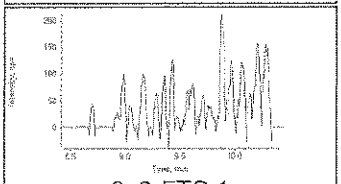
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



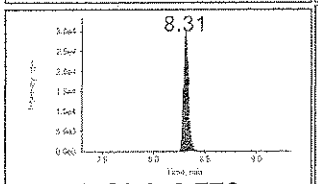
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



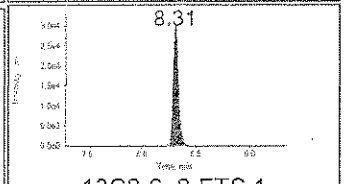
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



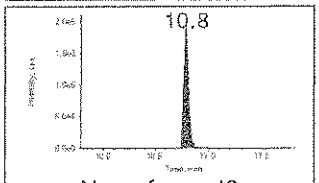
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

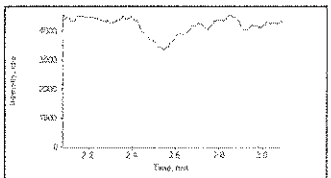


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

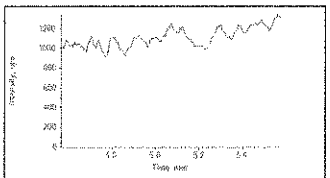


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

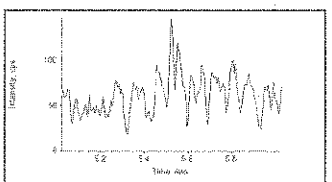
Ion Ratio Confirmation



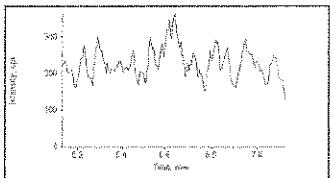
Pfba 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



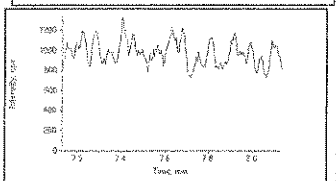
Pfpea 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



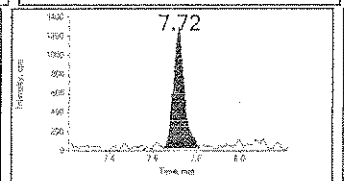
Pfbs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



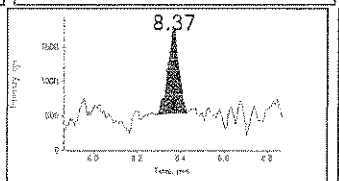
Pfhxa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



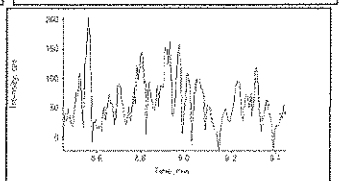
Pfhpa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



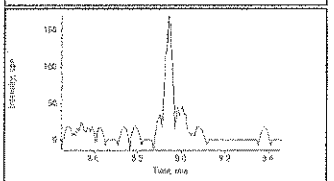
Pfhxs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



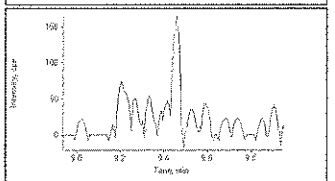
Pfoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



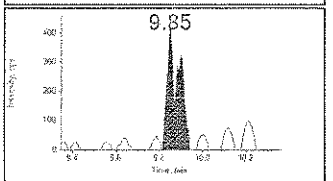
Pfna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



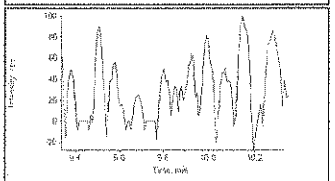
Pfos 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



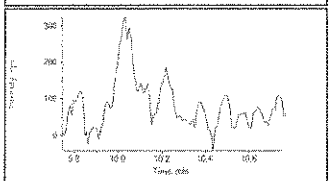
Pfda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



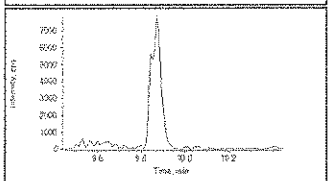
Pfuna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



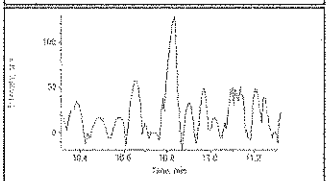
Pfds 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



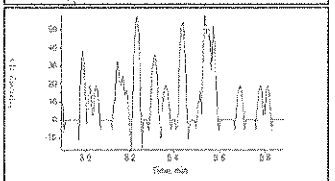
Pfdoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



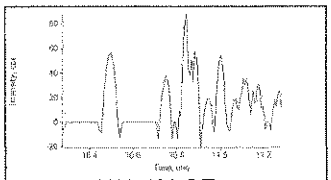
Fosa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



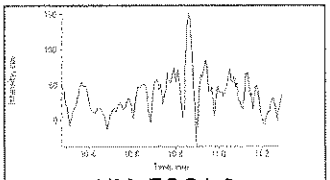
Pfteda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



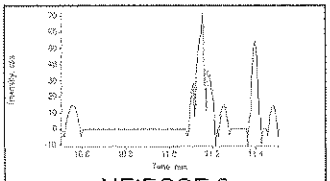
PFHpS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



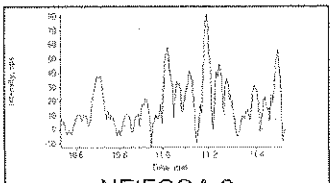
NMeFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



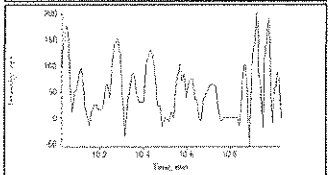
NMeFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



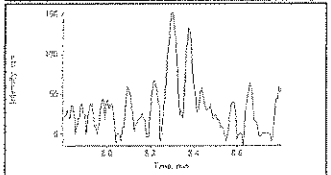
NEtFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



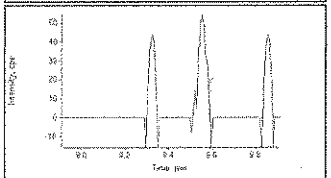
NEtFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

Quantitation Report

Data File:	033016\1049.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/31/16 00:34:28	**Vial:**	28
Run Type:	CCV	**Dilution:**	1
Lab ID:	KQ1603023-04	**Raw Units:**	ng/mL

Bottle ID:		**Tier:**	IV	**Matrix:**	Ground Water
Prod Code:	PFOA	**Collect Date:**	3/16/16	**Receive Date:**	3/17/16

Analysis Lot:	490080	**Prep Lot:**		**Report Group:**	KQ1603023
Analysis Method:	PFC/537M	**Prep Method:**			
		Prep Date:			

Title:	Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS	**Calibration ID:**	KC1600038
		Report List ID:	14664

Internal Standard Compounds

Parameter Name	RT	Response	Solution Conc	Area Criteria
N-methyl-d3-perfluoro-1-octanesulfonamide	10.8	634290.75	5.00	OK

Surrogate Compounds

Parameter Name	RT	Response	Solution Conc	% Rec	% Rec Criteria
Perfluoro-n-[1,2,3,4-13C4] butanoic acid	2.56	3620499.28	5.148	5.15	
Perfluoro-n-[1,2-13C2] hexanoic acid	6.62	4020859.83	5.326	5.33	
Sodium perfluoro-1-hexane[18O2]sulfonate	7.70	1335070.76	5.303	5.30	
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	8.36	2248734.81	5.308	5.31	
Perfluoro-n-[1,2,3,4,5-13C5] nonanoic acid	8.95	2618872.25	5.370	5.37	
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulf	8.96	3363032.69	5.456	5.46	
Perfluoro-n-[1,2-13C2] decanoic acid	9.44	1575010.66	5.265	5.27	
Perfluoro-n-[1,2-13C2]undecanoic Acid	9.85	427667.84	5.052	5.05	
Perfluoro-n-[1,2-13C2]dodecanoic Acid	10.2	26822.71	4.920	4.92	
S_N-ethyl-d5-perfluoro-1-octanesulfonamide	11.0	849494.24	5.061	5.06	
d9-NEtFOSE (Surr)	11.0	1769116.40	5.629	5.63	
d7-N-MeFOSE (Surr)	10.8	1561378.03	5.238	5.24	
S_6:2 Fluorotelomer sulfonate-13C2	8.31	122916.38	5.289	5.29	

Target Compounds

Final Conc.Units: ng/mL

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorobutanoic Acid	2.57	653120.57	1.135	1.14	
Perfluoropentanoic Acid	5.05	534182.35	1.047	1.05	
Perfluorobutane Sulfonate	5.50	1090818.37	1.087	1.09	
Perfluorohexanoic Acid	6.62	815294.15	1.057	1.06	
Perfluoroheptanoic Acid	7.62	692374.35	1.043	1.04	
Perfluorohexane Sulfonate	7.70	755474.71	1.041	1.04	
Perfluorooctanoic Acid	8.36	272217.54	1.121	1.12	
Perfluorononanoic Acid	8.95	532402.01	1.099	1.10	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

Printed: 3/31/16 14:48

\\alprews001\starlims$\LIMSReps\QuantValidation.rpt

Data File:	033016\1049.wiff	**Instrument:**	K-LCMS-02
Acqu Date:	3/31/16 00:34:28	**Vial:**	28
Run Type:	CCV	**Dilution:**	1
Lab ID:	KQ1603023-04	**Raw Units:**	ng/mL

Target Compounds

Final Conc.Units: ng/mL

Parameter Name	RT	Response	Solution Conc	Final Conc	Q
Perfluorooctane Sulfonate	8.96	632830.11	1.066	1.07	
Perfluorodecanoic Acid	9.44	352862.37	1.061	1.06	
Perfluoroundecanoic Acid	9.86	205262.86	1.017	1.02	
Perfluorodecane Sulfonate	9.84	780602.89	1.050	1.05	
Perfluorododecanoic Acid	10.2	318139.51	1.054	1.05	
Perfluorooctylsulfonamide	9.96	720289.81	1.054	1.05	
Perfluoro-n-tridecanoic acid	10.5	244588.70	0.822	0.822	
Perfluoro-n-tetradecanoic acid	10.8	98088.30	0.797	0.797	
Perfluoroheptane sulfonate	8.39	233808.16	1.018	1.02	
N-ethylperfluoro-1-octanesulfonamide	11.0	164523.03	1.065	1.07	
N-methylperfluoro-1-octanesulfonamide	10.8	122531.18	1.005	1.01	
2-(N-ethylperfluoro-1-octanesulfonamido)-eth	11.0	383394.50	0.897	0.897	
2-(N-methylperfluoro-1-octanesulfonamido)-e	10.8	335932.87	1.128	1.13	
6:2 Fluorotelomer sulfonate	8.31	175822.18	1.153	1.15	
8:2 Fluorotelomer sulfonate	9.42	157257.70	0.985	0.985	

U: Undetected at or above MDL
J: Analyte detected above MDL, but below MRL
B: Hit above MRL also found in Method Blank
E: Analyte concentration above high point of ICAL
N: Presumptive evidence of compound

D: Result from dilution
m: Manual integration performed
d: Compound manually deleted
NR: Analyte not reported from this analysis

*: Result fails acceptance criteria
#: Acceptance criteria not applicable
?: Insufficient information to determine acceptance
e: Result >= MRL, but MRL less than low point of ICAL
c: check for co-elution

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Project	Ewan's Projects\PFCs	Result Table	033016.rdb
Data File	033016\1049.wiff	Algorithm Used	MQL
Acquisition Method	PFC_090315 schedule mrm.dam	Instrument Name	LCMS02

Sample Name	PFC 1.0ppb	Injection Vial	8
Acquisition Date	3/31/2016 12:34:28 AM	Injection Volume	10
Acquisition Method	PFC_090315 schedule mrm.dam	Sample Type	Quality Control
Sample ID	15-OLC-02-35F	Dilution Factor	1.00

Results Summary

Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
Pfba 1	2.57 (2.60)	13c_pfba	3620499	653121	1.00	1.1350	114	No
Pfpea 1	5.05 (5.06)	13c_pfhxa	4020860	534182	1.00	1.0470	105	No
Pfbs 1	5.50 (5.53)	18o-pfhs	1335071	1090818	1.00	1.0870	109	No
Pfhxa 1	6.62 (6.63)	13c_pfhxa	4020860	815294	1.00	1.0570	106	No
Pfhpa 1	7.62 (7.64)	13c_pfhxa	4020860	692374	1.00	1.0430	104	No
Pfhxs 1	7.70 (7.72)	18o-pfhs	1335071	755475	1.00	1.0410	104	No
Pfoa 1	8.36 (8.36)	13c-pfoa	2248735	272218	1.00	1.1210	112	No
Pfna 1	8.95 (8.95)	13c-pfna	2618872	532402	1.00	1.0990	110	No
Pfos 1	8.96 (8.96)	13c-pfos	3363033	632830	1.00	1.0660	107	No
Pfda 1	9.44 (9.44)	13c-pfda	1575011	352862	1.00	1.0610	106	No
Pfuna 1	9.86 (9.86)	13c-pfuna	427668	205263	1.00	1.0170	102	No
Pfds 1	9.84 (9.84)	13c-pfos	3363033	780603	1.00	1.0500	105	No
Pfdoa 1	10.20 (10.20)	13c-pfdoda	26823	318140	1.00	1.0540	105	No
Fosa 1	9.96 (9.94)	d5-NEtFOSA	849494	720290	1.00	1.0540	105	No
Pfteda 1	10.80 (10.80)	13c-pfdoda	26823	98088	1.00	0.7970	80	No
PFHpS 1	8.39 (8.39)	18o-pfhs	1335071	233808	1.00	1.0180	102	No
NMeFOSE 1	10.80 (10.80)	d7-NMeFOSE	1561378	335933	1.00	1.1280	113	No
NMeFOSA 1	10.80 (10.80)	d7-NMeFOSE	1561378	122531	1.00	1.0050	101	No
NEtFOSE 1	11.00 (11.00)	d9-EtFOSE	1769116	383395	1.00	0.8970	90	No
NEtFOSA 1	11.00 (11.00)	d5-NEtFOSA	849494	164523	1.00	1.0650	107	No
d9-EtFOSE 1	11.00 (11.00)	N_mefosa_d3	634291	1769116	5.00	5.6290	113	No
d5-NEtFOSA 1	11.00 (11.00)	N_mefosa_d3	634291	849494	5.00	5.0610	101	No
d7-NMeFOSE 1	10.80 (10.80)	N_mefosa_d3	634291	1561378	5.00	5.2380	105	No

APR 0 1 2016

Analyte Name	Analyte RT (Expected)	IS Name	IS Area	Analyte Area	Exp Conc (ng/mL)	Calc. Conc (ng/mL)	Accuracy (%)	Mod?
13C_PFBA 1	2.56 (2.58)	N_mefosa d3	634291	3620499	5.00	5.1480	103	No
13C_PFHXA 1	6.62 (6.63)	N_mefosa d3	634291	4020860	5.00	5.3260	107	No
13C-PFOA 1	8.36 (8.35)	N_mefosa d3	634291	2248735	5.00	5.3080	106	No
13C-PFNA 1	8.95 (8.96)	N_mefosa d3	634291	2618872	5.00	5.3700	107	No
13C-PFOS 1	8.96 (8.95)	N_mefosa d3	634291	3363033	5.00	5.4560	109	No
13C-PFDA 1	9.44 (9.45)	N_mefosa d3	634291	1575011	5.00	5.2650	105	No
13C-PFUNA 1	9.85 (9.85)	N_mefosa d3	634291	427668	5.00	5.0520	101	No
18O-PFHxS 1	7.70 (7.72)	N_mefosa d3	634291	1335071	5.00	5.3030	106	No
13C-PFDoA 1	10.20 (10.20)	N_mefosa d3	634291	26823	5.00	4.9200	98	No
PFTrDA 1	10.50 (10.50)	13c-pfdoda	26823	244589	1.00	0.8220	82	No
6_2-FTS 1	8.31 (8.31)	13C2-6_2-FTS	122916	175822	1.00	1.1530	115	No
8_2-FTS 1	9.42 (9.42)	13C2-6_2-FTS	122916	157258	1.00	0.9850	99	No
13C2-6_2-FTS 1	8.31 (8.31)	N_mefosa d3	634291	122916	5.00	5.2890	106	No

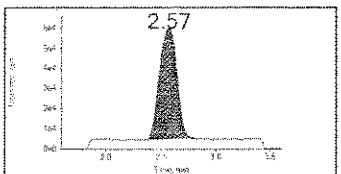
IRC Summary

Analyte Peak Name	RT (Exp RT)	Area	Modified?	Ratio Confirms ID
Pfba 2	2.58 (2.58)	646993	No	YES
Pfpea 2	5.05 (5.07)	549581	No	YES
Pfbs 2	5.51 (5.52)	503285	No	YES
Pfhxa 2	6.62 (6.63)	67047	No	YES
Pfhpa 2	7.62 (7.63)	294839	No	YES
Pfhxs 2	7.71 (7.72)	297855	No	YES
Pfoa 2	8.36 (8.36)	496514	No	YES
Pfna 2	8.95 (8.95)	170658	No	YES
Pfos 2	8.96 (8.95)	217912	No	YES
Pfda 2	9.44 (9.44)	98549	No	YES
Pfuna 2	9.85 (9.85)	97069	No	YES
Pfds 2	9.84 (9.84)	262561	No	YES
Pfdoa 2	10.20 (10.20)	108734	No	YES

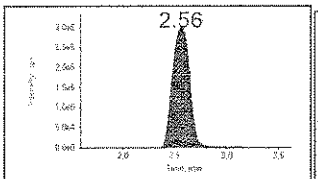
Analyte Peak Name	RT (Exp RT)	Area	Modified?	Ratio Confirms ID
Fosa 2	9.96 (9.94)	18036	No	No
Pfteda 2	10.80 (10.80)	41322	No	YES
PFHpS 2	8.39 (8.39)	99213	No	YES
NMeFOSE 2	10.80 (10.80)	1368	No	YES
NMeFOSA 2	10.80 (10.80)	115498	No	YES
NEtFOSE 2	11.00 (11.00)	1320	No	No
NEtFOSA 2	11.00 (11.00)	118721	No	YES
PFTrDA 2	10.50 (10.50)	99668	No	No
6_2-FTS 2	8.31 (8.30)	222906	No	YES
8_2-FTS 2	9.42 (9.41)	16866	No	YES

Quantitative Peak Review

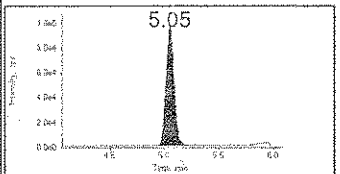
PFC 1.0ppb 15-OLC-02-35F



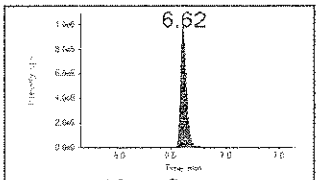
Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



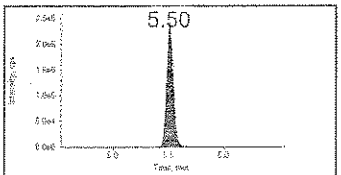
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



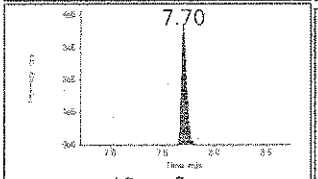
Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak



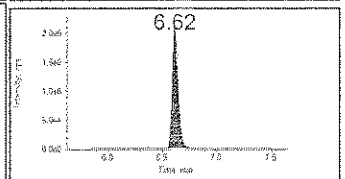
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



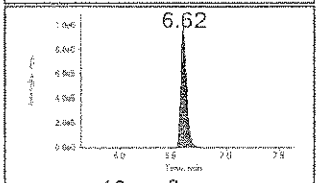
Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



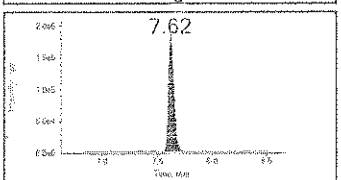
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



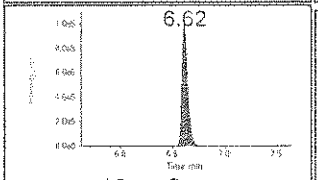
Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak



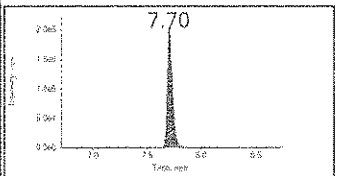
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



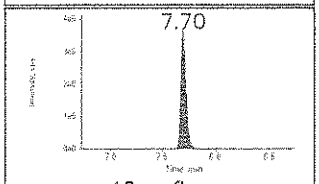
Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



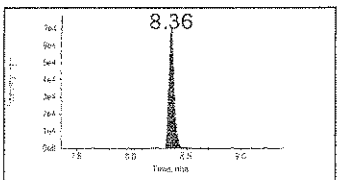
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



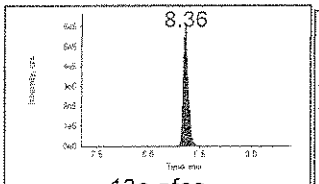
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



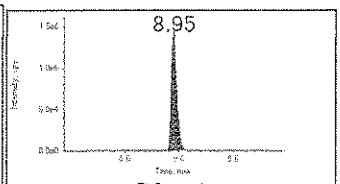
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



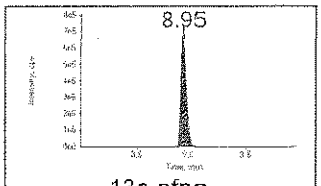
Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



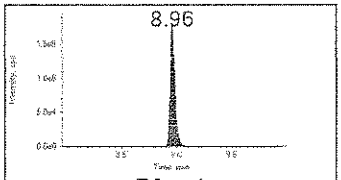
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



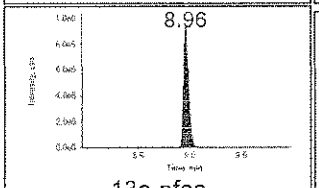
Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak



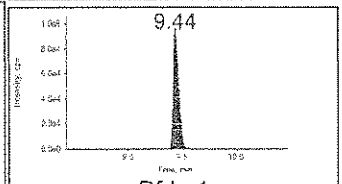
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



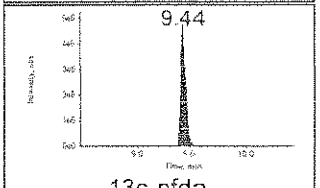
Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



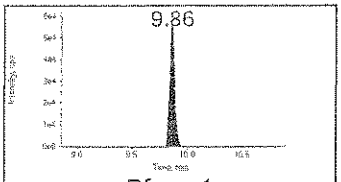
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



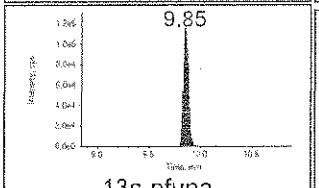
Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



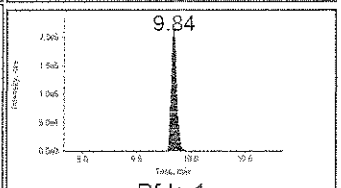
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



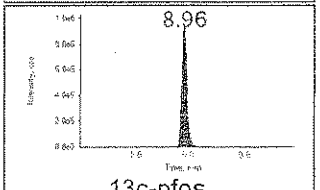
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



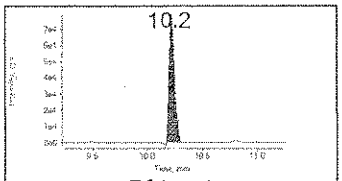
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



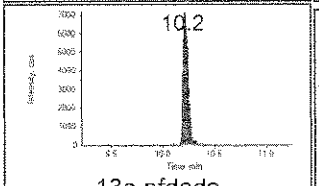
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



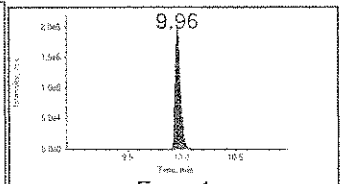
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



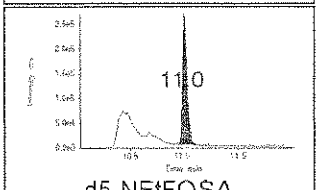
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



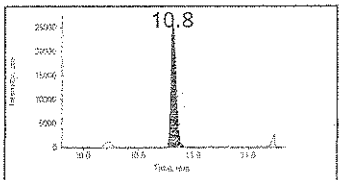
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



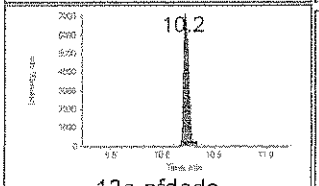
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



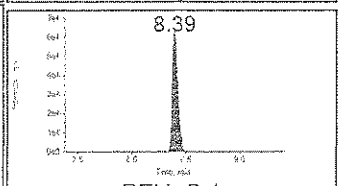
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



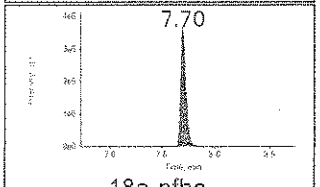
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



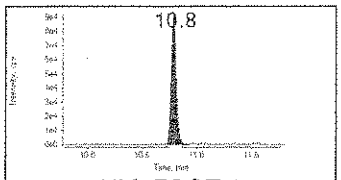
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



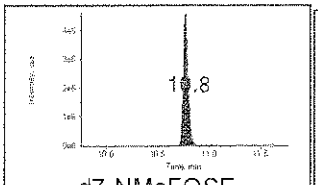
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



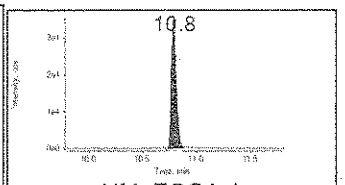
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



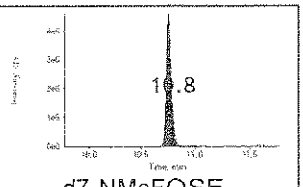
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



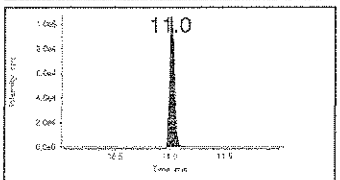
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



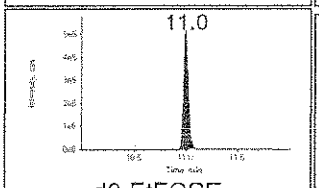
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



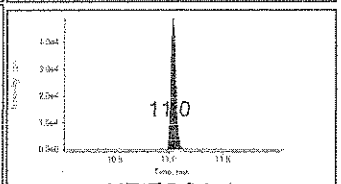
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



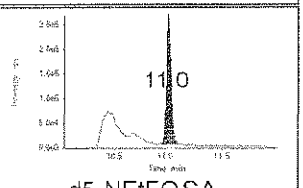
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



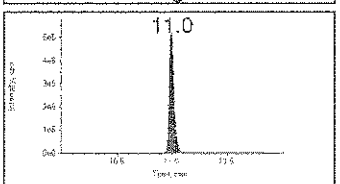
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



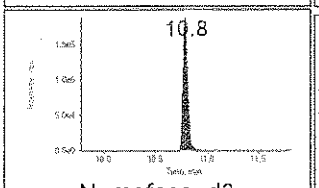
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



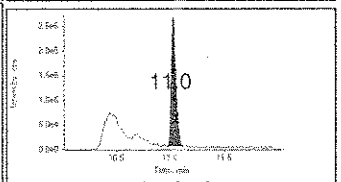
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



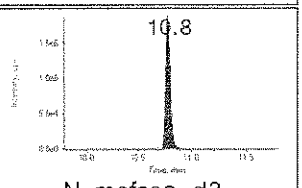
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



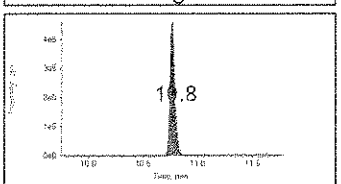
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



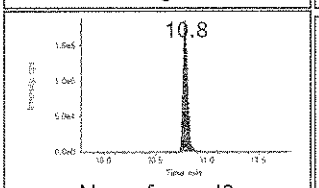
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



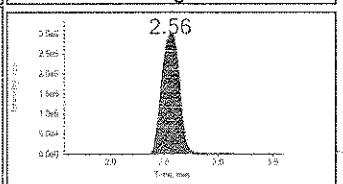
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



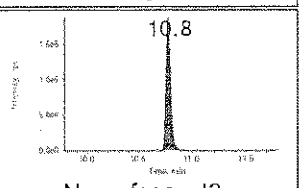
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



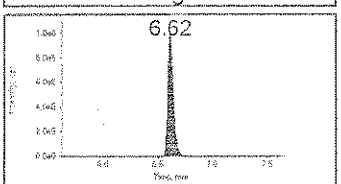
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



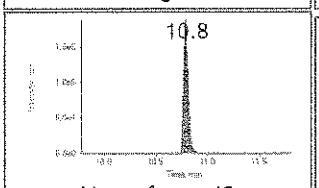
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



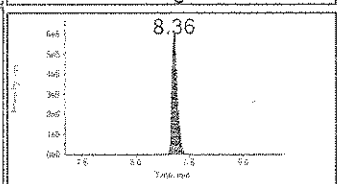
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



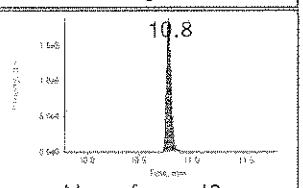
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



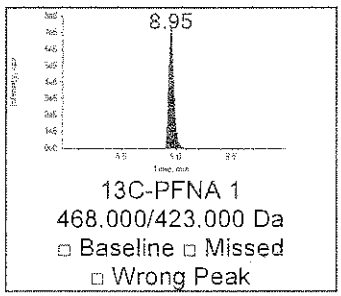
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



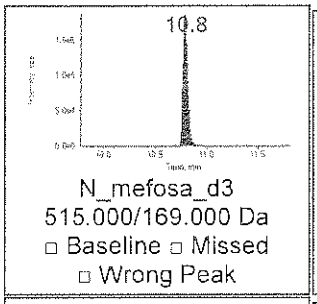
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



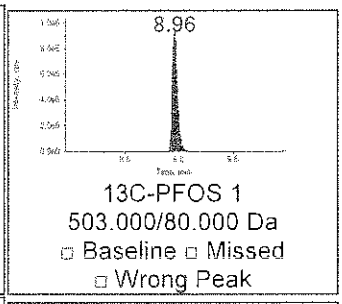
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



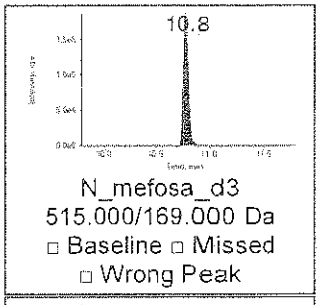
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



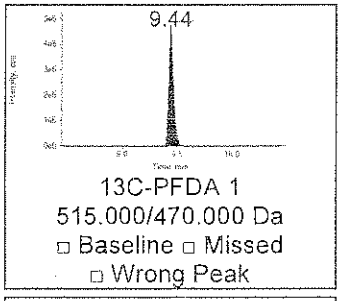
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



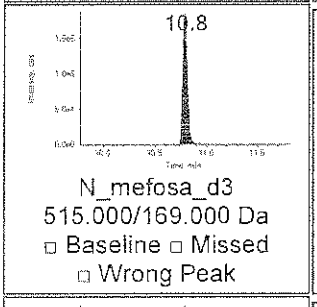
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



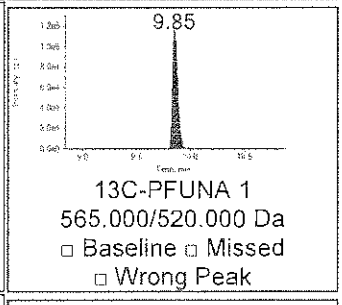
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



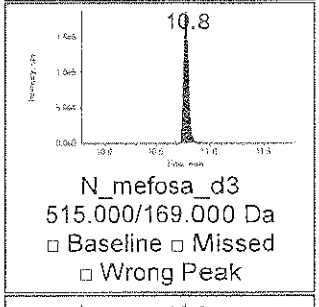
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



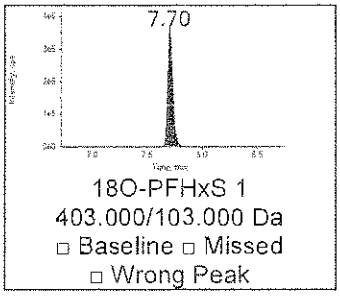
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



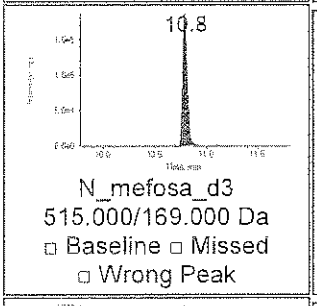
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



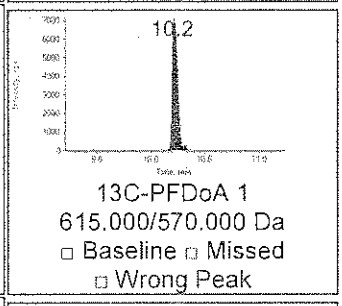
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



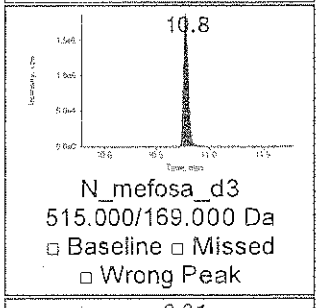
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



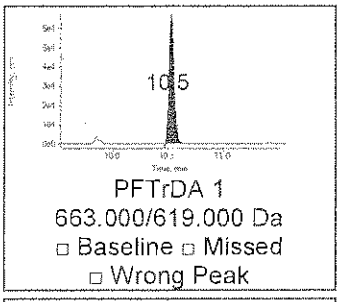
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



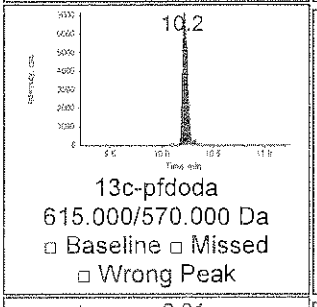
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



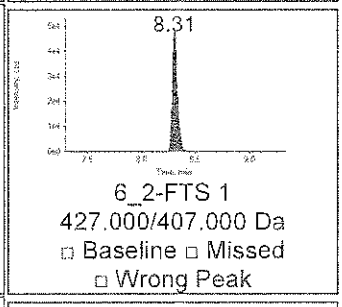
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



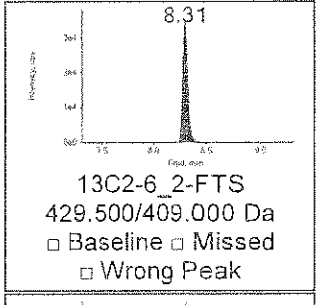
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



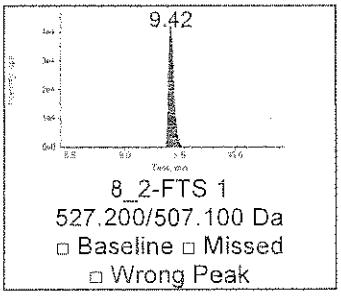
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



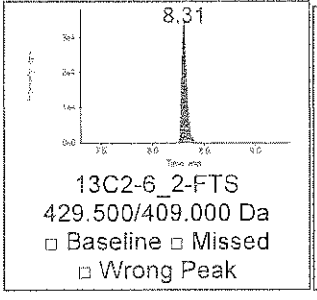
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



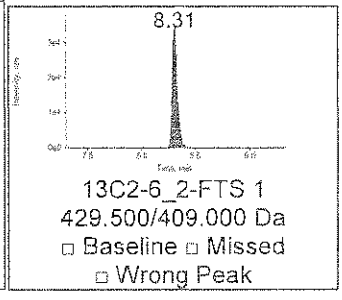
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



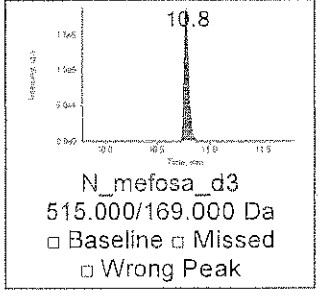
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

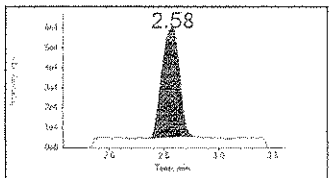


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

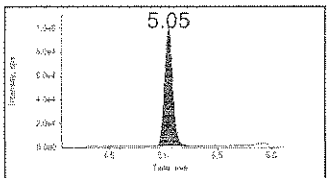


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

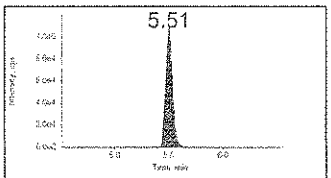
Ion Ratio Confirmation



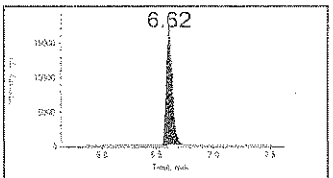
Pfba 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



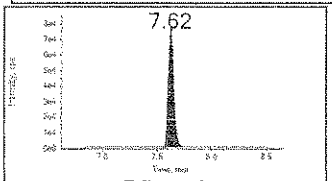
Pfpea 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



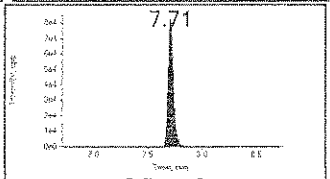
Pfbs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



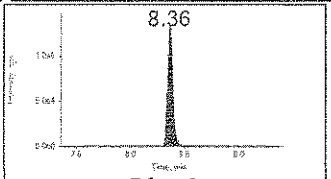
Pfhxa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



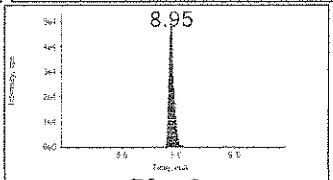
Pfhpa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



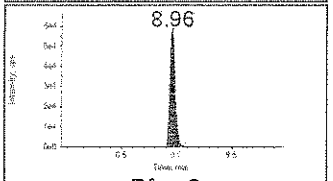
Pfhxs 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



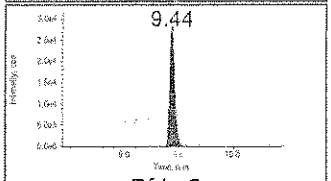
Pfoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



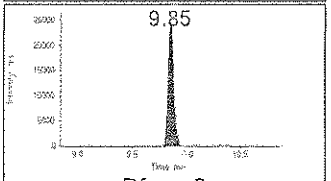
Pfna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



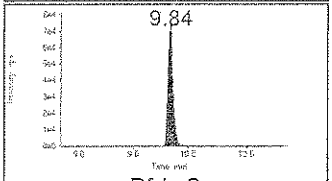
Pfos 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



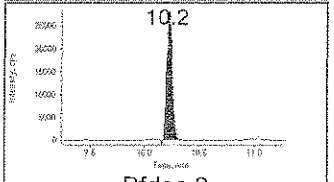
Pfda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



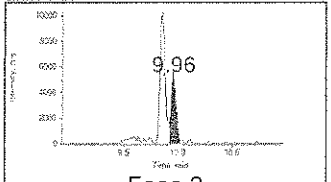
Pfuna 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



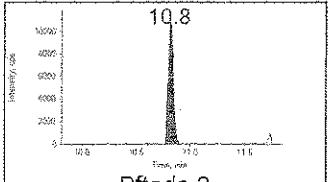
Pfds 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



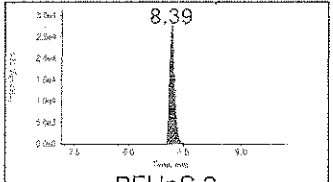
Pfdoa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



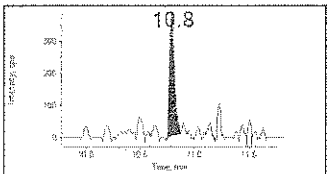
Fosa 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



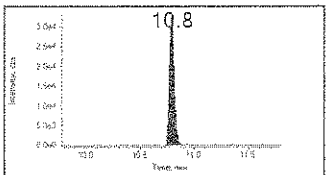
Pfteda 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



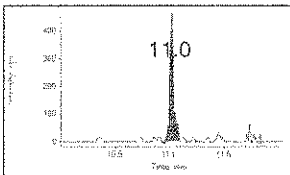
PFHpS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



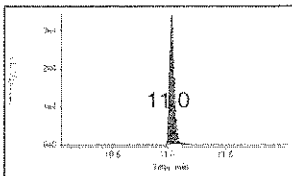
NMeFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



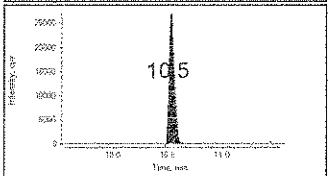
NMeFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



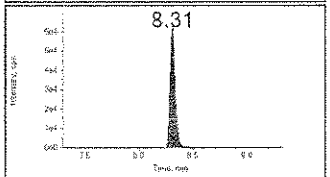
NEtFOSE 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



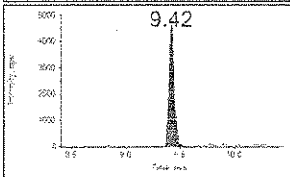
NEtFOSA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod?
□ Baseline □ Missed
□ Wrong Peak

Project	Ewan's Projects\PFCs
Data File	033016\1050.wiff
Result Table	033016.rdb
Instrument Name	LCMS02

Sample Name	IB	Injection Volume	10
Acquisition Date	3/31/2016 12:53:50 AM	Sample Type	Unknown
Acquisition Method	PFC_090315 schedule mrm.dam	Dilution Factor	1.00
Injection Vial	2	Weight to Volume	0.00

Results Summary

Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
Pfba 1	13c_pfba	3304895	0.00 (2.60)	0	N/A	Yes
Pfpea 1	13c_pfhxa	3787319	0.00 (5.06)	0	N/A	No
Pfbs 1	18o-pfhs	1251570	0.00 (5.53)	0	N/A	No
Pfhxa 1	13c_pfhxa	3787319	6.62 (6.63)	5086	0.0070	No
Pfhpa 1	13c_pfhxa	3787319	0.00 (7.64)	0	N/A	No
Pfhxs 1	18o-pfhs	1251570	7.71 (7.72)	11516	0.0170	No
Pfoa 1	13c-pfoa	2142587	8.36 (8.36)	2157	0.0090	No
Pfna 1	13c-pfna	2455990	0.00 (8.95)	0	N/A	No
Pfos 1	13c-pfos	3029633	0.00 (8.96)	0	N/A	No
Pfda 1	13c-pfda	1340746	0.00 (9.44)	0	N/A	No
Pfuna 1	13c-pfuna	395653	9.86 (9.86)	2533	0.0140	No
Pfds 1	13c-pfos	3029633	0.00 (9.84)	0	N/A	No
Pfdoa 1	13c-pfdoda	27418	10.20 (10.20)	1744	0.0060	No
Fosa 1	d5-NEtFOSA	809746	9.96 (9.94)	2383	0.0040	No
Pfteda 1	13c-pfdoda	27418	0.00 (10.80)	0	N/A	No
PFHpS 1	18o-pfhs	1251570	0.00 (8.39)	0	N/A	No
NMeFOSE 1	d7-NMeFOSE	1553936	0.00 (10.80)	0	N/A	No
NMeFOSA 1	d7-NMeFOSE	1553936	0.00 (10.80)	0	N/A	No
NEtFOSE 1	d9-EtFOSE	1514430	0.00 (11.00)	0	N/A	No
NEtFOSA 1	d5-NEtFOSA	809746	0.00 (11.00)	0	N/A	No

APR 01 2016

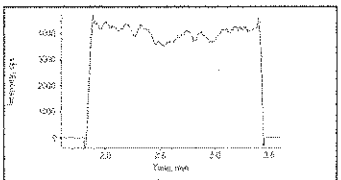
Analyte Name	IS Name	IS Area	Analyte RT (Exp RT)	Analyte Area	Calc. Conc (ng/mL)	Modified?
d9-EtFOSE 1	N_mefosa_d3	672506	11.00 (11.00)	1514430	4.5440	No
d5-NEtFOSA 1	N_mefosa_d3	672506	11.00 (11.00)	809746	4.5500	No
d7-NMeFOSE 1	N_mefosa_d3	672506	10.80 (10.80)	1553936	4.9170	No
13C_PFBA 1	N_mefosa_d3	672506	2.56 (2.58)	3304895	4.4320	No
13C_PFHXA 1	N_mefosa_d3	672506	6.62 (6.63)	3787319	4.7310	No
13C-PFOA 1	N_mefosa_d3	672506	8.35 (8.35)	2142587	4.7700	No
13C-PFNA 1	N_mefosa_d3	672506	8.94 (8.96)	2455990	4.7490	No
13C-PFOS 1	N_mefosa_d3	672506	8.95 (8.95)	3029633	4.6360	No
13C-PFDA 1	N_mefosa_d3	672506	9.43 (9.45)	1340746	4.2280	No
13C-PFUNA 1	N_mefosa_d3	672506	9.85 (9.85)	395653	4.4090	No
18O-PFHxS 1	N_mefosa_d3	672506	7.70 (7.72)	1251570	4.6880	No
13C-PFDoA 1	N_mefosa_d3	672506	10.20 (10.20)	27418	4.7430	No
PFTrDA 1	13c-pfdoda	27418	0.00 (10.50)	0	N/A	No
6_2-FTS 1	13C2-6_2-FTS	109648	0.00 (8.31)	0	N/A	No
8_2-FTS 1	13C2-6_2-FTS	109648	0.00 (9.42)	0	N/A	No
13C2-6_2-FTS 1	N_mefosa_d3	672506	8.30 (8.31)	109648	4.4500	No

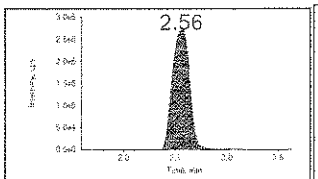
IRC Summary

Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfba 2	0.00 (2.58)	0	No	0.00 (0.98)	No
Pfpea 2	0.00 (5.07)	0	No	0.00 (1.01)	No
Pfbs 2	0.00 (5.52)	0	No	0.00 (0.48)	No
Pfhxa 2	0.00 (6.63)	0	No	0.00 (0.09)	No
Pfhpa 2	0.00 (7.63)	0	No	0.00 (0.44)	No
Pfhxs 2	7.70 (7.72)	4516	No	0.39 (0.40)	YES
Pfoa 2	8.35 (8.36)	5516	No	2.56 (1.81)	No
Pfna 2	0.00 (8.95)	0	No	0.00 (0.33)	No

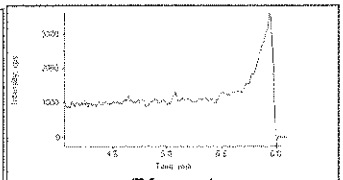
Analyte Peak Name	RT (Exp RT)	Area	Modified?	Calc (Exp) MRM Ratio	Ratio Confirms ID
Pfos 2	0.00 (8.95)	0	No	0.00 (0.36)	No
Pfda 2	0.00 (9.44)	0	No	0.00 (0.26)	No
Pfuna 2	9.85 (9.85)	783	No	0.31 (0.50)	No
Pfds 2	0.00 (9.84)	0	No	0.00 (0.36)	No
Pfdoa 2	0.00 (10.20)	0	No	0.00 (0.37)	No
Fosa 2	0.00 (9.94)	0	No	0.00 (0.03)	No
Pfteda 2	0.00 (10.80)	0	No	0.00 (0.42)	No
PFHpS 2	0.00 (8.39)	0	No	0.00 (0.39)	No
NMeFOSE 2	0.00 (10.80)	0	No	0.00 (0.00)	No
NMeFOSA 2	0.00 (10.80)	0	No	0.00 (0.93)	No
NEtFOSE 2	0.00 (11.00)	0	No	0.00 (0.00)	No
NEtFOSA 2	0.00 (11.00)	0	No	0.00 (0.70)	No
PFTrDA 2	0.00 (10.50)	0	No	0.00 (0.32)	No
6_2-FTS 2	0.00 (8.30)	0	No	0.00 (1.35)	No
8_2-FTS 2	0.00 (9.41)	0	No	0.00 (0.12)	No

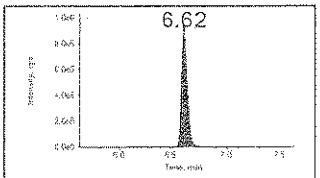
Quantitative Peak Review IB *No data for Sample ID*


Pfba 1
213.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

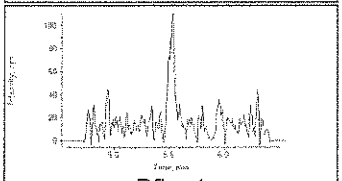


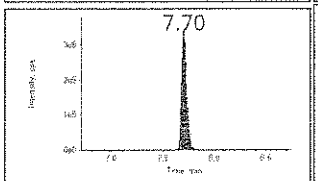
13c_pfba
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfpea 1
263.000/219.000 Da
□ Baseline □ Missed
□ Wrong Peak

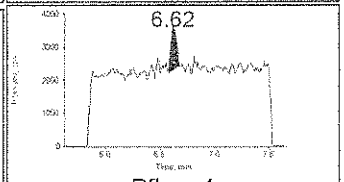


13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak

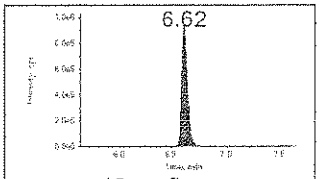

Pfbs 1
299.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



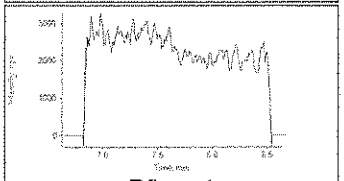
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak

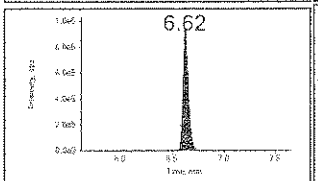


Pfhxa 1
313.000/269.000 Da
□ Baseline □ Missed
□ Wrong Peak

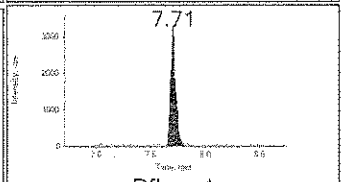


13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak

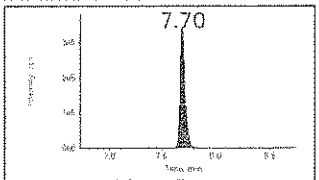

Pfhpa 1
363.000/319.000 Da
□ Baseline □ Missed
□ Wrong Peak



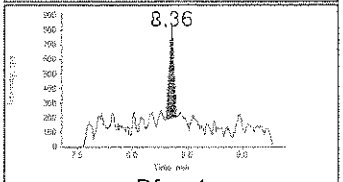
13c_pfhxa
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



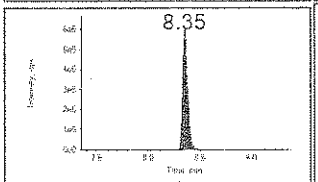
Pfhxs 1
399.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



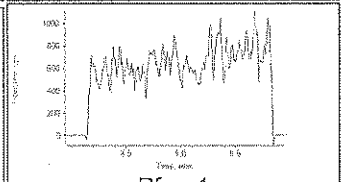
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak

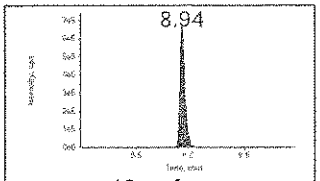


Pfoa 1
413.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

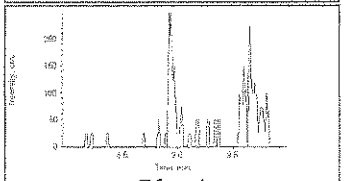


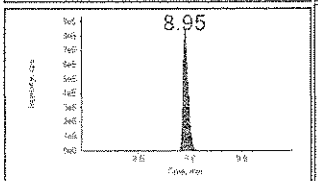
13c-pfoa
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfna 1
463.000/419.000 Da
□ Baseline □ Missed
□ Wrong Peak

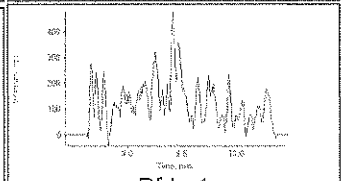


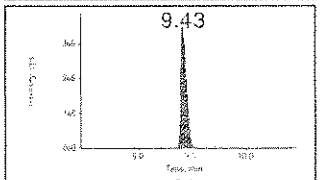
13c-pfna
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak


Pfos 1
499.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak

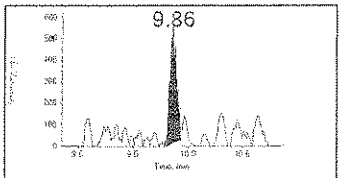


13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak

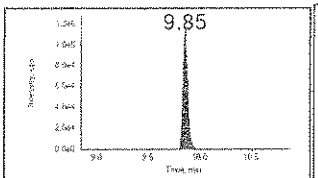

Pfda 1
513.000/469.000 Da
□ Baseline □ Missed
□ Wrong Peak



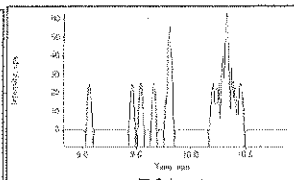
13c-pfda
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



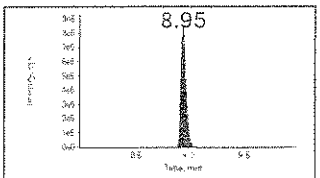
Pfuna 1
563.000/519.000 Da
□ Baseline □ Missed
□ Wrong Peak



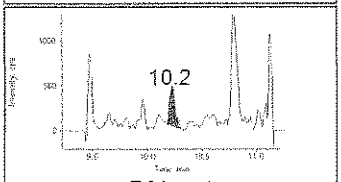
13c-pfuna
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



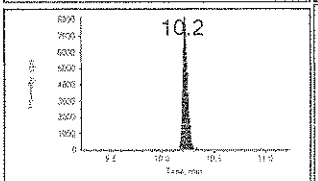
Pfds 1
599.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



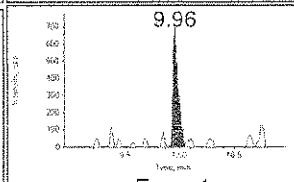
13c-pfos
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



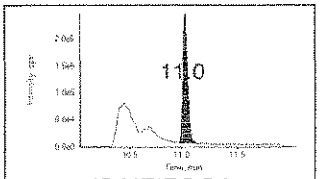
Pfdoa 1
613.000/569.000 Da
□ Baseline □ Missed
□ Wrong Peak



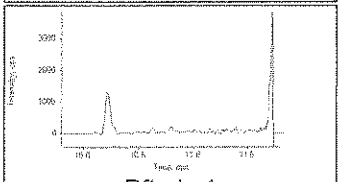
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



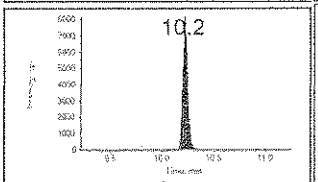
Fosa 1
498.000/78.000 Da
□ Baseline □ Missed
□ Wrong Peak



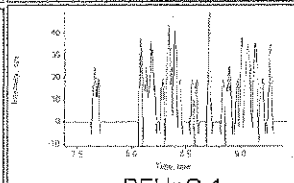
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



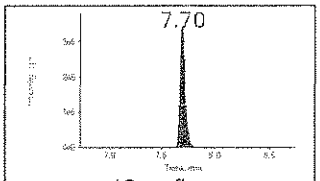
Pfteda 1
713.000/669.000 Da
□ Baseline □ Missed
□ Wrong Peak



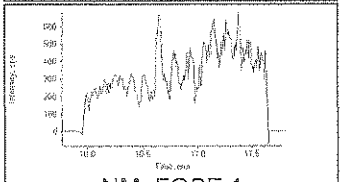
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



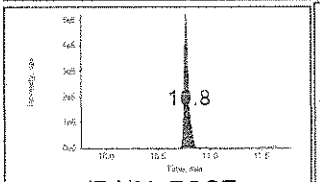
PFHpS 1
449.400/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



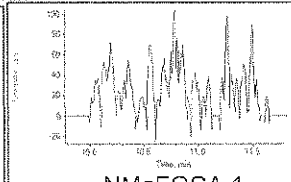
18o-pfhs
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



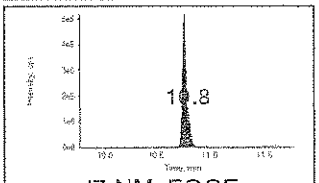
NMeFOSE 1
616.200/58.800 Da
□ Baseline □ Missed
□ Wrong Peak



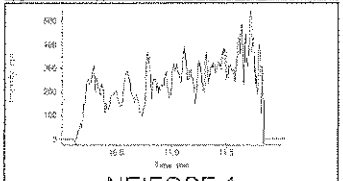
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



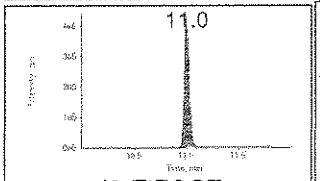
NMeFOSA 1
512.200/169.300 Da
□ Baseline □ Missed
□ Wrong Peak



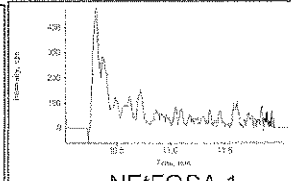
d7-NMeFOSE
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



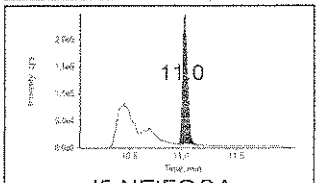
NEtFOSE 1
630.200/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



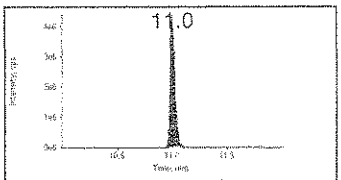
d9-EtFOSE
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



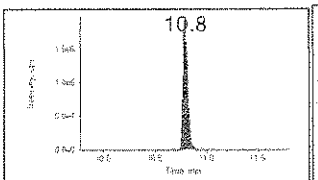
NEtFOSA 1
526.200/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



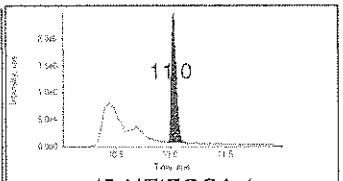
d5-NEtFOSA
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



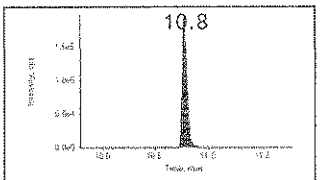
d9-EtFOSE 1
639.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



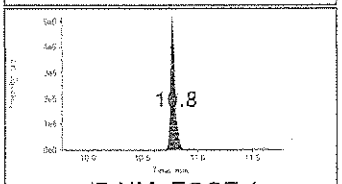
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



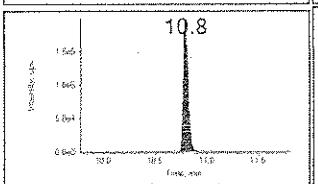
d5-NEtFOSA 1
531.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



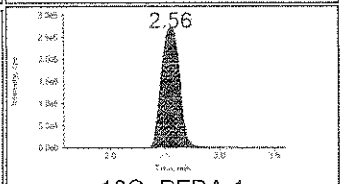
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



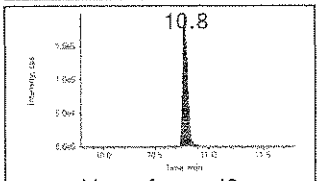
d7-NMeFOSE 1
623.000/59.000 Da
□ Baseline □ Missed
□ Wrong Peak



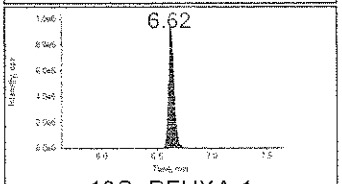
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



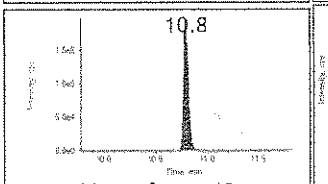
13C_PFBA 1
217.000/172.000 Da
□ Baseline □ Missed
□ Wrong Peak



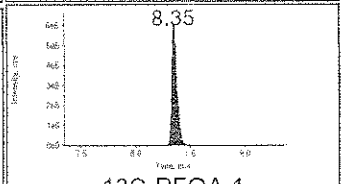
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



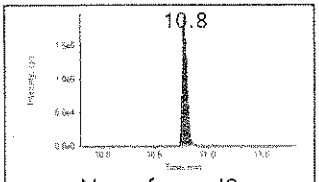
13C_PFHXA 1
315.000/270.000 Da
□ Baseline □ Missed
□ Wrong Peak



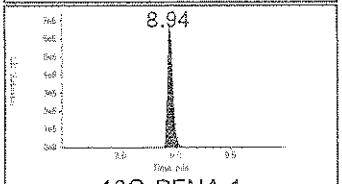
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



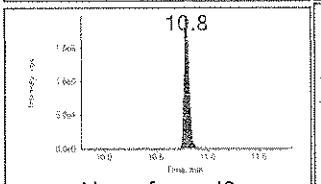
13C-PFOA 1
417.000/372.000 Da
□ Baseline □ Missed
□ Wrong Peak



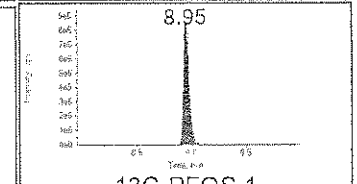
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



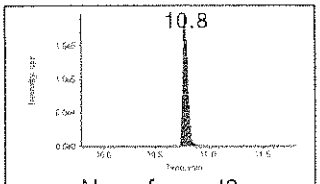
13C-PFNA 1
468.000/423.000 Da
□ Baseline □ Missed
□ Wrong Peak



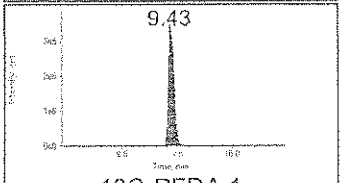
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



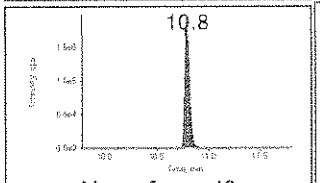
13C-PFOS 1
503.000/80.000 Da
□ Baseline □ Missed
□ Wrong Peak



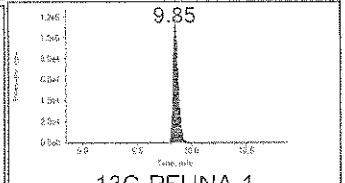
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



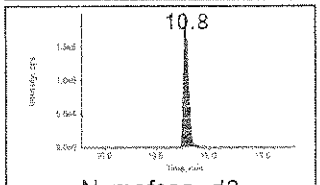
13C-PFDA 1
515.000/470.000 Da
□ Baseline □ Missed
□ Wrong Peak



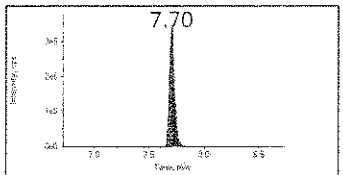
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



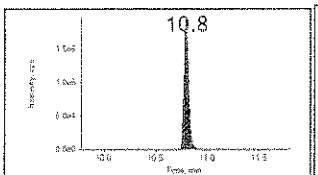
13C-PFUNA 1
565.000/520.000 Da
□ Baseline □ Missed
□ Wrong Peak



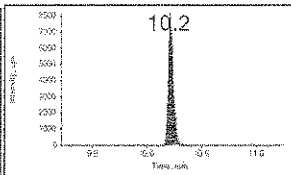
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



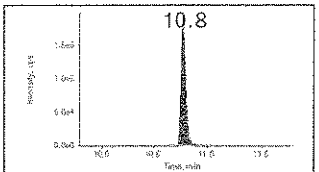
18O-PFHxS 1
403.000/103.000 Da
□ Baseline □ Missed
□ Wrong Peak



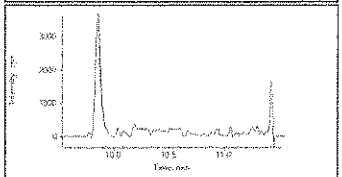
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



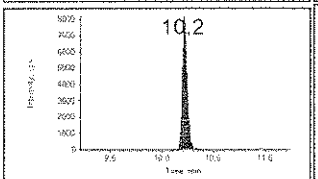
13C-PFDoA 1
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



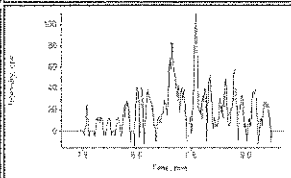
N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak



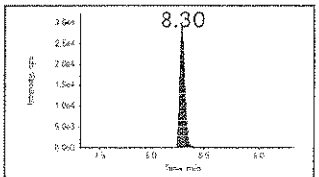
PFTrDA 1
663.000/619.000 Da
□ Baseline □ Missed
□ Wrong Peak



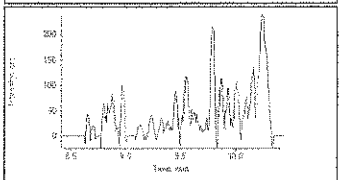
13c-pfdoda
615.000/570.000 Da
□ Baseline □ Missed
□ Wrong Peak



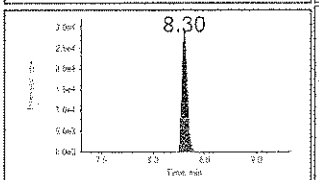
6_2-FTS 1
427.000/407.000 Da
□ Baseline □ Missed
□ Wrong Peak



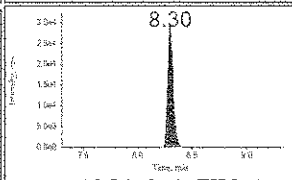
13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak



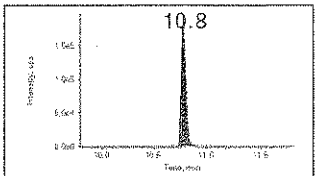
8_2-FTS 1
527.200/507.100 Da
□ Baseline □ Missed
□ Wrong Peak



13C2-6_2-FTS
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

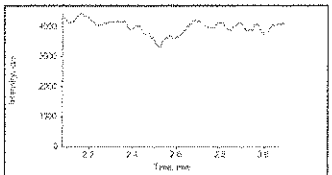


13C2-6_2-FTS 1
429.500/409.000 Da
□ Baseline □ Missed
□ Wrong Peak

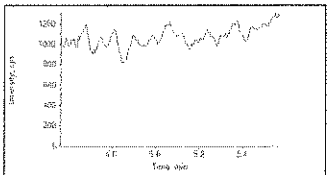


N_mefosa_d3
515.000/169.000 Da
□ Baseline □ Missed
□ Wrong Peak

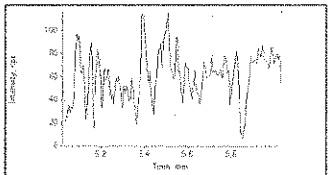
Ion Ratio Confirmation



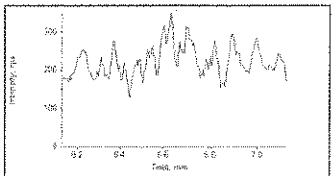
Pfba 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



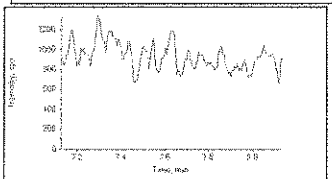
Pfpea 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



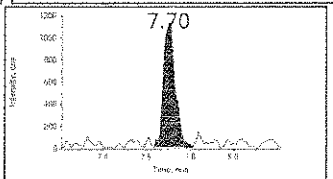
Pfbs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



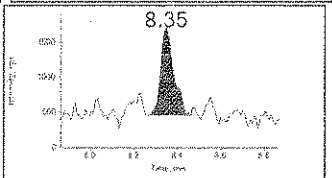
Pfhxa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



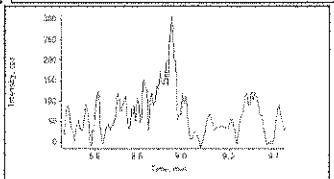
Pfhpa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



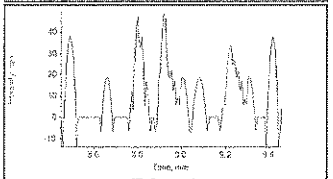
Pfhxs 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



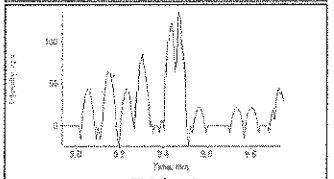
Pfoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



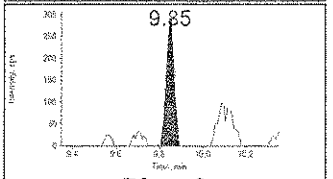
Pfna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



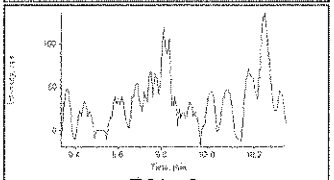
Pfos 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



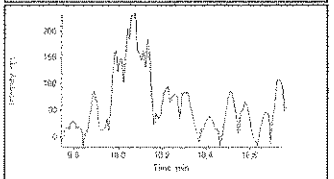
Pfda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



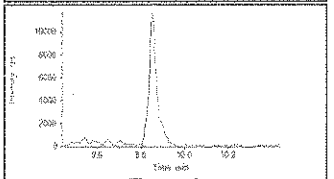
Pfuna 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



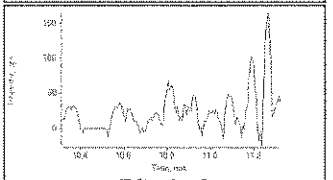
Pfds 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



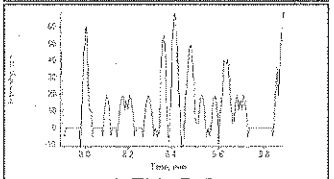
Pfdoa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



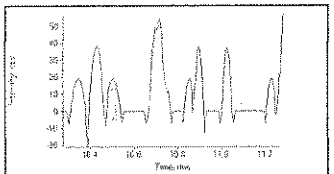
Fosa 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



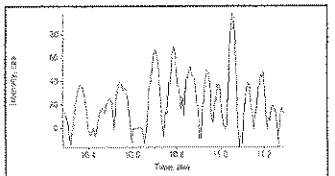
Pfteda 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



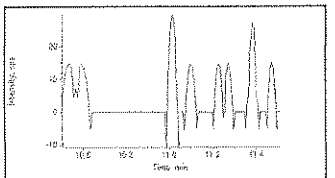
PFHpS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



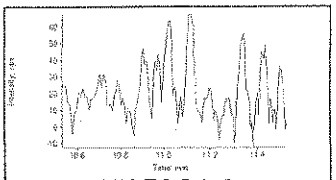
NMeFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



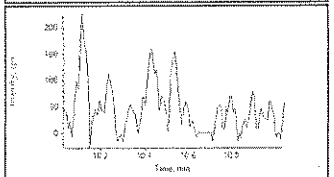
NMeFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



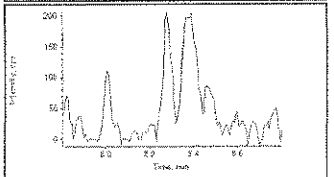
NEtFOSE 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



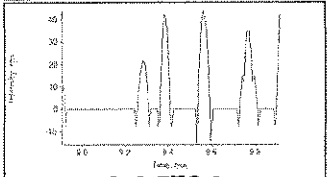
NEtFOSA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



PFTrDA 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



6_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak



8_2-FTS 2
Mod? No
□ Baseline □ Missed
□ Wrong Peak

Preparation Information Benchsheet

Prep Run#: 258211
Team: Organic LC/NCISNEY
Prep WorkFlow: OrgExtAq(14)
Prep Method: EPA 3535A
Status: Prepped
Prep Date/Time: 3/28/16 07:03 AM

Number of Copies to make: 7

	Lab Code	Client ID	B#	Method /Test	pH	Matrix	Amt. Ext.	Final Vol	Sample Description
1	K1602709-001	KCH067-042	.01	PFC/537M/PFOA		Water	290.0000mL	8.00mL	
2	K1602665-003	CHPZ0002-S0316	.04	PFC/537M/PFOA		Water	255.0000mL	8.00mL	
3	K1602665-004	CHPZ0001-S0316	.04	PFC/537M/PFOA		Water	255.0000mL	8.00mL	
4	K1602708-002RE	P8026-MAR16-3	.01	PFC/537M/PFOA		Ground Water	270.0000mL	8.00mL	
5	K1602708-003RE	P8030-MAR16-3	.01	PFC/537M/PFOA		Ground Water	265.0000mL	8.00mL	
6	K1602748-002	CHPE120SARA-Q0316	.01	PFC/537M/PFOA		Water	290.0000mL	8.00mL	
7	K1602748-003	CHPE071BOXB-Q0316	.01	PFC/537M/PFOA		Water	290.0000mL	8.00mL	
8	K1602748-004	CHPE0633OLB-Q0316	.01	PFC/537M/PFOA		Water	290.0000mL	8.00mL	
9	K1602748-005	CHPE0457OLB-Q0316	.01	PFC/537M/PFOA		Water	290.0000mL	8.00mL	
10	K1602748-006	CHPE035CAPE-Q0316	.01	PFC/537M/PFOA		Water	290.0000mL	8.00mL	
11	K1602748-007	CHPE020SARA-Q0316	.01	PFC/537M/PFOA		Water	290.0000mL	8.00mL	
12	K1602946-001	CHPZ0PMP4-O0316	.01	PFC/537M/PFOA		Water	290.0000mL	8.00mL	
13	K1602946-002	CHPZ0PMP3-O0316	.01	PFC/537M/PFOA		Water	290.0000mL	8.00mL	
14	K1602946-003	CHPZ0PMP2-O0316	.01	PFC/537M/PFOA		Water	290.0000mL	8.00mL	
15	K1602946-004	CHPZ0PMP1-O0316	.01	PFC/537M/PFOA		Water	290.0000mL	8.00mL	
16	K1602946-005	CHPZ0MILL-O0316	.01	PFC/537M/PFOA		Water	290.0000mL	8.00mL	
17	K1602745-001	Merrimack River	.01	PFC/537M/PFOA		Water	285.0000mL	8.00mL	
18	K1602918-001	Montgomery	.01	PFC/537M/PFOA		Drinking Water	275.0000mL	8.00mL	
19	KQ1602838-04	MB		PFC/537M/PFOA		Liquid	250.0000mL	8.00mL	
20	KQ1602838-03	LCS		PFC/537M/PFOA		Liquid	250.0000mL	8.00mL	
21	KQ1602838-01	K1602748-007 MS	.09	PFC/537M/PFOA		Liquid	290.0000mL	8.00mL	
22	KQ1602838-02	K1602748-007 DMS	.10	PFC/537M/PFOA		Liquid	290.0000mL	8.00mL	

Preparation Information Benchsheet

Prep Run#: 258211
Team: Organic LC/NCISNEY

Prep WorkFlow: OrgExtAq(14)
Prep Method: EPA 3535A

Status: Prepped
Prep Date/Time: 3/28/16 07:03 AM

Spiking Solutions

Name:	PFC isotopes 2ppm	Inventory ID	85368	Logbook Ref:	15-OLC-02-1D	Expires On:	08/18/2020

K1602665-003	20.00µL	K1602665-004	20.00µL	K1602708-002	20.00µL	K1602708-003	20.00µL	K1602709-001	20.00µL	K1602745-001	20.00µL
K1602748-002	20.00µL	K1602748-003	20.00µL	K1602748-004	20.00µL	K1602748-005	20.00µL	K1602748-006	20.00µL	K1602748-007	20.00µL
K1602918-001	20.00µL	K1602946-001	20.00µL	K1602946-002	20.00µL	K1602946-003	20.00µL	K1602946-004	20.00µL	K1602946-005	20.00µL
KQ1602838-01	20.00µL	KQ1602838-02	20.00µL	KQ1602838-03	20.00µL	KQ1602838-04	20.00µL				

Name:	PFC isotopes 2ppm	Inventory ID	86913	Logbook Ref:	15-OLC-02-6H	Expires On:	05/03/2016

K1602665-003	20.00µL	K1602665-004	20.00µL	K1602708-002	20.00µL	K1602708-003	20.00µL	K1602709-001	20.00µL	K1602745-001	20.00µL
K1602748-002	20.00µL	K1602748-003	20.00µL	K1602748-004	20.00µL	K1602748-005	20.00µL	K1602748-006	20.00µL	K1602748-007	20.00µL
K1602918-001	20.00µL	K1602946-001	20.00µL	K1602946-002	20.00µL	K1602946-003	20.00µL	K1602946-004	20.00µL	K1602946-005	20.00µL
KQ1602838-01	20.00µL	KQ1602838-02	20.00µL	KQ1602838-03	20.00µL	KQ1602838-04	20.00µL				

Name:	PFC IS	Inventory ID	87320	Logbook Ref:	15-OLC-02-27D	Expires On:	05/03/2016

K1602665-003	10.00µL	K1602665-004	10.00µL	K1602708-002	10.00µL	K1602708-003	10.00µL	K1602709-001	10.00µL	K1602745-001	10.00µL
K1602748-002	10.00µL	K1602748-003	10.00µL	K1602748-004	10.00µL	K1602748-005	10.00µL	K1602748-006	10.00µL	K1602748-007	10.00µL
K1602918-001	10.00µL	K1602946-001	10.00µL	K1602946-002	10.00µL	K1602946-003	10.00µL	K1602946-004	10.00µL	K1602946-005	10.00µL
KQ1602838-01	10.00µL	KQ1602838-02	10.00µL	KQ1602838-03	10.00µL	KQ1602838-04	10.00µL				

Name:	PFC Targets 2ppm	Inventory ID	88343	Logbook Ref:	15-OLC-02-32D	Expires On:	04/23/2016

KQ1602838-01	20.00µL	KQ1602838-02	20.00µL	KQ1602838-03	20.00µL

Name:	PFC Targets 2ppm	Inventory ID	88798	Logbook Ref:	15-OLC-02-42J	Expires On:	09/16/2016

KQ1602838-01	20.00µL	KQ1602838-02	20.00µL	KQ1602838-03	20.00µL

Preparation Steps

Step:	Extraction	Step:	Final Volume
Started:	3/28/16 07:03	Started:	3/28/16 07:47
Finished:	3/29/16 07:46	Finished:	3/28/16 07:47
By:	NCISNEY	By:	NCISNEY
Comments		Comments	

Preparation Information Benchsheet

Prep Run#: 258211
Team: Organic LC/NCISNEY

Prep WorkFlow: OrgExtAq(14)
Prep Method: EPA 3535A

Status: Prepped
Prep Date/Time: 3/28/16 07:03 AM

Comments: _____

Reviewed By: _____ Date: 4/12/16

Chain of Custody

Relinquished By: _____ Date: 03/29/16

Received By: _____ Date: 3/30/16

Extracts Examined
(Yes) No

Preparation Information Benchsheet

ep Run#: 258211 | Prep WorkFlow: OrgExtAq(14) | Status: Draft
am: Organic LC/NCISNEY | Prep Method: EPA 3535A | Prep Date/Time: 3/28/16 07:03 AM
Number of Copies to make: 7

	Lab Code	Client ID	B#	√	Method /Test	Matrix	Amt. Ext. mL	pH	Int. Vol	Final Vol mL	Surr Amt	Spike Amt
	K1602709-001	KCH067-042	.01	✓	PFC/537M / PFOA	Water	290	3.5	N/A	8	(A) (B)	—
	K1602665-003	CHPZ0002-S0316	.04	✓	PFC/537M / PFOA	Water	255	3.5		8		—
	K1602665-004	CHPZ0001-S0316	.04	✓	PFC/537M / PFOA	Water	255	3.6		8		—
	K1602708-002RE	P8026-MAR16-3	.01	✓	PFC/537M / PFOA	Ground Water	270	3.6		8		—
	K1602708-003RE	P8030-MAR16-3	.01	✓	PFC/537M / PFOA	Ground Water	265	3.6		8		—
	K1602748-002	CHPE120SARA-Q0316	.01	✓	PFC/537M / PFOA	Water	290	3.4		8		—
	K1602748-003	CHPE071BOXB-Q0316	.01	✓	PFC/537M / PFOA	Water	290	3.6		8		—
	K1602748-004	CHPE0633OLB-Q0316	.01	✓	PFC/537M / PFOA	Water	290	3.5		8		—
	K1602748-005	CHPE0457OLB-Q0316	.01	✓	PFC/537M / PFOA	Water	290	3.6		8		—
0	K1602748-006	CHPE035CAPE-Q0316	.01	✓	PFC/537M / PFOA	Water	290	3.4		8		—
1	K1602748-007 (P)	CHPE020SARA-Q0316 .10	~~.01~~ (D)	✓	PFC/537M / PFOA	Water	290	3.4		8		—
2	K1602946-001	CHPZ0PMP4-O0316	.01	✓	PFC/537M / PFOA	Water	290	3.5		8		—
3	K1602946-002	CHPZ0PMP3-O0316	.01	✓	PFC/537M / PFOA	Water	290	3.4		8		—
4	K1602946-003	CHPZ0PMP2-O0316	.01	✓	PFC/537M / PFOA	Water	290	3.4		8		—
5	K1602946-004	CHPZ0PMP1-O0316	.01	✓	PFC/537M / PFOA	Water	290	3.5		8		—
6	K1602946-005	CHPZ0MILL-O0316	.01	✓	PFC/537M / PFOA	Water	290	3.4		8		—
7	K1602745-001	Merrimack River	.01	✓	PFC/537M / PFOA	Water	285	3.4		8		—
8	K1602918-001	Montgomery	.01	✓	PFC/537M / PFOA	Drinking Water	275	3.6		8		—
9	KQ1602838-04	MB	✓	✓	PFC/537M / PFOA	Liquid	250	3.5		8		—
0	KQ1602838-03	LCS	✓	✓	PFC/537M / PFOA	Liquid	250	3.5		8		(C) (D)
1	KQ1602838-01	K1602748-007 MS	.09	✓	PFC/537M / PFOA	Liquid	290	3.6		8		
2	KQ1602838-02 (P)	K1602748-007 DMS .01	~~.10~~ (D)	✓	PFC/537M / PFOA	Liquid	290	3.6		8		

H_2O Lot# 5530B Acetic Acid Lot# BCBN4596V 0.1% NH_4OH Solution: 15-OLC-01-33J 2mL (P) 25mM Acetate Buffer: 15-OLC-01-33A
Strata XL-AW 100mm Sorbent Lot# 5322015 MeOH Lot# 55316 Internal Standard: 15-OLC-01-33B 10 µL XP: 8/19/16 500 ppb PHCE-2

(P) = at time of extraction K1602748-007 & the DMS were switched NC 03/31/16

Comments: (P) EB NC 03/28/16

Surrogate ID: (A) 15-OLC-02-46B 2ppm XP: 9/22/16 20 µL PHCE-19
(B) 15-OLC-01-32D 2ppm XP: 12/22/20 20 µL PHCE-19

Spike ID: (C) 15-OLC-02-31J 2ppm XP: 1/16/20 PHCE-19
(D) 15-OLC-02-44A 2ppm XP: 9/17/16 PHCE-19

Witnessed By: [signature] 3/28/16

Analyst: Nick Cisney

Assisted By:

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

Kleinfelder
1039 Hyland Drive
Evergreen, CO 80439
ATTN: Ms. Karin Kaiser

May 25, 2016

SUBJECT: China Lake, CTO 067, Data Validation

Dear Ms. Kaiser,

Enclosed are the final validation reports for the fractions listed below. These SDGs were received on May 2, 2016. Attachment 1 is a summary of the samples that were reviewed for each analysis.

LDC Project #36282:

SDG #	Fraction
16C070 16C074 16C129 78915 78998 K1602494 K1602709	Volatiles, PAHs, Chlorinated Pesticides, PCBs, Metals, TPH as Gasoline, TPH as Extractables, Explosives, Perchlorate, Polychlorinated Dioxins/Dibenzofurans, Perfluorinated Alkyl Acids

The data validation was performed under Level III & IV guidelines. The analyses were validated using the following documents, as applicable to each method:

- Final Sampling and Analysis Plan, Field Sampling Plan and Quality Assurance Project Plan, Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43 and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California , February 2016
- U.S. Department of Defense Quality Systems Manual for Environmental Laboratories, Version 5.0, July 2013
- USEPA Contract Laboratory Program National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins, and Chlorinated Dibenzofurans Data Review, September 2011
- USEPA Contract Laboratory Program National Functional Guidelines for Superfund Organic Methods Data Review, August 2014
- USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Superfund Data Review, August 2014
- EPA SW 846, Third Edition, Test Methods for Evaluating Solid Waste, update 1, July 1992; update IIA, August 1993; update II, September 1994; update IIB, January 1995; update III, December 1996; update IIIA, April 1998; IIIB, November 2004; update IV, February 2007; update V, July 2014

Hold HC & CD for KK approval- EM;

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

Sincerely,

Pei Geng
Project Manager/Senior Chemist

6,096 pages-SF

Attachment 1

EDD Client Select IV

LDC #36282 (Kleinfelder-Evergreen, CO / China Lake, CTO 067)

LDC	SDG#	DATE REC'D	(2) DATE DUE	VOA (8260B)		PAHs (8270C-SIM)		Pest. (8081A)		PCBs (8082)		Metals (6020A/7470A)		TPH-G (8015B)		TPH-E (8015B)		Dioxins (8290A)		Expl. (8330A)		CLO_4 (6850)		PFCs (537M)		Cr(VI) (7199)													
Matrix:	Water/Soil			W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S	W	S
A	16C070	05/02/16	05/16/16	1	8	0	3	0	3	0	3	0	23	1	8	0	17	-	-	0	13	0	13	-	-	0	16												
A	16C070	05/02/16	05/16/16	0	2	0	1	0	1	0	1	0	4	0	2	0	2	-	-	0	1	0	1	-	-	0	2												
B	16C074	05/02/16	05/16/16	2	0	1	0	1	0	1	0	1	0	2	0	1	0	-	-	1	0	1	0	-	-	1	0												
C	16C129	05/02/16	05/16/16	2	0	2	1	2	14	1	0	2	9	2	0	2	1	-	-	2	8	2	8	-	-	2	1												
C	16C129	05/02/16	05/16/16	0	0	0	1	0	2	0	0	0	2	0	0	0	1	-	-	0	1	0	1	-	-	0	1												
D	78915	05/02/16	05/16/16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	13	-	-	-	-	-	-	-	-												
D	78915	05/02/16	05/16/16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	-	-	-	-	-	-	-	-												
E	78998	05/02/16	05/16/16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	-	-	-	-	-	-	-	-												
E	78998	05/02/16	05/16/16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	-	-	-	-	-	-	-	-												
F	K1602494	05/02/16	05/16/16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	7	-	-												
F	K1602494	05/02/16	05/16/16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	-	-												
G	K1602709	05/02/16	05/16/16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	-	-												
Total	T/PG			5	10	3	6	3	20	2	4	3	38	5	10	3	21	3	16	3	23	3	23	2	8	3	20	0	0	0	0	0	0	0	0	0	0	0	237

Shaded cells indicate Level IV validation (all other cells are Level III validation). These sample counts do not include MS/MSD, and DUPs

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Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 11, 2016

Parameters: Volatiles

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C070

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-002	16C070-02	Soil	03/08/16
KCH067-004**	16C070-04**	Soil	03/08/16
KCH067-006	16C070-06	Soil	03/08/16
KCH067-008	16C070-08	Soil	03/08/16
KCH067-010	16C070-10	Soil	03/08/16
KCH067-011	16C070-11	Soil	03/08/16
KCH067-013	16C070-13	Soil	03/08/16
KCH067-014	16C070-14	Soil	03/08/16
KCH067-016**	16C070-16**	Soil	03/08/16
KCH067-018	16C070-18	Soil	03/08/16
KCH067-020	16C070-19	Water	03/08/16
KCH067-016MS	16C070-16MS	Soil	03/08/16
KCH067-016MSD	16C070-16MSD	Soil	03/08/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

Average relative response factors (RRF) for all compounds were within validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
02/26/16	tert-Butyl alcohol	0.007 (≤0.01)	All water samples in SDG 16C070	UJ (all non-detects)	A

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
03/14/17	tert-Butyl alcohol	0.007 (≤0.01)	All water samples in SDG 16C070	UJ (all non-detects)	A

V. Laboratory Blanks

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

VI. Field Blanks

Sample KCH067-020 was identified as a trip blank. No contaminants were found.

Sample KCH067-019 (from SDG 16C074) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
KCH067-019	03/08/16	Carbon disulfide	0.40 ng/L	All soil samples in SDG 16C070

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated field blanks.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

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

Relative percent differences (RPD) were within QC limits with the following exceptions:

Spike ID (Associated Samples)	Compound	RPD (Limits)	Flag	A or P
KCH067-016MS/MSD (KCH067-016**)	tert-Butyl alcohol	24 (≤20)	NA	-

IX. Laboratory Control Samples

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

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

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

Due to initial calibration and continuing calibration RRF, data were qualified as estimated in one sample.

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

China Lake CTO 067
Volatiles - Data Qualification Summary - SDG 16C070

Sample	Compound	Flag	A or P	Reason (Code)
KCH067-020	tert-Butyl alcohol	UJ (all non-detects)	A	Initial calibration (RRF) (5)
KCH067-020	tert-Butyl alcohol	UJ (all non-detects)	A	Continuing calibration (RRF) (5)

China Lake CTO 067
Volatiles - Laboratory Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

China Lake CTO 067
Volatiles - Field Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

METHOD SW5035A/8260B
VOLATILE ORGANICS BY GC/MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 12:10
Sample ID	: KCH067-002	Date Analyzed:	03/15/16 12:10
Lab Samp ID	: C070-02	Dilution Factor:	1.01
Lab File ID	: RCB171	Matrix	: SOIL
Ext Btch ID	: VS03C08	% Moisture	: 9.0
Calib. Ref.	: RCB100	Instrument ID	: T-003

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
1,1,1,2-TETRACHLOROETHANE	ND	5.5	0.55	1.1
1,1,1-TRICHLOROETHANE	ND	5.5	0.55	1.1
1,1,2,2-TETRACHLOROETHANE	ND	5.5	0.55	1.1
1,1,2-TRICHLOROETHANE	ND	5.5	0.55	1.1
1,1-DICHLOROETHANE	ND	5.5	0.55	1.1
1,1-DICHLOROETHENE	ND	5.5	0.55	1.1
1,1-DICHLOROPROPENE	ND	5.5	0.55	1.1
1,2,3-TRICHLOROBENZENE	ND	5.5	1.1	2.2
1,2,3-TRICHLOROPROPANE	ND	5.5	1.1	2.2
1,2,4-TRICHLOROBENZENE	ND	5.5	1.1	2.2
1,2,4-TRIMETHYLBENZENE	ND	5.5	0.61	2.2
1,2-DIBROMO-3-CHLOROPROPANE	ND	5.5	1.1	2.2
1,2-DIBROMOETHANE	ND	5.5	0.55	1.1
1,2-DICHLOROBENZENE	ND	5.5	0.55	1.1
1,2-DICHLOROETHANE	ND	5.5	0.55	1.1
1,2-DICHLOROPROPANE	ND	5.5	0.55	1.1
1,3,5-TRIMETHYLBENZENE	ND	5.5	0.65	2.2
1,3-DICHLOROBENZENE	ND	5.5	0.58	1.1
1,3-DICHLOROPROPANE	ND	5.5	0.55	1.1
1,4-DICHLOROBENZENE	ND	5.5	0.55	1.1
2,2-DICHLOROPROPANE	ND	5.5	1.1	2.2
2-BUTANONE	ND	11	2.8	5.5
2-CHLOROTOLUENE	ND	5.5	0.91	2.2
2-HEXANONE	ND	11	3.2	5.5
4-CHLOROTOLUENE	ND	5.5	0.74	2.2
ACETONE	ND	11	3.4	5.5
BENZENE	ND	5.5	0.55	1.1
BROMOBENZENE	ND	5.5	0.55	1.1
BROMOCHLOROMETHANE	ND	5.5	0.55	1.1
BROMODICHLOROMETHANE	ND	5.5	0.55	1.1
BROMOFORM	ND	5.5	1.1	2.2
BROMOMETHANE	ND	11	2.0	2.2
CARBON DISULFIDE	ND	5.5	0.55	1.1
CARBON TETRACHLORIDE	ND	5.5	0.60	1.1
CHLOROBENZENE	ND	5.5	0.55	1.1
CHLOROETHANE	ND	5.5	1.4	2.2
CHLOROFORM	ND	5.5	0.55	1.1
CHLOROMETHANE	ND	5.5	1.1	2.2
CIS-1,2-DICHLOROETHENE	ND	5.5	0.55	1.1
CIS-1,3-DICHLOROPROPENE	ND	5.5	0.55	1.1
DIBROMOCHLOROMETHANE	ND	5.5	0.55	1.1
DIBROMOMETHANE	ND	5.5	0.55	1.1
DICHLORODIFLUOROMETHANE	ND	5.5	1.3	2.2
ETHYLBENZENE	ND	5.5	0.55	1.1
HEXACHLOROBUTADIENE	ND	5.5	1.1	2.2
ISOPROPYLBENZENE	ND	5.5	0.71	2.2
M/P-XYLENES	ND	11	1.1	2.2
4-METHYL-2-PENTANONE	ND	11	3.1	5.5
METHYLENE CHLORIDE	ND	11	2.2	5.5
METHYL TERT-BUTYL ETHER	ND	5.5	0.55	1.1
NAPHTHALENE	ND	11	1.1	2.2
N-BUTYLBENZENE	ND	5.5	0.78	2.2
N-PROPYLBENZENE	ND	5.5	0.72	2.2
O-XYLENE	ND	5.5	0.55	1.1
P-ISOPROPYLTOLUENE	ND	5.5	0.69	2.2
SEC-BUTYLBENZENE	ND	5.5	0.74	2.2
STYRENE	ND	5.5	1.1	2.2
TERT-BUTYLBENZENE	ND	5.5	0.69	2.2
TETRACHLOROETHENE	ND	5.5	0.55	1.1
TOLUENE	ND	5.5	0.55	1.1
TRANS-1,2-DICHLOROETHENE	ND	5.5	0.55	1.1
TRANS-1,3-DICHLOROPROPENE	ND	5.5	0.55	1.1
TRICHLOROETHENE	ND	5.5	0.55	1.1
TRICHLOROFLUOROMETHANE	ND	5.5	1.2	2.2
VINYL CHLORIDE	ND	5.5	1.6	2.2
TERTIARY BUTYL ALCOHOL	ND	22	10	11

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	53.8	55.49	97.0	71-136
4-BROMOFLUOROBENZENE	52.0	55.49	93.8	79-119
TOLUENE-D8	53.3	55.49	96.1	85-116
DIBROMOFLUOROMETHANE	53.9	55.49	97.2	78-119

3/17/16

METHOD SW5035A/8260B
VOLATILE ORGANICS BY GC/MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 12:38
Sample ID:	KCH067-004	Date Analyzed:	03/15/16 12:38
Lab Samp ID:	C070-04	Dilution Factor:	0.91
Lab File ID:	RCB172	Matrix	: SOIL
Ext Btch ID:	VS03C08	% Moisture	: 4.9
Calib. Ref.:	RCB100	Instrument ID	: T-003

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
1,1,1,2-TETRACHLOROETHANE	ND	4.8	0.48	0.96
1,1,1-TRICHLOROETHANE	ND	4.8	0.48	0.96
1,1,2,2-TETRACHLOROETHANE	ND	4.8	0.48	0.96
1,1,2-TRICHLOROETHANE	ND	4.8	0.48	0.96
1,1-DICHLOROETHANE	ND	4.8	0.48	0.96
1,1-DICHLOROETHENE	ND	4.8	0.48	0.96
1,1-DICHLOROPROPENE	ND	4.8	0.48	0.96
1,2,3-TRICHLOROBENZENE	ND	4.8	0.96	1.9
1,2,3-TRICHLOROPROPANE	ND	4.8	0.96	1.9
1,2,4-TRICHLOROBENZENE	ND	4.8	0.96	1.9
1,2,4-TRIMETHYLBENZENE	ND	4.8	0.53	1.9
1,2-DIBROMO-3-CHLOROPROPANE	ND	4.8	0.96	1.9
1,2-DIBROMOETHANE	ND	4.8	0.48	0.96
1,2-DICHLOROBENZENE	ND	4.8	0.48	0.96
1,2-DICHLOROETHANE	ND	4.8	0.48	0.96
1,2-DICHLOROPROPANE	ND	4.8	0.48	0.96
1,3,5-TRIMETHYLBENZENE	ND	4.8	0.56	1.9
1,3-DICHLOROBENZENE	ND	4.8	0.50	0.96
1,3-DICHLOROPROPANE	ND	4.8	0.48	0.96
1,4-DICHLOROBENZENE	ND	4.8	0.48	0.96
2,2-DICHLOROPROPANE	ND	4.8	0.96	1.9
2-BUTANONE	ND	9.6	2.4	4.8
2-CHLOROTOLUENE	ND	4.8	0.78	1.9
2-HEXANONE	ND	9.6	2.8	4.8
4-CHLOROTOLUENE	ND	4.8	0.64	1.9
ACETONE	ND	9.6	3.0	4.8
BENZENE	ND	4.8	0.48	0.96
BROMOBENZENE	ND	4.8	0.48	0.96
BROMOCHLOROMETHANE	ND	4.8	0.48	0.96
BROMODICHLOROMETHANE	ND	4.8	0.48	0.96
BROMOFORM	ND	4.8	0.96	1.9
BROMOMETHANE	ND	9.6	1.7	1.9
CARBON DISULFIDE	ND	4.8	0.48	0.96
CARBON TETRACHLORIDE	ND	4.8	0.52	0.96
CHLOROBENZENE	ND	4.8	0.48	0.96
CHLOROETHANE	ND	4.8	1.2	1.9
CHLOROFORM	ND	4.8	0.48	0.96
CHLOROMETHANE	ND	4.8	0.96	1.9
CIS-1,2-DICHLOROETHENE	ND	4.8	0.48	0.96
CIS-1,3-DICHLOROPROPENE	ND	4.8	0.48	0.96
DIBROMOCHLOROMETHANE	ND	4.8	0.48	0.96
DIBROMOMETHANE	ND	4.8	0.48	0.96
DICHLORODIFLUOROMETHANE	ND	4.8	1.1	1.9
ETHYLBENZENE	ND	4.8	0.48	0.96
HEXACHLOROBUTADIENE	ND	4.8	0.96	1.9
ISOPROPYLBENZENE	ND	4.8	0.61	1.9
M/P-XYLENES	ND	9.6	0.96	1.9
4-METHYL-2-PENTANONE	ND	9.6	2.7	4.8
METHYLENE CHLORIDE	ND	9.6	1.9	4.8
METHYL TERT-BUTYL ETHER	ND	4.8	0.48	0.96
NAPHTHALENE	ND	9.6	0.96	1.9
N-BUTYLBENZENE	ND	4.8	0.67	1.9
N-PROPYLBENZENE	ND	4.8	0.62	1.9
O-XYLENE	ND	4.8	0.48	0.96
P-ISOPROPYLTOLUENE	ND	4.8	0.59	1.9
SEC-BUTYLBENZENE	ND	4.8	0.64	1.9
STYRENE	ND	4.8	0.96	1.9
TERT-BUTYLBENZENE	ND	4.8	0.59	1.9
TETRACHLOROETHENE	ND	4.8	0.48	0.96
TOLUENE	ND	4.8	0.48	0.96
TRANS-1,2-DICHLOROETHENE	ND	4.8	0.48	0.96
TRANS-1,3-DICHLOROPROPENE	ND	4.8	0.48	0.96
TRICHLOROETHENE	ND	4.8	0.48	0.96
TRICHLOROFLUOROMETHANE	ND	4.8	1.1	1.9
VINYL CHLORIDE	ND	4.8	1.3	1.9
TERTIARY BUTYL ALCOHOL	ND	19	8.8	9.6

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	47.1	47.84	98.4	71-136
4-BROMOFLUOROBENZENE	45.2	47.84	94.4	79-119
TOLUENE-D8	46.1	47.84	96.3	85-116
DIBROMOFLUOROMETHANE	44.7	47.84	93.5	78-119

D5 17/16

METHOD SW5035A/8260B
VOLATILE ORGANICS BY GC/MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:06
Sample ID:	KCH067-006	Date Analyzed:	03/15/16 13:06
Lab Samp ID:	C070-06	Dilution Factor:	0.92
Lab File ID:	RCB173	Matrix	: SOIL
Ext Btch ID:	VS03C08	% Moisture	: 2.2
Calib. Ref.:	RCB100	Instrument ID	: T-003

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
1,1,1,2-TETRACHLOROETHANE	ND	4.7	0.47	0.94
1,1,1-TRICHLOROETHANE	ND	4.7	0.47	0.94
1,1,2,2-TETRACHLOROETHANE	ND	4.7	0.47	0.94
1,1,2-TRICHLOROETHANE	ND	4.7	0.47	0.94
1,1-DICHLOROETHANE	ND	4.7	0.47	0.94
1,1-DICHLOROETHENE	ND	4.7	0.47	0.94
1,1-DICHLOROPROPENE	ND	4.7	0.47	0.94
1,2,3-TRICHLOROBENZENE	ND	4.7	0.94	1.9
1,2,3-TRICHLOROPROPANE	ND	4.7	0.94	1.9
1,2,4-TRICHLOROBENZENE	ND	4.7	0.94	1.9
1,2,4-TRIMETHYLBENZENE	ND	4.7	0.52	1.9
1,2-DIBROMO-3-CHLOROPROPANE	ND	4.7	0.94	1.9
1,2-DIBROMOETHANE	ND	4.7	0.47	0.94
1,2-DICHLOROBENZENE	ND	4.7	0.47	0.94
1,2-DICHLOROETHANE	ND	4.7	0.47	0.94
1,2-DICHLOROPROPANE	ND	4.7	0.47	0.94
1,3,5-TRIMETHYLBENZENE	ND	4.7	0.56	1.9
1,3-DICHLOROBENZENE	ND	4.7	0.49	0.94
1,3-DICHLOROPROPANE	ND	4.7	0.47	0.94
1,4-DICHLOROBENZENE	ND	4.7	0.47	0.94
2,2-DICHLOROPROPANE	ND	4.7	0.94	1.9
2-BUTANONE	ND	9.4	2.4	4.7
2-CHLOROTOLUENE	ND	4.7	0.77	1.9
2-HEXANONE	ND	9.4	2.7	4.7
4-CHLOROTOLUENE	ND	4.7	0.63	1.9
ACETONE	ND	9.4	2.9	4.7
BENZENE	ND	4.7	0.47	0.94
BROMOBENZENE	ND	4.7	0.47	0.94
BROMOCHLOROMETHANE	ND	4.7	0.47	0.94
BROMODICHLOROMETHANE	ND	4.7	0.47	0.94
BROMOFORM	ND	4.7	0.94	1.9
BROMOMETHANE	ND	9.4	1.7	1.9
CARBON DISULFIDE	ND	4.7	0.47	0.94
CARBON TETRACHLORIDE	ND	4.7	0.51	0.94
CHLOROBENZENE	ND	4.7	0.47	0.94
CHLOROETHANE	ND	4.7	1.2	1.9
CHLOROFORM	ND	4.7	0.47	0.94
CHLOROMETHANE	ND	4.7	0.94	1.9
CIS-1,2-DICHLOROETHENE	ND	4.7	0.47	0.94
CIS-1,3-DICHLOROPROPENE	ND	4.7	0.47	0.94
DIBROMOCHLOROMETHANE	ND	4.7	0.47	0.94
DIBROMOMETHANE	ND	4.7	0.47	0.94
DICHLORODIFLUOROMETHANE	ND	4.7	1.1	1.9
ETHYLBENZENE	ND	4.7	0.47	0.94
HEXACHLOROBUTADIENE	ND	4.7	0.94	1.9
ISOPROPYLBENZENE	ND	4.7	0.60	1.9
M/P-XYLENES	ND	9.4	0.94	1.9
4-METHYL-2-PENTANONE	ND	9.4	2.6	4.7
METHYLENE CHLORIDE	ND	9.4	1.9	4.7
METHYL TERT-BUTYL ETHER	ND	4.7	0.47	0.94
NAPHTHALENE	ND	9.4	0.94	1.9
N-BUTYLBENZENE	ND	4.7	0.66	1.9
N-PROPYLBENZENE	ND	4.7	0.61	1.9
O-XYLENE	ND	4.7	0.47	0.94
P-ISOPROPYLTOLUENE	ND	4.7	0.58	1.9
SEC-BUTYLBENZENE	ND	4.7	0.63	1.9
STYRENE	ND	4.7	0.94	1.9
TERT-BUTYLBENZENE	ND	4.7	0.58	1.9
TETRACHLOROETHENE	ND	4.7	0.47	0.94
TOLUENE	ND	4.7	0.47	0.94
TRANS-1,2-DICHLOROETHENE	ND	4.7	0.47	0.94
TRANS-1,3-DICHLOROPROPENE	ND	4.7	0.47	0.94
TRICHLOROETHENE	ND	4.7	0.47	0.94
TRICHLOROFLUOROMETHANE	ND	4.7	1.0	1.9
VINYL CHLORIDE	ND	4.7	1.3	1.9
TERTIARY BUTYL ALCOHOL	ND	19	8.7	9.4

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	44.1	47.03	93.9	71-136
4-BROMOFLUOROBENZENE	44.7	47.03	95.0	79-119
TOLUENE-D8	44.9	47.03	95.6	85-116
DIBROMOFLUOROMETHANE	44.2	47.03	94.0	78-119

3/25/16

METHOD SW5035A/8260B
VOLATILE ORGANICS BY GC/MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:34
Sample ID	: KCH067-008	Date Analyzed:	03/15/16 13:34
Lab Samp ID	: C070-08	Dilution Factor:	1.05
Lab File ID	: RCB174	Matrix	: SOIL
Ext Btch ID	: VS03C08	% Moisture	: 1.5
Calib. Ref.	: RCB100	Instrument ID	: T-003

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
1,1,1,2-TETRACHLOROETHANE	ND	5.3	0.53	1.1
1,1,1-TRICHLOROETHANE	ND	5.3	0.53	1.1
1,1,2,2-TETRACHLOROETHANE	ND	5.3	0.53	1.1
1,1,2-TRICHLOROETHANE	ND	5.3	0.53	1.1
1,1-DICHLOROETHANE	ND	5.3	0.53	1.1
1,1-DICHLOROETHENE	ND	5.3	0.53	1.1
1,1-DICHLOROPROPENE	ND	5.3	0.53	1.1
1,2,3-TRICHLOROBENZENE	ND	5.3	1.1	2.1
1,2,3-TRICHLOROPROPANE	ND	5.3	1.1	2.1
1,2,4-TRICHLOROBENZENE	ND	5.3	1.1	2.1
1,2,4-TRIMETHYLBENZENE	ND	5.3	0.59	2.1
1,2-DIBROMO-3-CHLOROPROPANE	ND	5.3	1.1	2.1
1,2-DIBROMOETHANE	ND	5.3	0.53	1.1
1,2-DICHLOROBENZENE	ND	5.3	0.53	1.1
1,2-DICHLOROETHANE	ND	5.3	0.53	1.1
1,2-DICHLOROPROPANE	ND	5.3	0.53	1.1
1,3,5-TRIMETHYLBENZENE	ND	5.3	0.63	2.1
1,3-DICHLOROBENZENE	ND	5.3	0.55	1.1
1,3-DICHLOROPROPANE	ND	5.3	0.53	1.1
1,4-DICHLOROBENZENE	ND	5.3	0.53	1.1
2,2-DICHLOROPROPANE	ND	5.3	1.1	2.1
2-BUTANONE	ND	11	2.7	5.3
2-CHLOROTOLUENE	ND	5.3	0.87	2.1
2-HEXANONE	ND	11	3.1	5.3
4-CHLOROTOLUENE	ND	5.3	0.71	2.1
ACETONE	ND	11	3.3	5.3
BENZENE	ND	5.3	0.53	1.1
BROMOBENZENE	ND	5.3	0.53	1.1
BROMOCHLOROMETHANE	ND	5.3	0.53	1.1
BROMODICHLOROMETHANE	ND	5.3	0.53	1.1
BROMOFORM	ND	5.3	1.1	2.1
BROMOMETHANE	ND	11	1.9	2.1
CARBON DISULFIDE	ND	5.3	0.53	1.1
CARBON TETRACHLORIDE	ND	5.3	0.58	1.1
CHLOROBENZENE	ND	5.3	0.53	1.1
CHLOROETHANE	ND	5.3	1.4	2.1
CHLOROFORM	ND	5.3	0.53	1.1
CHLOROMETHANE	ND	5.3	1.1	2.1
CIS-1,2-DICHLOROETHENE	ND	5.3	0.53	1.1
CIS-1,3-DICHLOROPROPENE	ND	5.3	0.53	1.1
DIBROMOCHLOROMETHANE	ND	5.3	0.53	1.1
DIBROMOMETHANE	ND	5.3	0.53	1.1
DICHLORODIFLUOROMETHANE	ND	5.3	1.3	2.1
ETHYLBENZENE	ND	5.3	0.53	1.1
HEXACHLOROBUTADIENE	ND	5.3	1.1	2.1
ISOPROPYLBENZENE	ND	5.3	0.68	2.1
M/P-XYLENES	ND	11	1.1	2.1
4-METHYL-2-PENTANONE	ND	11	3.0	5.3
METHYLENE CHLORIDE	ND	11	2.1	5.3
METHYL TERT-BUTYL ETHER	ND	5.3	0.53	1.1
NAPHTHALENE	ND	11	1.1	2.1
N-BUTYLBENZENE	ND	5.3	0.75	2.1
N-PROPYLBENZENE	ND	5.3	0.69	2.1
O-XYLENE	ND	5.3	0.53	1.1
P-ISOPROPYLTOLUENE	ND	5.3	0.66	2.1
SEC-BUTYLBENZENE	ND	5.3	0.71	2.1
STYRENE	ND	5.3	1.1	2.1
TERT-BUTYLBENZENE	ND	5.3	0.66	2.1
TETRACHLOROETHENE	ND	5.3	0.53	1.1
TOLUENE	ND	5.3	0.53	1.1
TRANS-1,2-DICHLOROETHENE	ND	5.3	0.53	1.1
TRANS-1,3-DICHLOROPROPENE	ND	5.3	0.53	1.1
TRICHLOROETHENE	ND	5.3	0.53	1.1
TRICHLOROFLUOROMETHANE	ND	5.3	1.2	2.1
VINYL CHLORIDE	ND	5.3	1.5	2.1
TERTIARY BUTYL ALCOHOL	ND	21	9.8	11

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	51.6	53.30	96.9	71-136
4-BROMOFLUOROBENZENE	52.1	53.30	97.7	79-119
TOLUENE-D8	51.7	53.30	97.0	85-116
DIBROMOFLUOROMETHANE	49.3	53.30	92.5	78-119

3/25/16

METHOD SW5035A/8260B
VOLATILE ORGANICS BY GC/MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 14:02
Sample ID	: KCH067-010	Date Analyzed:	03/15/16 14:02
Lab Samp ID	: C070-10	Dilution Factor:	0.91
Lab File ID	: RCB175	Matrix	: SOIL
Ext Btch ID	: VS03C08	% Moisture	: 3.8
Calib. Ref.	: RCB100	Instrument ID	: T-003

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
1,1,1,2-TETRACHLOROETHANE	ND	4.7	0.47	0.95
1,1,1-TRICHLOROETHANE	ND	4.7	0.47	0.95
1,1,2,2-TETRACHLOROETHANE	ND	4.7	0.47	0.95
1,1,2-TRICHLOROETHANE	ND	4.7	0.47	0.95
1,1-DICHLOROETHANE	ND	4.7	0.47	0.95
1,1-DICHLOROETHENE	ND	4.7	0.47	0.95
1,1-DICHLOROPROPENE	ND	4.7	0.47	0.95
1,2,3-TRICHLOROBENZENE	ND	4.7	0.95	1.9
1,2,3-TRICHLOROPROPANE	ND	4.7	0.95	1.9
1,2,4-TRICHLOROBENZENE	ND	4.7	0.95	1.9
1,2,4-TRIMETHYLBENZENE	ND	4.7	0.52	1.9
1,2-DIBROMO-3-CHLOROPROPANE	ND	4.7	0.95	1.9
1,2-DIBROMOETHANE	ND	4.7	0.47	0.95
1,2-DICHLOROBENZENE	ND	4.7	0.47	0.95
1,2-DICHLOROETHANE	ND	4.7	0.47	0.95
1,2-DICHLOROPROPANE	ND	4.7	0.47	0.95
1,3,5-TRIMETHYLBENZENE	ND	4.7	0.56	1.9
1,3-DICHLOROBENZENE	ND	4.7	0.49	0.95
1,3-DICHLOROPROPANE	ND	4.7	0.47	0.95
1,4-DICHLOROBENZENE	ND	4.7	0.47	0.95
2,2-DICHLOROPROPANE	ND	4.7	0.95	1.9
2-BUTANONE	ND	9.5	2.4	4.7
2-CHLOROTOLUENE	ND	4.7	0.78	1.9
2-HEXANONE	ND	9.5	2.7	4.7
4-CHLOROTOLUENE	ND	4.7	0.63	1.9
ACETONE	ND	9.5	2.9	4.7
BENZENE	ND	4.7	0.47	0.95
BROMOBENZENE	ND	4.7	0.47	0.95
BROMOCHLOROMETHANE	ND	4.7	0.47	0.95
BROMODICHLOROMETHANE	ND	4.7	0.47	0.95
BROMOFORM	ND	4.7	0.95	1.9
BROMOMETHANE	ND	9.5	1.7	1.9
CARBON DISULFIDE	ND	4.7	0.47	0.95
CARBON TETRACHLORIDE	ND	4.7	0.51	0.95
CHLOROBENZENE	ND	4.7	0.47	0.95
CHLOROETHANE	ND	4.7	1.2	1.9
CHLOROFORM	ND	4.7	0.47	0.95
CHLOROMETHANE	ND	4.7	0.95	1.9
CIS-1,2-DICHLOROETHENE	ND	4.7	0.47	0.95
CIS-1,3-DICHLOROPROPENE	ND	4.7	0.47	0.95
DIBROMOCHLOROMETHANE	ND	4.7	0.47	0.95
DIBROMOMETHANE	ND	4.7	0.47	0.95
DICHLORODIFLUOROMETHANE	ND	4.7	1.1	1.9
ETHYLBENZENE	ND	4.7	0.47	0.95
HEXACHLOROBUTADIENE	ND	4.7	0.95	1.9
ISOPROPYLBENZENE	ND	4.7	0.61	1.9
M/P-XYLENES	ND	9.5	0.95	1.9
4-METHYL-2-PENTANONE	ND	9.5	2.6	4.7
METHYLENE CHLORIDE	ND	9.5	1.9	4.7
METHYL TERT-BUTYL ETHER	ND	4.7	0.47	0.95
NAPHTHALENE	ND	9.5	0.95	1.9
N-BUTYLBENZENE	ND	4.7	0.66	1.9
N-PROPYLBENZENE	ND	4.7	0.61	1.9
O-XYLENE	ND	4.7	0.47	0.95
P-ISOPROPYLTOLUENE	ND	4.7	0.59	1.9
SEC-BUTYLBENZENE	ND	4.7	0.63	1.9
STYRENE	ND	4.7	0.95	1.9
TERT-BUTYLBENZENE	ND	4.7	0.59	1.9
TETRACHLOROETHENE	ND	4.7	0.47	0.95
TOLUENE	ND	4.7	0.47	0.95
TRANS-1,2-DICHLOROETHENE	ND	4.7	0.47	0.95
TRANS-1,3-DICHLOROPROPENE	ND	4.7	0.47	0.95
TRICHLOROETHENE	ND	4.7	0.47	0.95
TRICHLOROFLUOROMETHANE	ND	4.7	1.0	1.9
VINYL CHLORIDE	ND	4.7	1.3	1.9
TERTIARY BUTYL ALCOHOL	ND	19	8.7	9.5

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	46.9	47.30	99.1	71-136
4-BROMOFLUOROBENZENE	45.6	47.30	96.3	79-119
TOLUENE-D8	45.2	47.30	95.5	85-116
DIBROMOFLUOROMETHANE	46.4	47.30	98.2	78-119

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METHOD SW5035A/8260B
VOLATILE ORGANICS BY GC/MS

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
Batch No. : 16C070	Date Extracted: 03/15/16 14:29
Sample ID: KCH067-011	Date Analyzed: 03/15/16 14:29
Lab Samp ID: C070-11	Dilution Factor: 0.9
Lab File ID: RCB176	Matrix : SOIL
Ext Btch ID: VS03C08	% Moisture : 3.1
Calib. Ref.: RCB100	Instrument ID : T-003

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
1,1,1,2-TETRACHLOROETHANE	ND	4.6	0.46	0.93
1,1,1-TRICHLOROETHANE	ND	4.6	0.46	0.93
1,1,2,2-TETRACHLOROETHANE	ND	4.6	0.46	0.93
1,1,2-TRICHLOROETHANE	ND	4.6	0.46	0.93
1,1-DICHLOROETHANE	ND	4.6	0.46	0.93
1,1-DICHLOROETHENE	ND	4.6	0.46	0.93
1,1-DICHLOROPROPENE	ND	4.6	0.46	0.93
1,2,3-TRICHLOROBENZENE	ND	4.6	0.93	1.9
1,2,3-TRICHLOROPROPANE	ND	4.6	0.93	1.9
1,2,4-TRICHLOROBENZENE	ND	4.6	0.93	1.9
1,2,4-TRIMETHYLBENZENE	0.68J	4.6	0.51	1.9
1,2-DIBROMO-3-CHLOROPROPANE	ND	4.6	0.93	1.9
1,2-DIBROMOETHANE	ND	4.6	0.46	0.93
1,2-DICHLOROBENZENE	ND	4.6	0.46	0.93
1,2-DICHLOROETHANE	ND	4.6	0.46	0.93
1,2-DICHLOROPROPANE	ND	4.6	0.46	0.93
1,3,5-TRIMETHYLBENZENE	ND	4.6	0.55	1.9
1,3-DICHLOROBENZENE	ND	4.6	0.48	0.93
1,3-DICHLOROPROPANE	ND	4.6	0.46	0.93
1,4-DICHLOROBENZENE	ND	4.6	0.46	0.93
2,2-DICHLOROPROPANE	ND	4.6	0.93	1.9
2-BUTANONE	ND	9.3	2.3	4.6
2-CHLOROTOLUENE	ND	4.6	0.76	1.9
2-HEXANONE	ND	9.3	2.7	4.6
4-CHLOROTOLUENE	ND	4.6	0.62	1.9
ACETONE	5.0J	9.3	2.9	4.6
BENZENE	ND	4.6	0.46	0.93
BROMOBENZENE	ND	4.6	0.46	0.93
BROMOCHLOROMETHANE	ND	4.6	0.46	0.93
BROMODICHLOROMETHANE	ND	4.6	0.46	0.93
BROMOFORM	ND	4.6	0.93	1.9
BROMOMETHANE	ND	9.3	1.7	1.9
CARBON DISULFIDE	ND	4.6	0.46	0.93
CARBON TETRACHLORIDE	ND	4.6	0.50	0.93
CHLOROBENZENE	ND	4.6	0.46	0.93
CHLOROETHANE	ND	4.6	1.2	1.9
CHLOROFORM	ND	4.6	0.46	0.93
CHLOROMETHANE	ND	4.6	0.93	1.9
CIS-1,2-DICHLOROETHENE	ND	4.6	0.46	0.93
CIS-1,3-DICHLOROPROPENE	ND	4.6	0.46	0.93
DIBROMOCHLOROMETHANE	ND	4.6	0.46	0.93
DIBROMOMETHANE	ND	4.6	0.46	0.93
DICHLORODIFLUOROMETHANE	ND	4.6	1.1	1.9
ETHYLBENZENE	ND	4.6	0.46	0.93
HEXACHLOROBUTADIENE	ND	4.6	0.93	1.9
ISOPROPYLBENZENE	ND	4.6	0.59	1.9
M/P-XYLENES	ND	9.3	0.93	1.9
4-METHYL-2-PENTANONE	ND	9.3	2.6	4.6
METHYLENE CHLORIDE	ND	9.3	1.9	4.6
METHYL TERT-BUTYL ETHER	ND	4.6	0.46	0.93
NAPHTHALENE	2.6J	9.3	0.93	1.9
N-BUTYLBENZENE	ND	4.6	0.65	1.9
N-PROPYLBENZENE	ND	4.6	0.60	1.9
O-XYLENE	ND	4.6	0.46	0.93
P-ISOPROPYLTOLUENE	ND	4.6	0.58	1.9
SEC-BUTYLBENZENE	ND	4.6	0.62	1.9
STYRENE	ND	4.6	0.93	1.9
TERT-BUTYLBENZENE	ND	4.6	0.58	1.9
TETRACHLOROETHENE	ND	4.6	0.46	0.93
TOLUENE	0.48J	4.6	0.46	0.93
TRANS-1,2-DICHLOROETHENE	ND	4.6	0.46	0.93
TRANS-1,3-DICHLOROPROPENE	ND	4.6	0.46	0.93
TRICHLOROETHENE	ND	4.6	0.46	0.93
TRICHLOROFLUOROMETHANE	ND	4.6	1.0	1.9
VINYL CHLORIDE	ND	4.6	1.3	1.9
TERTIARY BUTYL ALCOHOL	ND	19	8.5	9.3

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	47.5	46.44	102	71-136
4-BROMOFLUOROBENZENE	51.2	46.44	110	79-119
TOLUENE-D8	48.7	46.44	105	85-116
DIBROMOFLUOROMETHANE	46.7	46.44	101	78-119

8/25/16

METHOD SW5035A/8260B
VOLATILE ORGANICS BY GC/MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 17:03
Sample ID	: KCH067-013	Date Analyzed:	03/15/16 17:03
Lab Samp ID	: C070-13	Dilution Factor:	0.82
Lab File ID	: RCB181	Matrix	: SOIL
Ext Btch ID	: VS03C08	% Moisture	: 5.0
Calib. Ref.	: RCB100	Instrument ID	: T-003

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
1,1,1,2-TETRACHLOROETHANE	ND	4.3	0.43	0.86
1,1,1-TRICHLOROETHANE	ND	4.3	0.43	0.86
1,1,2,2-TETRACHLOROETHANE	ND	4.3	0.43	0.86
1,1,2-TRICHLOROETHANE	ND	4.3	0.43	0.86
1,1-DICHLOROETHANE	ND	4.3	0.43	0.86
1,1-DICHLOROETHENE	ND	4.3	0.43	0.86
1,1-DICHLOROPROPENE	ND	4.3	0.43	0.86
1,2,3-TRICHLOROBENZENE	ND	4.3	0.86	1.7
1,2,3-TRICHLOROPROPANE	ND	4.3	0.86	1.7
1,2,4-TRICHLOROBENZENE	ND	4.3	0.86	1.7
1,2,4-TRIMETHYLBENZENE	ND	4.3	0.47	1.7
1,2-DIBROMO-3-CHLOROPROPANE	ND	4.3	0.86	1.7
1,2-DIBROMOETHANE	ND	4.3	0.43	0.86
1,2-DICHLOROBENZENE	ND	4.3	0.43	0.86
1,2-DICHLOROETHANE	ND	4.3	0.43	0.86
1,2-DICHLOROPROPANE	ND	4.3	0.43	0.86
1,3,5-TRIMETHYLBENZENE	ND	4.3	0.51	1.7
1,3-DICHLOROBENZENE	ND	4.3	0.45	0.86
1,3-DICHLOROPROPANE	ND	4.3	0.43	0.86
1,4-DICHLOROBENZENE	ND	4.3	0.43	0.86
2,2-DICHLOROPROPANE	ND	4.3	0.86	1.7
2-BUTANONE	ND	8.6	2.2	4.3
2-CHLOROTOLUENE	ND	4.3	0.71	1.7
2-HEXANONE	ND	8.6	2.5	4.3
4-CHLOROTOLUENE	ND	4.3	0.58	1.7
ACETONE	ND	8.6	2.7	4.3
BENZENE	ND	4.3	0.43	0.86
BROMOBENZENE	ND	4.3	0.43	0.86
BROMOCHLOROMETHANE	ND	4.3	0.43	0.86
BROMODICHLOROMETHANE	ND	4.3	0.43	0.86
BROMOFORM	ND	4.3	0.86	1.7
BROMOMETHANE	ND	8.6	1.6	1.7
CARBON DISULFIDE	ND	4.3	0.43	0.86
CARBON TETRACHLORIDE	ND	4.3	0.47	0.86
CHLOROBENZENE	ND	4.3	0.43	0.86
CHLOROETHANE	ND	4.3	1.1	1.7
CHLOROFORM	ND	4.3	0.43	0.86
CHLOROMETHANE	ND	4.3	0.86	1.7
CIS-1,2-DICHLOROETHENE	ND	4.3	0.43	0.86
CIS-1,3-DICHLOROPROPENE	ND	4.3	0.43	0.86
DIBROMOCHLOROMETHANE	ND	4.3	0.43	0.86
DIBROMOMETHANE	ND	4.3	0.43	0.86
DICHLORODIFLUOROMETHANE	ND	4.3	1.0	1.7
ETHYLBENZENE	ND	4.3	0.43	0.86
HEXACHLOROBUTADIENE	ND	4.3	0.86	1.7
ISOPROPYLBENZENE	ND	4.3	0.55	1.7
M/P-XYLENES	ND	8.6	0.86	1.7
4-METHYL-2-PENTANONE	ND	8.6	2.4	4.3
METHYLENE CHLORIDE	ND	8.6	1.7	4.3
METHYL TERT-BUTYL ETHER	ND	4.3	0.43	0.86
NAPHTHALENE	ND	8.6	0.86	1.7
N-BUTYLBENZENE	ND	4.3	0.60	1.7
N-PROPYLBENZENE	ND	4.3	0.56	1.7
O-XYLENE	ND	4.3	0.43	0.86
P-ISOPROPYLTOLUENE	ND	4.3	0.54	1.7
SEC-BUTYLBENZENE	ND	4.3	0.58	1.7
STYRENE	ND	4.3	0.86	1.7
TERT-BUTYLBENZENE	ND	4.3	0.54	1.7
TETRACHLOROETHENE	ND	4.3	0.43	0.86
TOLUENE	ND	4.3	0.43	0.86
TRANS-1,2-DICHLOROETHENE	ND	4.3	0.43	0.86
TRANS-1,3-DICHLOROPROPENE	ND	4.3	0.43	0.86
TRICHLOROETHENE	ND	4.3	0.43	0.86
TRICHLOROFLUOROMETHANE	ND	4.3	0.95	1.7
VINYL CHLORIDE	ND	4.3	1.2	1.7
TERTIARY BUTYL ALCOHOL	ND	17	7.9	8.6

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	44.7	43.16	104	71-136
4-BROMOFLUOROBENZENE	39.7	43.16	92.0	79-119
TOLUENE-D8	40.4	43.16	93.6	85-116
DIBROMOFLUOROMETHANE	45.3	43.16	105	78-119

3/15/16

METHOD SW5035A/8260B
VOLATILE ORGANICS BY GC/MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 17:32
Sample ID	: KCH067-014	Date Analyzed:	03/15/16 17:32
Lab Samp ID	: C070-14	Dilution Factor:	0.87
Lab File ID	: RCB182	Matrix	: SOIL
Ext Btch ID	: VS03C08	% Moisture	: 3.9
Calib. Ref.	: RCB100	Instrument ID	: T-003

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
1,1,1,2-TETRACHLOROETHANE	ND	4.5	0.45	0.91
1,1,1-TRICHLOROETHANE	ND	4.5	0.45	0.91
1,1,2,2-TETRACHLOROETHANE	ND	4.5	0.45	0.91
1,1,2-TRICHLOROETHANE	ND	4.5	0.45	0.91
1,1-DICHLOROETHANE	ND	4.5	0.45	0.91
1,1-DICHLOROETHENE	ND	4.5	0.45	0.91
1,1-DICHLOROPROPENE	ND	4.5	0.45	0.91
1,2,3-TRICHLOROBENZENE	ND	4.5	0.91	1.8
1,2,3-TRICHLOROPROPANE	ND	4.5	0.91	1.8
1,2,4-TRICHLOROBENZENE	ND	4.5	0.91	1.8
1,2,4-TRIMETHYLBENZENE	ND	4.5	0.50	1.8
1,2-DIBROMO-3-CHLOROPROPANE	ND	4.5	0.91	1.8
1,2-DIBROMOETHANE	ND	4.5	0.45	0.91
1,2-DICHLOROBENZENE	ND	4.5	0.45	0.91
1,2-DICHLOROETHANE	ND	4.5	0.45	0.91
1,2-DICHLOROPROPANE	ND	4.5	0.45	0.91
1,3,5-TRIMETHYLBENZENE	ND	4.5	0.53	1.8
1,3-DICHLOROBENZENE	ND	4.5	0.47	0.91
1,3-DICHLOROPROPANE	ND	4.5	0.45	0.91
1,4-DICHLOROBENZENE	ND	4.5	0.45	0.91
2,2-DICHLOROPROPANE	ND	4.5	0.91	1.8
2-BUTANONE	ND	9.1	2.3	4.5
2-CHLOROTOLUENE	ND	4.5	0.74	1.8
2-HEXANONE	ND	9.1	2.6	4.5
4-CHLOROTOLUENE	ND	4.5	0.61	1.8
ACETONE	ND	9.1	2.8	4.5
BENZENE	ND	4.5	0.45	0.91
BROMOBENZENE	ND	4.5	0.45	0.91
BROMOCHLOROMETHANE	ND	4.5	0.45	0.91
BROMODICHLOROMETHANE	ND	4.5	0.45	0.91
BROMOFORM	ND	4.5	0.91	1.8
BROMOMETHANE	ND	9.1	1.6	1.8
CARBON DISULFIDE	ND	4.5	0.45	0.91
CARBON TETRACHLORIDE	ND	4.5	0.49	0.91
CHLOROBENZENE	ND	4.5	0.45	0.91
CHLOROETHANE	ND	4.5	1.2	1.8
CHLOROFORM	ND	4.5	0.45	0.91
CHLOROMETHANE	ND	4.5	0.91	1.8
CIS-1,2-DICHLOROETHENE	ND	4.5	0.45	0.91
CIS-1,3-DICHLOROPROPENE	ND	4.5	0.45	0.91
DIBROMOCHLOROMETHANE	ND	4.5	0.45	0.91
DIBROMOMETHANE	ND	4.5	0.45	0.91
DICHLORODIFLUOROMETHANE	ND	4.5	1.1	1.8
ETHYLBENZENE	ND	4.5	0.45	0.91
HEXACHLOROBUTADIENE	ND	4.5	0.91	1.8
ISOPROPYLBENZENE	ND	4.5	0.58	1.8
M/P-XYLENES	ND	9.1	0.91	1.8
4-METHYL-2-PENTANONE	ND	9.1	2.5	4.5
METHYLENE CHLORIDE	ND	9.1	1.8	4.5
METHYL TERT-BUTYL ETHER	ND	4.5	0.45	0.91
NAPHTHALENE	ND	9.1	0.91	1.8
N-BUTYLBENZENE	ND	4.5	0.63	1.8
N-PROPYLBENZENE	ND	4.5	0.59	1.8
O-XYLENE	ND	4.5	0.45	0.91
P-ISOPROPYLTOLUENE	ND	4.5	0.56	1.8
SEC-BUTYLBENZENE	ND	4.5	0.61	1.8
STYRENE	ND	4.5	0.91	1.8
TERT-BUTYLBENZENE	ND	4.5	0.56	1.8
TETRACHLOROETHENE	ND	4.5	0.45	0.91
TOLUENE	ND	4.5	0.45	0.91
TRANS-1,2-DICHLOROETHENE	ND	4.5	0.45	0.91
TRANS-1,3-DICHLOROPROPENE	ND	4.5	0.45	0.91
TRICHLOROETHENE	ND	4.5	0.45	0.91
TRICHLOROFLUOROMETHANE	ND	4.5	1.0	1.8
VINYL CHLORIDE	ND	4.5	1.3	1.8
TERTIARY BUTYL ALCOHOL	ND	18	8.3	9.1

SURROGATE PARAMETERS	RESULTS	SPK AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	46.5	45.27	103	71-136
4-BROMOFLUOROBENZENE	40.1	45.27	88.5	79-119
TOLUENE-D8	43.0	45.27	95.1	85-116
DIBROMOFLUOROMETHANE	47.2	45.27	104	78-119

SK 3/17/16

METHOD SW5035A/8260B
VOLATILE ORGANICS BY GC/MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 16:36
Sample ID:	KCH067-016	Date Analyzed:	03/15/16 16:36
Lab Samp ID:	C070-16	Dilution Factor:	0.95
Lab File ID:	RCB180	Matrix	: SOIL
Ext Btch ID:	VS03C08	% Moisture	: 2.8
Calib. Ref.:	RCB100	Instrument ID	: T-003

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
1,1,1,2-TETRACHLOROETHANE	ND	4.9	0.49	0.98
1,1,1-TRICHLOROETHANE	ND	4.9	0.49	0.98
1,1,2,2-TETRACHLOROETHANE	ND	4.9	0.49	0.98
1,1,2-TRICHLOROETHANE	ND	4.9	0.49	0.98
1,1-DICHLOROETHANE	ND	4.9	0.49	0.98
1,1-DICHLOROETHENE	ND	4.9	0.49	0.98
1,1-DICHLOROPROPENE	ND	4.9	0.49	0.98
1,2,3-TRICHLOROBENZENE	ND	4.9	0.98	2.0
1,2,3-TRICHLOROPROPANE	ND	4.9	0.98	2.0
1,2,4-TRICHLOROBENZENE	ND	4.9	0.98	2.0
1,2,4-TRIMETHYLBENZENE	ND	4.9	0.54	2.0
1,2-DIBROMO-3-CHLOROPROPANE	ND	4.9	0.98	2.0
1,2-DIBROMOETHANE	ND	4.9	0.49	0.98
1,2-DICHLOROBENZENE	ND	4.9	0.49	0.98
1,2-DICHLOROETHANE	ND	4.9	0.49	0.98
1,2-DICHLOROPROPANE	ND	4.9	0.49	0.98
1,3,5-TRIMETHYLBENZENE	ND	4.9	0.58	2.0
1,3-DICHLOROBENZENE	ND	4.9	0.51	0.98
1,3-DICHLOROPROPANE	ND	4.9	0.49	0.98
1,4-DICHLOROBENZENE	ND	4.9	0.49	0.98
2,2-DICHLOROPROPANE	ND	4.9	0.98	2.0
2-BUTANONE	ND	9.8	2.4	4.9
2-CHLOROTOLUENE	ND	4.9	0.80	2.0
2-HEXANONE	ND	9.8	2.8	4.9
4-CHLOROTOLUENE	ND	4.9	0.65	2.0
ACETONE	ND	9.8	3.0	4.9
BENZENE	ND	4.9	0.49	0.98
BROMOBENZENE	ND	4.9	0.49	0.98
BROMOCHLOROMETHANE	ND	4.9	0.49	0.98
BROMODICHLOROMETHANE	ND	4.9	0.49	0.98
BROMOFORM	ND	4.9	0.98	2.0
BROMOMETHANE	ND	9.8	1.8	2.0
CARBON DISULFIDE	ND	4.9	0.49	0.98
CARBON TETRACHLORIDE	ND	4.9	0.53	0.98
CHLOROBENZENE	ND	4.9	0.49	0.98
CHLOROETHANE	ND	4.9	1.3	2.0
CHLOROFORM	ND	4.9	0.49	0.98
CHLOROMETHANE	ND	4.9	0.98	2.0
CIS-1,2-DICHLOROETHENE	ND	4.9	0.49	0.98
CIS-1,3-DICHLOROPROPENE	ND	4.9	0.49	0.98
DIBROMOCHLOROMETHANE	ND	4.9	0.49	0.98
DIBROMOMETHANE	ND	4.9	0.49	0.98
DICHLORODIFLUOROMETHANE	ND	4.9	1.2	2.0
ETHYLBENZENE	ND	4.9	0.49	0.98
HEXACHLOROBUTADIENE	ND	4.9	0.98	2.0
ISOPROPYLBENZENE	ND	4.9	0.63	2.0
M/P-XYLENES	ND	9.8	0.98	2.0
4-METHYL-2-PENTANONE	ND	9.8	2.7	4.9
METHYLENE CHLORIDE	ND	9.8	2.0	4.9
METHYL TERT-BUTYL ETHER	ND	4.9	0.49	0.98
NAPHTHALENE	ND	9.8	0.98	2.0
N-BUTYLBENZENE	ND	4.9	0.68	2.0
N-PROPYLBENZENE	ND	4.9	0.64	2.0
O-XYLENE	ND	4.9	0.49	0.98
P-ISOPROPYLTOLUENE	ND	4.9	0.61	2.0
SEC-BUTYLBENZENE	ND	4.9	0.65	2.0
STYRENE	ND	4.9	0.98	2.0
TERT-BUTYLBENZENE	ND	4.9	0.61	2.0
TETRACHLOROETHENE	ND	4.9	0.49	0.98
TOLUENE	ND	4.9	0.49	0.98
TRANS-1,2-DICHLOROETHENE	ND	4.9	0.49	0.98
TRANS-1,3-DICHLOROPROPENE	ND	4.9	0.49	0.98
TRICHLOROETHENE	ND	4.9	0.49	0.98
TRICHLOROFLUOROMETHANE	ND	4.9	1.1	2.0
VINYL CHLORIDE	ND	4.9	1.4	2.0
TERTIARY BUTYL ALCOHOL	ND	20	9.0	9.8

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	48.8	48.87	99.8	71-136
4-BROMOFLUOROBENZENE	45.0	48.87	92.2	79-119
TOLUENE-D8	46.0	48.87	94.2	85-116
DIBROMOFLUOROMETHANE	48.7	48.87	99.7	78-119

3/25/16

METHOD SW5035A/8260B
VOLATILE ORGANICS BY GC/MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 18:00
Sample ID:	KCH067-018	Date Analyzed:	03/15/16 18:00
Lab Samp ID:	C070-18	Dilution Factor:	0.87
Lab File ID:	RCB183	Matrix	: SOIL
Ext Btch ID:	VS03C08	% Moisture	: 2.1
Calib. Ref.:	RCB100	Instrument ID	: T-003

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
1,1,1,2-TETRACHLOROETHANE	ND	4.4	0.44	0.89
1,1,1-TRICHLOROETHANE	ND	4.4	0.44	0.89
1,1,2,2-TETRACHLOROETHANE	ND	4.4	0.44	0.89
1,1,2-TRICHLOROETHANE	ND	4.4	0.44	0.89
1,1-DICHLOROETHANE	ND	4.4	0.44	0.89
1,1-DICHLOROETHENE	ND	4.4	0.44	0.89
1,1-DICHLOROPROPENE	ND	4.4	0.44	0.89
1,2,3-TRICHLOROBENZENE	ND	4.4	0.89	1.8
1,2,3-TRICHLOROPROPANE	ND	4.4	0.89	1.8
1,2,4-TRICHLOROBENZENE	ND	4.4	0.89	1.8
1,2,4-TRIMETHYLBENZENE	ND	4.4	0.49	1.8
1,2-DIBROMO-3-CHLOROPROPANE	ND	4.4	0.89	1.8
1,2-DIBROMOETHANE	ND	4.4	0.44	0.89
1,2-DICHLOROBENZENE	ND	4.4	0.44	0.89
1,2-DICHLOROETHANE	ND	4.4	0.44	0.89
1,2-DICHLOROPROPANE	ND	4.4	0.44	0.89
1,3,5-TRIMETHYLBENZENE	ND	4.4	0.52	1.8
1,3-DICHLOROBENZENE	ND	4.4	0.46	0.89
1,3-DICHLOROPROPANE	ND	4.4	0.44	0.89
1,4-DICHLOROBENZENE	ND	4.4	0.44	0.89
2,2-DICHLOROPROPANE	ND	4.4	0.89	1.8
2-BUTANONE	ND	8.9	2.2	4.4
2-CHLOROTOLUENE	ND	4.4	0.73	1.8
2-HEXANONE	ND	8.9	2.6	4.4
4-CHLOROTOLUENE	ND	4.4	0.60	1.8
ACETONE	ND	8.9	2.8	4.4
BENZENE	ND	4.4	0.44	0.89
BROMOBENZENE	ND	4.4	0.44	0.89
BROMOCHLOROMETHANE	ND	4.4	0.44	0.89
BROMODICHLOROMETHANE	ND	4.4	0.44	0.89
BROMOFORM	ND	4.4	0.89	1.8
BROMOMETHANE	ND	8.9	1.6	1.8
CARBON DISULFIDE	ND	4.4	0.44	0.89
CARBON TETRACHLORIDE	ND	4.4	0.48	0.89
CHLOROBENZENE	ND	4.4	0.44	0.89
CHLOROETHANE	ND	4.4	1.2	1.8
CHLOROFORM	ND	4.4	0.44	0.89
CHLOROMETHANE	ND	4.4	0.89	1.8
CIS-1,2-DICHLOROETHENE	ND	4.4	0.44	0.89
CIS-1,3-DICHLOROPROPENE	ND	4.4	0.44	0.89
DIBROMOCHLOROMETHANE	ND	4.4	0.44	0.89
DIBROMOMETHANE	ND	4.4	0.44	0.89
DICHLORODIFLUOROMETHANE	ND	4.4	1.1	1.8
ETHYLBENZENE	ND	4.4	0.44	0.89
HEXACHLOROBUTADIENE	ND	4.4	0.89	1.8
ISOPROPYLBENZENE	ND	4.4	0.57	1.8
M/P-XYLENES	ND	8.9	0.89	1.8
4-METHYL-2-PENTANONE	ND	8.9	2.5	4.4
METHYLENE CHLORIDE	ND	8.9	1.8	4.4
METHYL TERT-BUTYL ETHER	ND	4.4	0.44	0.89
NAPHTHALENE	ND	8.9	0.89	1.8
N-BUTYLBENZENE	ND	4.4	0.62	1.8
N-PROPYLBENZENE	ND	4.4	0.58	1.8
O-XYLENE	ND	4.4	0.44	0.89
P-ISOPROPYLTOLUENE	ND	4.4	0.55	1.8
SEC-BUTYLBENZENE	ND	4.4	0.60	1.8
STYRENE	ND	4.4	0.89	1.8
TERT-BUTYLBENZENE	ND	4.4	0.55	1.8
TETRACHLOROETHENE	ND	4.4	0.44	0.89
TOLUENE	ND	4.4	0.44	0.89
TRANS-1,2-DICHLOROETHENE	ND	4.4	0.44	0.89
TRANS-1,3-DICHLOROPROPENE	ND	4.4	0.44	0.89
TRICHLOROETHENE	ND	4.4	0.44	0.89
TRICHLOROFLUOROMETHANE	ND	4.4	0.98	1.8
VINYL CHLORIDE	ND	4.4	1.2	1.8
TERTIARY BUTYL ALCOHOL	ND	18	8.2	8.9

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	46.0	44.43	104	71-136
4-BROMOFLUOROBENZENE	40.6	44.43	91.3	79-119
TOLUENE-D8	42.3	44.43	95.1	85-116
DIBROMOFLUOROMETHANE	46.6	44.43	105	78-119

3/17/16

METHOD SW5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/14/16 13:59
Sample ID	: KCH067-020	Date Analyzed:	03/14/16 13:59
Lab Samp ID	: C070-19	Dilution Factor:	1
Lab File ID	: RCC265	Matrix	: WATER
Ext Btch ID	: VO67C11	% Moisture	: NA
Calib. Ref.	: RBC337	Instrument ID	: 67

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,1,1,2-TETRACHLOROETHANE	ND	1.0	0.10	0.20
1,1,1-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.11	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHENE	ND	1.0	0.10	0.20
1,1-DICHLOROPROPENE	ND	1.0	0.10	0.20
1,2,3-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2,3-TRICHLOROPROPANE	ND	2.0	0.25	0.50
1,2,4-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2,4-TRIMETHYLBENZENE	ND	1.0	0.11	0.20
1,2-DIBROMO-3-CHLOROPROPANE	ND	2.0	0.25	0.50
1,2-DIBROMOETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROBENZENE	ND	1.0	0.10	0.20
1,2-DICHLOROETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,3,5-TRIMETHYLBENZENE	ND	1.0	0.13	0.20
1,3-DICHLOROBENZENE	ND	1.0	0.11	0.20
1,3-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,4-DICHLOROBENZENE	ND	1.0	0.10	0.20
2,2-DICHLOROPROPANE	ND	1.0	0.16	0.30
2-BUTANONE	ND	10	2.0	5.0
2-CHLOROTOLUENE	ND	1.0	0.12	0.20
2-HEXANONE	ND	10	2.3	5.0
4-CHLOROTOLUENE	ND	1.0	0.11	0.20
ACETONE	ND	10	2.6	5.0
BENZENE	ND	1.0	0.10	0.20
BROMOBENZENE	ND	1.0	0.10	0.20
BROMOCHLOROMETHANE	ND	1.0	0.11	0.20
BROMODICHLOROMETHANE	ND	1.0	0.10	0.20
BROMOFORM	ND	1.0	0.15	0.30
BROMOMETHANE	ND	1.0	0.16	0.30
CARBON DISULFIDE	ND	1.0	0.25	0.50
CARBON TETRACHLORIDE	ND	1.0	0.10	0.20
CHLOROBENZENE	ND	1.0	0.10	0.20
CHLOROETHANE	ND	1.0	0.27	0.30
CHLOROFORM	ND	1.0	0.10	0.20
CHLOROMETHANE	ND	1.0	0.15	0.30
CIS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.10	0.20
DIBROMOCHLOROMETHANE	ND	1.0	0.10	0.20
DIBROMOMETHANE	ND	1.0	0.10	0.20
DICHLORODIFLUOROMETHANE	ND	1.0	0.15	0.30
ETHYLBENZENE	ND	1.0	0.10	0.20
HEXACHLOROBUTADIENE	ND	1.0	0.22	0.30
ISOPROPYLBENZENE	ND	1.0	0.10	0.20
M/P-XYLENES	ND	2.0	0.21	0.40
4-METHYL-2-PENTANONE	ND	10	2.1	5.0
METHYLENE CHLORIDE	ND	2.0	0.50	1.0
METHYL TERT-BUTYL ETHER	ND	1.0	0.13	0.20
NAPHTHALENE	ND	2.0	0.50	1.0
N-BUTYLBENZENE	ND	1.0	0.17	0.30
N-PROPYLBENZENE	ND	1.0	0.13	0.20
O-XYLENE	ND	1.0	0.10	0.20
P-ISOPROPYLTOLUENE	ND	1.0	0.14	0.20
SEC-BUTYLBENZENE	ND	1.0	0.13	0.20
STYRENE	ND	1.0	0.25	0.50
TERT-BUTYLBENZENE	ND	1.0	0.13	0.20
TETRACHLOROETHENE	ND	1.0	0.15	0.20
TOLUENE	ND	1.0	0.10	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.11	0.20
TRICHLOROETHENE	ND	1.0	0.10	0.20
TRICHLOROFLUOROMETHANE	ND	1.0	0.15	0.30
VINYL CHLORIDE	ND	1.0	0.12	0.20
TERTIARY BUTYL ALCOHOL	ND UJ(5)	10	2.5	5.0

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	9.68	10.00	96.8	81-118
4-BROMOFLUOROBENZENE	9.97	10.00	99.7	85-114
TOLUENE-D8	10.0	10.00	100	89-112
DIBROMOFLUOROMETHANE	9.97	10.00	99.7	80-119

SLC 3/17/16

LDC #: 36282A1 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/9/16
SDG #: 16C070 Standard/Full Page: 1 of 2
Laboratory: EMAX Laboratories Inc. Reviewer: EM
2nd Reviewer: M

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / D	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	SW/A	% RSD ≤ 15 ICV ≤ 20
IV.	Continuing calibration / ending CCV	SW	CCV ≤ 20
V.	Laboratory Blanks	A	
VI.	Field blanks	SW	EB = KCH067-019 (SDG# 16C074) *TB= 11
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	SW	
IX.	Laboratory control samples	A	was IR
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Standard validation.
XIII.	Target compound identification	A	Not reviewed for Standard validation.
XIV.	System performance	A	Not reviewed for Standard validation.
XV.	Overall assessment of data	A	

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

** Indicates sample underwent Full validation

	Client ID	Lab ID	Matrix	Date
1	KCH067-002	16C070-02	Soil	03/08/16
2	KCH067-004**	16C070-04**	Soil	03/08/16
3	KCH067-006	16C070-06	Soil	03/08/16
4	KCH067-008	16C070-08	Soil	03/08/16
5	KCH067-010	16C070-10	Soil	03/08/16
6	KCH067-011	16C070-11	Soil	03/08/16
7	KCH067-013	16C070-13	Soil	03/08/16
8	KCH067-014	16C070-14	Soil	03/08/16
9	KCH067-016**	16C070-16**	Soil	03/08/16
10	KCH067-018	16C070-18	Soil	03/08/16
11	KCH067-020 TB	16C070-19	Water	03/08/16
12	KCH067-016MS	16C070-16MS	Soil	03/08/16
13	KCH067-016MSD	16C070-16MSD	Soil	03/08/16

LDC #: 36282A1 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/9/16
SDG #: 16C070 Standard/Full Page: 2 of 2
Laboratory: EMAX Laboratories Inc. Reviewer:
2nd Reviewer:

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

	Client ID	Lab ID	Matrix	Date
14				
15				
16				
17				
18				

Notes:

	MBLK1W						
	MBLK1S						
	MBLK2S						
	MBLK3S						

LDC #: 36282A 1

VALIDATION FINDINGS CHECKLIST

Reviewer: FB
2nd Reviewer: DC

Method: Volatiles (EPA SW 846 Method 8260B)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. GC/MS Instrument performance check				
Were the BFB performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were all percent relative standard deviations (%RSD) ≤ ~~30%~~/15% and relative response factors (RRF) ≥ 0.05?	1	✓		
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) and relative response factors (RRF) within method criteria for all CCCs and SPCCs?	✓			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?		✓		
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed at least once every 12 hours for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks were identified in this SDG?	✓			
Were target compounds detected in the field blanks?	✓			
VII. Surrogate spikes				
Were all surrogate percent recovery (%R) within QC limits?	✓			
If the percent recovery (%R) for one or more surrogates was out of QC limits, was a reanalysis performed to confirm samples with %R outside of criteria?			✓	

LDC #: 36282A1

VALIDATION FINDINGS CHECKLIST

Reviewer: F
2nd Reviewer: FC

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		✓		
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?			✓	
XI. Internal standards				
Were internal standard area counts within -50% to +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methyl cyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 36282A1

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Reviewer: FT
2nd Reviewer: SC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A Did the laboratory perform a 5 point calibration prior to sample analysis?
Y N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
Y N N/A Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation?_____
Y N N/A Did the initial calibration meet the acceptance criteria?
Y N N/A Were all %RSDs and RRFs within the validation criteria of ≤30/15 %RSD and ≥0.05 RRF ?

code = 5

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30/15%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	2/26/16	VB67B26-ICAL	ZZZ		0.007 (20.01)	all water	J+/UJ/A (ND)

LDC #: 36282A /

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: FT
2nd Reviewer: DC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

work = 5

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	3/14/17	RCC 257-ccv	ZZZ		0.007 (I 0.01)	All water	J/UJ/A (ND)

LDC #: 36282A1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: FT
2nd Reviewer: SK

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

(Y) N N/A Were field blanks identified in this SDG? EB = KCH067-019 (SDG # 160074)
Y N N/A Were target compounds detected in the field blanks?

Blank units: ug/L **Associated sample units:** ug/Kg
Sampling date: 3/8/16
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: All soils (ND)

Compound	Blank ID	Sample Identification								
	EB									
G	0.40									

Blank units: _____ **Associated sample units:** _____
Sampling date: _____
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

.LDC #: 36282A1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: FT
2nd Reviewer: [illegible]

METHOD : GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.

Y N N/A Was a MS/MSD analyzed every 20 samples of each matrix?

Y N N/A Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?

Code= 9

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	12 + 13	ZZZ	( )	( )	24 (20)	9	J (NA / ND)
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

LDC #: 36282A1

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (50 std)	Recalculated RRF (50 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	V003C1D	3/10/16	C (1st internal standard)	0.389	0.389	0.358	0.358	13.88	13.88
			CC (2nd internal standard)	1.608	1.608	1.683	1.683	6.90	6.90
			BB (3rd internal standard)	1.311	1.311	1.409	1.409	4.62	4.62
			(4th internal standard)						
2			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						
3			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						
4			(1st internal standard)						
			(2nd internal standard)						
			(3rd internal standard)						
			(4th internal standard)						

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

LDC #: 36282A1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: FT
2nd Reviewer: AC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

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

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

#	Standard ID	Calibration Date	Compound (Reference internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	RCB162	3/15/16	C (IS1)	0.358	0.325	0.325	9.2	9.2
			CC (IS2)	1.683	1.701	1.701	1.1	1.1
			BB (IS3)	1.409	1.408	1.408	0.1	0.1
			(IS4)					
			(IS5)					
2			(IS1)					
			(IS2)					
			(IS3)					
			(IS4)					
			(IS5)					
3								
4								

LDC #: 36282A1

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: FT
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #9

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane	50.0	49.86	99.7	99.7	0
1,2-Dichloroethane-d4	↓	49.89	99.8	99.8	
Toluene-d8		47.11	94.2	94.2	
Bromofluorobenzene		46.08	92.2	92.2	↓

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Dibromofluoromethane					
1,2-Dichloroethane-d4					
Toluene-d8					
Bromofluorobenzene					

LDC #: 36282A1

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA Method 8260B)

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

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentration

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD sample: 12 + 13

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
1,1-Dichloroethene	45.8	46.3	ND	48.7	45.1	106	106	97	97	9	9
Trichloroethene	↓	↓	↓	49.5	46.3	108	108	100	100	8	8
Benzene	↓	↓	↓	~~45.8~~ F1 46.1	~~46.3~~ F1 43.4	101	101	94	94	7	7
Toluene	↓	↓	↓	48.0	45.6	105	105	99	99	6	6
Chlorobenzene	↓	↓	↓	47.8	46.2	104	104	100	100	4	4

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

LDC #: 36282A1

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: FT
2nd Reviewer:

METHOD: GC/MS VOA (EPA Method 8260B)

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

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration; SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboraotry control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS ID: VS03C08L1C

Compound	Spike Added (ug/kg)		Spiked Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalculated
1,1-Dichloroethene	50.0	50.0	44.4	48.6	89	89	97	97	9	9
Trichloroethene	↓	↓	51.1	53.4	102	102	107	107	4	4
Benzene			47.1	49.4	94	94	99	99	5	5
Toluene			50.6	52.5	101	101	105	105	4	4
Chlorobenzene			51.2	53.6	102	102	107	107	5	5

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

LDC #: 36282A1

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: FT
2nd reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

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

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

RRF = Relative response factor of the calibration standard.

V_o = Volume or weight of sample pruged in milliliters (ml) or grams (g).

Df = Dilution factor.

%S = Percent solids, applicable to soils and solid matrices only.

Example:

Sample I.D. VC5 , V :

Conc. = $\frac{(2869118)(50)}{(1831262)(1.663)(5.0)}$

= 47.1 ug/kg

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 12, 2016

Parameters: Polynuclear Aromatic Hydrocarbons

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C070

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-001	16C070-01	Soil	03/08/16
KCH067-002	16C070-02	Soil	03/08/16
KCH067-003	16C070-03	Soil	03/08/16
KCH067-004**	16C070-04**	Soil	03/08/16
KCH067-003MS	16C070-03MS	Soil	03/08/16
KCH067-003MSD	16C070-03MSD	Soil	03/08/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polynuclear Aromatic Hydrocarbons (PAHs) by Environmental Protection Agency (EPA) SW 846 Method 8270C using Selected Ion Monitoring (SIM)

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

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

VI. Field Blanks

Sample KCH067-019 (from SDG 16C074) was identified as an equipment blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

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

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

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

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

China Lake CTO 067
Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

China Lake CTO 067
Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

China Lake CTO 067
Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

METHOD SW3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS SIM

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 11:10
Sample ID:	KCH067-001	Date Analyzed:	03/16/16 14:09
Lab Samp ID:	C070-01	Dilution Factor:	1
Lab File ID:	RCJ209	Matrix	: SOIL
Ext Btch ID:	SVC013S	% Moisture	: 4.3
Calib. Ref.:	RBJ007	Instrument ID	: T-OE4

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ACENAPHTHENE	ND	10	1.3	2.6
ACENAPHTHYLENE	ND	10	1.3	2.6
ANTHRACENE	ND	10	1.3	2.6
BENZO(A)ANTHRACENE	ND	10	2.6	5.2
BENZO(A)PYRENE	ND	10	1.3	2.6
BENZO(B)FLUORANTHENE	1.6J	10	1.3	2.6
BENZO(K)FLUORANTHENE	ND	10	1.3	2.6
BENZO(G,H,I)PERYLENE	3.3J	10	1.3	2.6
CHRYSENE	ND	10	2.3	5.2
DIBENZO(A,H)ANTHRACENE	ND	10	1.3	2.6
FLUORANTHENE	1.6J	10	1.3	2.6
FLUORENE	ND	10	1.3	2.6
INDENO(1,2,3-CD)PYRENE	1.5J	10	1.3	2.6
NAPHTHALENE	ND	10	1.3	2.6
PHENANTHRENE	ND	10	1.3	2.6
PYRENE	1.5J	10	1.3	2.6
2-METHYLNAPHTHALENE	ND	10	1.3	2.6
1-METHYLNAPHTHALENE	ND	10	1.3	2.6

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	643	696.7	92.3	46-115
NITROBENZENE-D5	677	696.7	97.2	44-125
TERPHENYL-D14	833	696.7	120	58-133

KC01716

METHOD SW3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS SIM

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
Batch No. : 16C070	Date Extracted: 03/15/16 11:10
Sample ID: KCH067-002	Date Analyzed: 03/16/16 14:28
Lab Samp ID: C070-02	Dilution Factor: 1
Lab File ID: RCJ210	Matrix : SOIL
Ext Btch ID: SVC013S	% Moisture : 9.0
Calib. Ref.: RBJ007	Instrument ID : T-0E4

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ACENAPHTHENE	ND	11	1.4	2.7
ACENAPHTHYLENE	ND	11	1.4	2.7
ANTHRACENE	ND	11	1.4	2.7
BENZO(A)ANTHRACENE	ND	11	2.7	5.5
BENZO(A)PYRENE	ND	11	1.4	2.7
BENZO(B)FLUORANTHENE	ND	11	1.4	2.7
BENZO(K)FLUORANTHENE	ND	11	1.4	2.7
BENZO(G,H,I)PERYLENE	3.6J	11	1.4	2.7
CHRYSENE	ND	11	2.4	5.5
DIBENZO(A,H)ANTHRACENE	ND	11	1.4	2.7
FLUORANTHENE	ND	11	1.4	2.7
FLUORENE	ND	11	1.4	2.7
INDENO(1,2,3-CD)PYRENE	ND	11	1.4	2.7
NAPHTHALENE	ND	11	1.4	2.7
PHENANTHRENE	ND	11	1.4	2.7
PYRENE	ND	11	1.4	2.7
2-METHYLNAPHTHALENE	2.3J	11	1.4	2.7
1-METHYLNAPHTHALENE	2.4J	11	1.4	2.7

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	603	732.6	82.4	46-115
NITROBENZENE-D5	648	732.6	88.4	44-125
TERPHENYL-D14	815	732.6	111	58-133

8/05/16

METHOD SW3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS SIM

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
Batch No. : 16C070	Date Extracted: 03/15/16 11:10
Sample ID: KCH067-003	Date Analyzed: 03/16/16 14:48
Lab Samp ID: C070-03	Dilution Factor: 1
Lab File ID: RCJ211	Matrix : SOIL
Ext Btch ID: SVC013S	% Moisture : 6.9
Calib. Ref.: RBJ007	Instrument ID : T-OE4

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ACENAPHTHENE	2.6J	11	1.3	2.7
ACENAPHTHYLENE	2.5J	11	1.3	2.7
ANTHRACENE	ND	11	1.3	2.7
BENZO(A)ANTHRACENE	2.9J	11	2.6	5.4
BENZO(A)PYRENE	ND	11	1.3	2.7
BENZO(B)FLUORANTHENE	4.9J	11	1.3	2.7
BENZO(K)FLUORANTHENE	ND	11	1.3	2.7
BENZO(G,H,I)PERYLENE	2.6J	11	1.3	2.7
CHRYSENE	3.7J	11	2.4	5.4
DIBENZO(A,H)ANTHRACENE	ND	11	1.3	2.7
FLUORANTHENE	ND	11	1.3	2.7
FLUORENE	1.8J	11	1.3	2.7
INDENO(1,2,3-CD)PYRENE	ND	11	1.3	2.7
NAPHTHALENE	3.4J	11	1.3	2.7
PHENANTHRENE	ND	11	1.3	2.7
PYRENE	2.7J	11	1.3	2.7
2-METHYLNAPHTHALENE	2.7J	11	1.3	2.7
1-METHYLNAPHTHALENE	2.7J	11	1.3	2.7

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	653	716.1	91.3	46-115
NITROBENZENE-D5	696	716.1	97.2	44-125
TERPHENYL-D14	803	716.1	112	58-133

051716

METHOD SW3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS SIM

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 11:10
Sample ID:	KCH067-004	Date Analyzed:	03/16/16 15:08
Lab Samp ID:	C070-04	Dilution Factor:	1
Lab File ID:	RCJ212	Matrix :	SOIL
Ext Btch ID:	SVC013S	% Moisture :	4.9
Calib. Ref.:	RBJ007	Instrument ID :	T-OE4

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ACENAPHTHENE	ND	11	1.3	2.6
ACENAPHTHYLENE	ND	11	1.3	2.6
ANTHRACENE	ND	11	1.3	2.6
BENZO(A)ANTHRACENE	ND	11	2.6	5.3
BENZO(A)PYRENE	ND	11	1.3	2.6
BENZO(B)FLUORANTHENE	ND	11	1.3	2.6
BENZO(K)FLUORANTHENE	ND	11	1.3	2.6
BENZO(G,H,I)PERYLENE	ND	11	1.3	2.6
CHRYSENE	ND	11	2.3	5.3
DIBENZO(A,H)ANTHRACENE	ND	11	1.3	2.6
FLUORANTHENE	ND	11	1.3	2.6
FLUORENE	ND	11	1.3	2.6
INDENO(1,2,3-CD)PYRENE	ND	11	1.3	2.6
NAPHTHALENE	ND	11	1.3	2.6
PHENANTHRENE	ND	11	1.3	2.6
PYRENE	ND	11	1.3	2.6
2-METHYLNAPHTHALENE	ND	11	1.3	2.6
1-METHYLNAPHTHALENE	ND	11	1.3	2.6

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	621	701.1	88.6	46-115
NITROBENZENE-D5	663	701.1	94.6	44-125
TERPHENYL-D14	803	701.1	115	58-133

3/25/16

LDC #: 36282A2b **VALIDATION COMPLETENESS WORKSHEET** Date: 5/9/16
SDG #: 16C070 Standard/Full Page: 1 of 1
Laboratory: EMAX Laboratories Inc. Reviewer:
2nd Reviewer:

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270C-SIM)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/Δ	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A/Δ	%RSD ≤ 15, r² ICV ≤ 20
IV.	Continuing calibration /ending ccv	Δ	ccv ≤ 20
V.	Laboratory Blanks	Δ	
VI.	Field blanks	ND	EB= KCH067-019 (SDG # 16C071)
VII.	Surrogate spikes	Δ	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	Δ	
XII.	Compound quantitation RL/LOQ/LODs	Δ	Not reviewed for Standard validation.
XIII.	Target compound identification	Δ	Not reviewed for Standard validation.
XIV.	System performance	Δ	Not reviewed for Standard validation.
XV.	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-001	16C070-01	Soil	03/08/16
2	KCH067-002	16C070-02	Soil	03/08/16
3	KCH067-003	16C070-03	Soil	03/08/16
4	KCH067-004**	16C070-04**	Soil	03/08/16
5	KCH067-003MS	16C070-03MS	Soil	03/08/16
6	KCH067-003MSD	16C070-03MSD	Soil	03/08/16
7				
8				
9				

Notes:

	MBLK1S						

LDC #: 36282A2b

VALIDATION FINDINGS CHECKLIST

Reviewer: EP
2nd Reviewer: K

Method: Semivolatiles (EPA SW 846 Method 8270C-SIM)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. GC/MS Instrument performance check (Not required)				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 15% and relative response factors (RRF) ≥ 0.05?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤20% or percent recoveries (%R) 80-120%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VII. Surrogate spikes				
Were all surrogate percent differences (%R) within QC limits?	✓			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any percent recoveries (%R) was less than 10 percent, was a reanalysis performed to confirm %R?			✓	

LDC #: 36262Ab6 **VALIDATION FINDINGS CHECKLIST** Page: 2 of 2
Reviewer: FT
2nd Reviewer: TC

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?			✓	
XI. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS SVOA

A. Phenol	AA. 2-Chloronaphthalene	AAA. Butylbenzylphthalate	AAAA. Dibenzothiophene	A1.
B. Bis (2-chloroethyl) ether	BB. 2-Nitroaniline	BBB. 3,3'-Dichlorobenzidine	BBBB. Benzo(a)fluoranthene	B1.
C. 2-Chlorophenol	CC. Dimethylphthalate	CCC. Benzo(a)anthracene	CCCC. Benzo(b)fluorene	C1.
D. 1,3-Dichlorobenzene	DD. Acenaphthylene	DDD. Chrysene	DDDD. cis/trans-Decalin	D1.
E. 1,4-Dichlorobenzene	EE. 2,6-Dinitrotoluene	EEE. Bis(2-ethylhexyl)phthalate	EEEE. Biphenyl	E1.
F. 1,2-Dichlorobenzene	FF. 3-Nitroaniline	FFF. Di-n-octylphthalate	FFFF. Retene	F1.
G. 2-Methylphenol	GG. Acenaphthene	GGG. Benzo(b)fluoranthene	GGGG. C30-Hopane	G1.
H. 2,2'-Oxybis(1-chloropropane)	HH. 2,4-Dinitrophenol	HHH. Benzo(k)fluoranthene	HHHH. 1-Methylphenanthrene	H1.
I. 4-Methylphenol	II. 4-Nitrophenol	III. Benzo(a)pyrene	IIII. 1,4-Dioxane	I1.
J. N-Nitroso-di-n-propylamine	JJ. Dibenzofuran	JJJ. Indeno(1,2,3-cd)pyrene	JJJJ. Acetophenone	J1.
K. Hexachloroethane	KK. 2,4-Dinitrotoluene	KKK. Dibenz(a,h)anthracene	KKKK. Atrazine	K1.
L. Nitrobenzene	LL. Diethylphthalate	LLL. Benzo(g,h,i)perylene	LLLL. Benzaldehyde	L1.
M. Isophorone	MM. 4-Chlorophenyl-phenyl ether	MMM. Bis(2-Chloroisopropyl)ether	MMMM. Caprolactam	M1.
N. 2-Nitrophenol	NN. Fluorene	NNN. Aniline	NNNN. 2,6-Dichlorophenol	N1.
O. 2,4-Dimethylphenol	OO. 4-Nitroaniline	OOO. N-Nitrosodimethylamine	OOOO. 2,6-Dinitrotoluene	O1.
P. Bis(2-chloroethoxy)methane	PP. 4,6-Dinitro-2-methylphenol	PPP. Benzoic Acid	PPPP. 3-Methylphenol	P1.
Q. 2,4-Dichlorophenol	QQ. N-Nitrosodiphenylamine	QQQ. Benzyl alcohol	QQQQ. 3&4 Methylphenol	Q1.
R. 1,2,4-Trichlorobenzene	RR. 4-Bromophenyl-phenylether	RRR. Pyridine	RRRR. 4-Dimethyldibenzothiphene (4MDT)	R1.
S. Naphthalene	SS. Hexachlorobenzene	SSS. Benzidine	SSSS. 2/3-Dimethyldibenzothiophene (4MDT)	S1.
T. 4-Chloroaniline	TT. Pentachlorophenol	TTT. 1-Methylnaphthalene	TTTT. 1-Methyldibenzothiophene (1MDT)	T1.
U. Hexachlorobutadiene	UU. Phenanthrene	UUU.Benzo(b)thiophene	UUUU.	U1.
V. 4-Chloro-3-methylphenol	VV. Anthracene	VVV.Benzonaphthothiophene	VVVV.	V1.
W. 2-Methylnaphthalene	WW. Carbazole	WWW.Benzo(e)pyrene	WWWW.	W1.
X. Hexachlorocyclopentadiene	XX. Di-n-butylphthalate	XXX. 2,6-Dimethylnaphthalene	XXXX.	X1.
Y. 2,4,6-Trichlorophenol	YY. Fluoranthene	YYY. 2,3,5-Trimethylnaphthalene	YYYY.	Y1.
Z. 2,4,5-Trichlorophenol	ZZ. Pyrene	ZZZ. Perylene	ZZZZ.	Z1.

LDC #: 36282B2b

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer:

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)
The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Internal Standard)	Reported RRF (10 std)	Recalculated RRF (10 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/2/16	S (1st IS)	3.981	3.981	4.006	4.006	3.76	3.76
			YY (2nd IS)	1.437	1.437	1.451	1.451	9.00	9.00
			III (3rd IS)	1.165	1.165	1.083	1.083	11.33	11.33
			(4th IS)						
			(5th IS)						
			(6th IS)						
2			(1st IS)						
			(2nd IS)						
			(3rd IS)						
			(4th IS)						
			(5th IS)						
			(6th IS)						
3			(1st IS)						
			(2nd IS)						
			(3rd IS)						
			(4th IS)						
			(5th IS)						
			(6th IS)						

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

LDC #: 36282426

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)
The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

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

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

#	Standard ID	Calibration Date	Compound (Internal Standard)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	RCA193 CCV	3/16/16	S (1st IS)	4.006	3.873	3.873	3.3	3.3
			YY (2nd IS)	1.451	1.395	1.395	3.9	3.9
			III (3rd IS)	1.083	1.149	1.149	6.1	6.1
			(4th IS)					
			(5th IS)					
			(6th IS)					
2			(1st IS)					
			(2nd IS)					
			(3rd IS)					
			(4th IS)					
			(5th IS)					
			(6th IS)					
3			(1st IS)					
			(2nd IS)					
			(3rd IS)					
			(4th IS)					
			(5th IS)					
			(6th IS)					

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

LDC #: 36282A2b

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: FT
2nd reviewer: ↑

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #4

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	10	9.46	94.6	94.6	0
2-Fluorobiphenyl	↓	8.86	88.6	88.6	↓
Terphenyl-d14	↓	11.46	115	115	↓
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

LDC #: 36282A26

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

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

% Recovery = 100 * (SSC - SC)/SA Where: SSC = Spiked sample concentration; SA = Spike added; SC = Sample concentation

RPD = I MSC - MSC I * 2/(MSC + MSDC) MSC = Matrix spike concentration MSDC = Matrix spike duplicate concentration

MS/MSD samples: 5 + 6

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalc
Phenol											
N-Nitroso-di-n-propylamine											
4-Chloro-3-methylphenol											
Acenaphthene	1430	1430	2.61	1050	1050	73	73	73	73	0	0
Pentachlorophenol											
Pyrene	↓	↓	2.68	1370	1320	95	95	92	92	4	4

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

LDC #: 36282A2b

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: FT
2nd Reviewer: A

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

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

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: SYC013SL/SC

Compound	Spike Added (ug/kg)		Spike Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	1330	1330	967	932	73	73	70	70	4	4
Pentachlorophenol										
Pyrene	↓	↓	1230	1230	92	92	92	92	0	0

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

LDC #: 36282A2b

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: FT
2nd reviewer: JT

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

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

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

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

Example:

Sample I.D. LCS, Acenaphthene

Conc. = $\frac{(599770)(40)(2)(1000)}{(552251)(2.994)(30)}$

= 967 ug/kg

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 12, 2016

Parameters: Chlorinated Pesticides

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C070

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-001	16C070-01	Soil	03/08/16
KCH067-002	16C070-02	Soil	03/08/16
KCH067-003	16C070-03	Soil	03/08/16
KCH067-004**	16C070-04**	Soil	03/08/16
KCH067-003MS	16C070-03MS	Soil	03/08/16
KCH067-003MSD	16C070-03MSD	Soil	03/08/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Chlorinated Pesticides by Environmental Protection Agency (EPA) SW 846 Method 8081A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. GC Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

Retention time windows were established as required by the method for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

Retention times of all compounds in the calibration standards were within the established retention time windows for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

V. Laboratory Blanks

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

VI. Field Blanks

Sample KCH067-019 (from SDG 16C074) was identified as an equipment blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

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

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation.

The sample results for detected compounds from the two columns were within 40% relative percent difference (RPD) with the following exceptions:

Sample	Compound	RPD	Flag	A or P
KCH067-001	Aldrin Dieldrin 4,4'-DDE	109 113 66	J (all detects) J (all detects) J (all detects)	A
KCH067-003	Dieldrin 4,4'-DDT	111 156	J (all detects) J (all detects)	A
KCH067-004**	Dieldrin Endosulfan II	122 108	J (all detects) J (all detects)	A

Raw data were not reviewed for Level III validation.

XII. Target Compound Identification

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Overall Assessment of Data

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

Due to RPD between two columns, data were qualified as estimated in three samples.

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

China Lake CTO 067
Chlorinated Pesticides - Data Qualification Summary - SDG 16C070

Sample	Compound	Flag	A or P	Reason (Code)
KCH067-001	Aldrin Dieldrin 4,4'-DDE	J (all detects) J (all detects) J (all detects)	A	Compound quantitation (RPD between two columns) (12)
KCH067-003	Dieldrin 4,4'-DDT	J (all detects) J (all detects)	A	Compound quantitation (RPD between two columns) (12)
KCH067-004**	Dieldrin Endosulfan II	J (all detects) J (all detects)	A	Compound quantitation (RPD between two columns) (12)

China Lake CTO 067
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

China Lake CTO 067
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
Batch No. : 16C070	Date Extracted: 03/14/16 14:44
Sample ID: KCH067-001	Date Analyzed: 03/19/16 07:44
Lab Samp ID: C070-01	Dilution Factor: 1
Lab File ID: RC18055A	Matrix : SOIL
Ext Btch ID: CPC011S	% Moisture : 4.3
Calib. Ref.: RC18052A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND)	ND	2.1	0.21	0.42
GAMMA-BHC (LINDANE)	(ND)	0.42J	2.1	0.21	0.42
BETA-BHC	(ND)	ND	2.1	0.21	0.42
HEPTACHLOR	0.43J	(ND)	2.1	0.21	0.42
DELTA-BHC	(ND)	ND	2.1	0.28	0.42
ALDRIN	0.95J	(0.28J) J(12)	2.1	0.21	0.42
HEPTACHLOR EPOXIDE	1.2J	(ND)	2.1	0.21	0.42
GAMMA-CHLORDANE	(ND)	ND	2.1	0.21	0.42
ALPHA-CHLORDANE	(ND)	ND	2.1	0.21	0.42
ENDOSULFAN I	(ND)	0.75J	2.1	0.21	0.42
4,4'-DDE	7.7	(3.9) J(12)	2.1	0.21	0.42
DIELDRIN	4.3	(1.2J) J(12)	2.1	0.21	0.42
ENDRIN	(ND)	2.7	2.1	0.21	0.42
4,4'-DDD	(ND)	ND	2.1	0.21	0.42
ENDOSULFAN II	1.6J	(ND)	2.1	0.21	0.42
4,4'-DDT	(ND)	19	2.1	0.21	0.42
ENDRIN ALDEHYDE	(ND)	ND	2.1	0.37	0.42
ENDOSULFAN SULFATE	(ND)	ND	2.1	0.21	0.42
ENDRIN KETONE	0.31J	(ND)	2.1	0.21	0.42
METHOXYCHLOR	2.8J	(ND)	10	2.1	4.2
TOXAPHENE	(ND)	ND	52	5.2	10
TECHNICAL CHLORDANE	(ND)	ND	52	10	21

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	12.72 (14.06)	13.93	91.3 (101)	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

SG 5/17/16

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
Batch No. : 16C070	Date Extracted: 03/14/16 14:44
Sample ID: KCH067-002	Date Analyzed: 03/19/16 08:04
Lab Samp ID: C070-02	Dilution Factor: 1
Lab File ID: RC18056A	Matrix : SOIL
Ext Btch ID: CPC011S	% Moisture : 9.0
Calib. Ref.: RC18052A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND) | ND	2.2	0.22	0.44
GAMMA-BHC (LINDANE)	(ND) | ND	2.2	0.22	0.44
BETA-BHC	(ND) | ND	2.2	0.22	0.44
HEPTACHLOR	(ND) | ND	2.2	0.22	0.44
DELTA-BHC	(ND) | ND	2.2	0.30	0.44
ALDRIN	(ND) | ND	2.2	0.22	0.44
HEPTACHLOR EPOXIDE	(ND) | ND	2.2	0.22	0.44
GAMMA-CHLORDANE	(ND) | ND	2.2	0.22	0.44
ALPHA-CHLORDANE	(ND) | ND	2.2	0.22	0.44
ENDOSULFAN I	(ND) | ND	2.2	0.22	0.44
4,4'-DDE	0.39J | (ND)	2.2	0.22	0.44
DIELDRIN	0.33J | (ND)	2.2	0.22	0.44
ENDRIN	(ND) | ND	2.2	0.22	0.44
4,4'-DDD	(ND) | ND	2.2	0.22	0.44
ENDOSULFAN II	(ND) | ND	2.2	0.22	0.44
4,4'-DDT	(ND) | 1.7J	2.2	0.22	0.44
ENDRIN ALDEHYDE	(ND) | ND	2.2	0.38	0.44
ENDOSULFAN SULFATE	(ND) | ND	2.2	0.22	0.44
ENDRIN KETONE	(ND) | ND	2.2	0.22	0.44
METHOXYCHLOR	(ND) | ND	11	2.2	4.4
TOXAPHENE	(ND) | ND	55	5.5	11
TECHNICAL CHLORDANE	(ND) | ND	55	11	22

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	13.05 | (13.63)	14.65	89.1 | (93.0)	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

3/21/16

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
Batch No. : 16C070	Date Extracted: 03/14/16 14:44
Sample ID: KCH067-003	Date Analyzed: 03/19/16 08:24
Lab Samp ID: C070-03	Dilution Factor: 1
Lab File ID: RC18057A	Matrix : SOIL
Ext Btch ID: CPC011S	% Moisture : 6.9
Calib. Ref.: RC18052A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND) | ND	2.1	0.21	0.43
GAMMA-BHC (LINDANE)	(ND) | ND	2.1	0.21	0.43
BETA-BHC	(ND) | ND	2.1	0.21	0.43
HEPTACHLOR	0.32J | (ND)	2.1	0.21	0.43
DELTA-BHC	(ND) | ND	2.1	0.29	0.43
ALDRIN	3.3 | (ND)	2.1	0.21	0.43
HEPTACHLOR EPOXIDE	(ND) | ND	2.1	0.21	0.43
GAMMA-CHLORDANE	(ND) | ND	2.1	0.21	0.43
ALPHA-CHLORDANE	(ND) | ND	2.1	0.21	0.43
ENDOSULFAN I	(ND) | 1.4J	2.1	0.21	0.43
4,4'-DDE	15 | (ND)	2.1	0.21	0.43
DIELDRIN	8.4 | (2.4) J(12)	2.1	0.21	0.43
ENDRIN	(ND) | 5.9	2.1	0.21	0.43
4,4'-DDD	(ND) | 0.74J	2.1	0.21	0.43
ENDOSULFAN II	(ND) | ND	2.1	0.21	0.43
4,4'-DDT	(6.9) | 56 J(12)	2.1	0.21	0.43
ENDRIN ALDEHYDE	(ND) | ND	2.1	0.38	0.43
ENDOSULFAN SULFATE	(ND) | 1.8J	2.1	0.21	0.43
ENDRIN KETONE	0.85J | (ND)	2.1	0.21	0.43
METHOXYCHLOR	19 | (ND)	11	2.1	4.3
TOXAPHENE	(ND) | ND	54	5.4	11
TECHNICAL CHLORDANE	(ND) | ND	54	11	21

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	14.41 | (15.37)	14.32	101 | (107)	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

TG 51716

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
Batch No. : 16C070	Date Extracted: 03/14/16 14:44
Sample ID: KCH067-004	Date Analyzed: 03/19/16 09:25
Lab Samp ID: C070-04	Dilution Factor: 1
Lab File ID: RC18060A	Matrix : SOIL
Ext Btch ID: CPC011S	% Moisture : 4.9
Calib. Ref.: RC18052A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND)	ND	2.1	0.21	0.42
GAMMA-BHC (LINDANE)	(ND)	ND	2.1	0.21	0.42
BETA-BHC	(ND)	ND	2.1	0.21	0.42
HEPTACHLOR	(ND)	ND	2.1	0.21	0.42
DELTA-BHC	(ND)	ND	2.1	0.28	0.42
ALDRIN	0.35J	(ND)	2.1	0.21	0.42
HEPTACHLOR EPOXIDE	0.35J	(ND)	2.1	0.21	0.42
GAMMA-CHLORDANE	(ND)	ND	2.1	0.21	0.42
ALPHA-CHLORDANE	0.92J	(ND)	2.1	0.21	0.42
ENDOSULFAN I	(ND)	ND	2.1	0.21	0.42
4,4'-DDE	2.2	(ND)	2.1	0.21	0.42
DIELDRIN	1.4J	(0.34J) J (12)	2.1	0.21	0.42
ENDRIN	(ND)	0.72J	2.1	0.21	0.42
4,4'-DDD	(ND)	ND	2.1	0.21	0.42
ENDOSULFAN II	(0.36J)	1.2J J(12)	2.1	0.21	0.42
4,4'-DDT	(ND)	7.2	2.1	0.21	0.42
ENDRIN ALDEHYDE	(ND)	ND	2.1	0.37	0.42
ENDOSULFAN SULFATE	(ND)	0.21J	2.1	0.21	0.42
ENDRIN KETONE	(ND)	ND	2.1	0.21	0.42
METHOXYCHLOR	(ND)	ND	11	2.1	4.2
TOXAPHENE	(ND)	ND	53	5.3	11
TECHNICAL CHLORDANE	(ND)	ND	53	11	21

SURROGATE PARAMETERS	RESULTS		SPK_AMT	% RECOVERY		QC LIMIT
TETRACHLORO-M-XYLENE	13.43	(14.66)	14.02	95.8	(105)	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

LDC #: 36282A3a
SDG #: 16C070
Laboratory: EMAX Laboratories Inc.

VALIDATION COMPLETENESS WORKSHEET
Standard/Full

Date: 5/9/16
Page: 1 of 1
Reviewer: EJ
2nd Reviewer: [illegible]

METHOD: GC Chlorinated Pesticides (EPA SW846 Method 8081A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC Instrument Performance Check	A	
III.	Initial calibration/ICV	A / A	%D psp / ICV ≤ 20
IV.	Continuing calibration	A	CCV ≤ 20
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB = KCH067-019 (SDG # 16C074)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS ID
X.	Field duplicates	N	
XI.	Compound quantitation/RL/LOQ/LODs	SW	Not reviewed for Standard validation.
XII.	Target compound identification	A	Not reviewed for Standard validation.
XIII.	System Performance	A	Not reviewed for Standard validation.
XIV	Overall assessment of data	A	

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

** Indicates sample underwent Full validation

	Client ID	Lab ID	Matrix	Date
1	KCH067-001	16C070-01	Soil	03/08/16
2	KCH067-002	16C070-02	Soil	03/08/16
3	KCH067-003	16C070-03	Soil	03/08/16
4	KCH067-004**	16C070-04**	Soil	03/08/16
5	KCH067-003MS	16C070-03MS	Soil	03/08/16
6	KCH067-003MSD	16C070-03MSD	Soil	03/08/16
7				
8				
9				
10				
11				

Notes:

	MBLK1S						

LDC #: 36282A3a

VALIDATION FINDINGS CHECKLIST

Reviewer: FT
2nd Reviewer: M

Method: Pesticides (EPA SW 846 Method 8081)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. GC/ECD Instrument performance check				
Was the instrument performance found to be acceptable?	✓			
Were Evaluation mix standards analyzed prior to the initial calibration and at beginning of each 12-hour shift?	✓			
Were endrin and 4,4'-DDT breakdowns ≤ 15% for individual breakdown in the Evaluation mix standards?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?		✓		
Were the RT windows properly established?	✓			
IIIb. Initial calibration verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.			✓	
VI. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VII. Surrogate spikes/Internal Standards				
Were all surrogate percent recovery (%R) within the QC limits?	✓			

LDC #: 36282A3a

VALIDATION FINDINGS CHECKLIST

Reviewer: FT
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any percent recovery (%R) was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
Were internal standard area counts within ± 50% of the average area calculated during calibration?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓	~~✓~~	F7	
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?			✓	
XI. Compound quantitation				
Were compound quantitation and RLs adjusted to reflect all sample dilutions, dry weight factors, and clean-up activities applicable to level IV validation?	✓			
Were relative percent difference (RPD) of the results between two columns ≤ 40%?	F7 ~~✓~~	✓		
XII. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPA SW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG. Chlordane
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH. Chlordane (Technical)
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	II. Arochlor 1262
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ. Aroclor 1268
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. 2,4'-DDD	KK. Oxychlordane
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. 2,4'-DDE	LL. trans-Nonachlor
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. 2,4'-DDT	MM. cis-Nonachlor
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF. Hexachlorobenzene	NN.

Notes:_____

LDC #: 36287A3a

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: ✓ GC __ HPLC

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

Level IV/D Only

Y N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Y N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

code = 12

#	Associated Samples	Compound Name	% RPD But 2 col ≤ 40 Findings	Qualifications
	1	F	109	J (all) / A
		I	113	
		J	66	
	3	I	111	
		O	156	
	4	I	122	
		L	108	

Comments: See sample calculation verification worksheet for recalculations

LDC #: 36282A3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer: A

METHOD: GC Pesticides (EPA SW 846 Method 8081)

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C
Average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where: A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (20 std)/200	Recalculated CF (20 std)/200	Reported CF (initial)	Recalculated CF (intial)	Reported %RSD	Recalculated %RSD
1	ICA L	1/21/16	endosulfan I	431064	431064	419333.4	419333.4	12.1	12.1
	RTX cup1		Methoxychlor	146220	146220	164669.2	164669.2	15.4	15.4
2	RTX cup2		↓	107259	107259	105819.2	105819.2	5.8	5.8
				44563	44563	45652.3	45652.3	5.4	5.4
3									
4									

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

LDC #: 36282A3a

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Page: 6 of 7
Reviewer: FT
2nd Reviewer: A

METHOD: GC Pesticides (EPA SW 846 Method 8081)

Percent difference (%D) = 100 * (N - C)/N

Where: N = Initial Calibration Factor or Nominal Amount (ng)
C = Calibration Factor from Continuing Calibration Standard or Calculated Amount (ng)

Standard ID	Calibration Date/Time	Compound	Average CF/ CCV Conc	Reported CF/Conc CCV	Recalculated CF/Conc CCV	Reported %D	Recalculated %D
CCV 1607	3/18/16	endosulfan / RTX cap1	20.0	17.62	17.62	12	12
		methoxychlor	200.0	211.66	211.66	6	6
		↓ RTX cap2		19.51	19.51	2	2
			↓	218.07	218.07	9	9
CCV 0643	3/19/16	↓	20.0	18.54	18.54	7	7
			200.0	226.93	226.93	13	13
				20.05	20.05	0	0
		↓	↓	231.56	231.56	16	16

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

LDC #: 36282A3a

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: FT
2nd reviewer: N

METHOD: GC Pesticides (EPA SW 846 Method 8081)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #4

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Tetrachloro-m-xylene	RTX CLP 1	40.0	38.310	95.8	95.8	0
Tetrachloro-m-xylene	RTX CLP II	↓	41.840	105	105	0
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Notes:

LDC #: 36287T3a

VALIDATION FINDINGS WORKSHEET

Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: FT
2nd Reviewer: AC

METHOD: GC Pesticides (EPA SW 846 Method 8081)

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

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

Where: SSC = Spiked sample concentration
SA = Spike added
SC = Concentration

RPD = I MS - MSD I * 2/(MS + MSD)

MS = Matrix spike percent recovery

MSD = Matrix spike duplicate percent recovery

MS/MSD samples: 5 + 6

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	7.16	7.16	ND	8.24	8.18	115	115	114	114	1	1
4,4'-DDT	7.16	7.16	6.9	16.3	16.1	131	131	128	128	1	1

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

LDC #: 36282T3a

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Page: 1 of 1
Reviewer: RZ
2nd Reviewer: DL

METHOD: GC Pesticides (EPA SW 846 Method 8081A)

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

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

Where: SSC = Spiked sample concentration
SA = Spike added
SC = Concentration

RPD = I LCS - LCSD I * 2/(LCS + LCSD)

LCS = Laboratory control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: OPC 0115L / SC

Compound	Spike Added (ug/kg)		Spiked Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	6.67	6.67	6.18	6.16	93	93	92	92	0	0
4,4'-DDT	↓	↓	6.55	7.22	98	98	108	109	10	10

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

LDC #: 36287T3a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: EJ
2nd reviewer: JC

METHOD: GC Pesticides (EPA SW 846 Method 8081A)

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

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

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

Example:

Sample I.D. #4 , endosulfan II

Conc. = $\frac{379617 \quad (10)}{367000.6 \quad (30.01) \quad (0.951)}$

=

0.36 ug/kg

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 11, 2016

Parameters: Polychlorinated Biphenyls

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C070

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-001	16C070-01	Soil	03/08/16
KCH067-002	16C070-02	Soil	03/08/16
KCH067-003	16C070-03	Soil	03/08/16
KCH067-004**	16C070-04**	Soil	03/08/16
KCH067-003MS	16C070-03MS	Soil	03/08/16
KCH067-003MSD	16C070-03MSD	Soil	03/08/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Biphenyls (PCBs) by Environmental Protection Agency (EPA) SW 846 Method 8082

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

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

V. Field Blanks

Sample KCH067-019 (from SDG 16C074) was identified as an equipment blank. No contaminants were found.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation.

The sample results for detected compounds from the two columns were within 40% relative percent difference (RPD) with the following exceptions:

Sample	Compound	RPD	Flag	A or P
KCH067-001	Aroclor-1260	73	J (all detects)	A
KCH067-002	Aroclor-1254	56	J (all detects)	A
KCH067-003	Aroclor-1260	77	J (all detects)	A
KCH067-004**	Aroclor-1260	63	J (all detects)	A

Raw data were not reviewed for Level III validation.

XI. Target Compound Identification

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

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

Due to RPD between two columns, data were qualified as estimated in four samples.

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

China Lake CTO 067
Polychlorinated Biphenyls - Data Qualification Summary - SDG 16C070

Sample	Compound	Flag	A or P	Reason (Code)
KCH067-001 KCH067-003 KCH067-004**	Aroclor-1260	J (all detects)	A	Compound quantitation (RPD between two columns) (12)
KCH067-002	Aroclor-1254	J (all detects)	A	Compound quantitation (RPD between two columns) (12)

China Lake CTO 067
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

China Lake CTO 067
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

METHOD SW3550B/8082
PCBs

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
Batch No. : 16C070	Date Extracted: 03/14/16 14:44
Sample ID: KCH067-001	Date Analyzed: 03/15/16 11:36
Lab Samp ID: C070-01	Dilution Factor: 1
Lab File ID: SC15007A	Matrix : SOIL
Ext Btch ID: CPC011S	% Moisture : 4.3
Calib. Ref.: SC15002A	Instrument ID : GCT008

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
AROCLOR 1016	(ND) | ND	52	14	18
AROCLOR 1221	(ND) | ND	52	8.7	18
AROCLOR 1232	(ND) | ND	52	9.4	18
AROCLOR 1242	(ND) | ND	52	9.7	18
AROCLOR 1248	(ND) | ND	52	8.7	18
AROCLOR 1254	(260) | 260	52	8.7	18
AROCLOR 1260	69 | (32J) J (12)	52	10	18

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	14.08 | (15.37)	13.93	101 | (110)	44-130

Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )
* Out side of QC Limit

3/16/16

METHOD SW3550B/8082
PCBs

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
Batch No. : 16C070	Date Extracted: 03/14/16 14:44
Sample ID: KCH067-002	Date Analyzed: 03/15/16 11:54
Lab Samp ID: C070-02	Dilution Factor: 1
Lab File ID: SC15008A	Matrix : SOIL
Ext Btch ID: CPC011S	% Moisture : 9.0
Calib. Ref.: SC15002A	Instrument ID : GCT008

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
AROCLOR 1016	(ND) | ND	55	14	19
AROCLOR 1221	(ND) | ND	55	9.1	19
AROCLOR 1232	(ND) | ND	55	9.9	19
AROCLOR 1242	(ND) | ND	55	10	19
AROCLOR 1248	(ND) | ND	55	9.1	19
AROCLOR 1254	(23J) | 13J J (12)	55	9.1	19
AROCLOR 1260	(ND) | ND	55	11	19

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	13.20 | (14.39)	14.65	90.1 | (98.2)	44-130

Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )
* Out side of QC Limit

8/05/16

METHOD SW3550B/8082
PCBs

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
Batch No. : 16C070	Date Extracted: 03/14/16 14:44
Sample ID: KCH067-003	Date Analyzed: 03/15/16 12:11
Lab Samp ID: C070-03	Dilution Factor: 1
Lab File ID: SC15009A	Matrix : SOIL
Ext Btch ID: CPC011S	% Moisture : 6.9
Calib. Ref.: SC15002A	Instrument ID : GCT008

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
AROCLOR 1016	(ND) | ND	54	14	18
AROCLOR 1221	(ND) | ND	54	8.9	18
AROCLOR 1232	(ND) | ND	54	9.7	18
AROCLOR 1242	(ND) | ND	54	10	18
AROCLOR 1248	(ND) | ND	54	8.9	18
AROCLOR 1254	570 | (580)	54	8.9	18
AROCLOR 1260	160 | (71) J (12)	54	11	18

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	14.15 | (15.37)	14.32	98.8 | (107)	44-130

Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )
* Out side of QC Limit

4/05/16

METHOD SW3550B/8082
PCBs

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/14/16 14:44
Sample ID	: KCH067-004	Date Analyzed:	03/15/16 13:03
Lab Samp ID	: C070-04	Dilution Factor:	1
Lab File ID	: SC15012A	Matrix	: SOIL
Ext Btch ID	: CPC011S	% Moisture	: 4.9
Calib. Ref.:	SC15002A	Instrument ID	: GCT008

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
AROCLOR 1016	(ND) | ND	53	14	18
AROCLOR 1221	(ND) | ND	53	8.7	18
AROCLOR 1232	(ND) | ND	53	9.5	18
AROCLOR 1242	(ND) | ND	53	9.8	18
AROCLOR 1248	(ND) | ND	53	8.7	18
AROCLOR 1254	(76) | 74	53	8.7	18
AROCLOR 1260	(21J) | 11J J(12)	53	10	18

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	13.56 | (14.77)	14.02	96.8 | (105)	44-130

Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )
* Out side of QC Limit

3/17/16

LDC #: 36282A3b

SDG #: 16C070

Laboratory: EMAX Laboratories Inc.

VALIDATION COMPLETENESS WORKSHEET

Standard/Full

Date: 5/9/16

Page: 1 of 1

Reviewer: EM

2nd Reviewer: M

METHOD: GC Polychlorinated Biphenyls (EPA SW846 Method 8082)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	Initial calibration/ICV	A / A	
III.	Continuing calibration	A	
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	EB= KCH067-019 (SDG # 16C074)
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS ID
IX.	Field duplicates	N	
X.	Compound quantitation/RL/LOQ/LODs	SW	Not reviewed for Standard validation.
XI.	Target compound identification	A	Not reviewed for Standard validation.
XII.	Overall assessment of data	A	

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

** Indicates sample underwent Full validation

	Client ID	Lab ID	Matrix	Date
1	KCH067-001	16C070-01	Soil	03/08/16
2	KCH067-002	16C070-02	Soil	03/08/16
3	KCH067-003	16C070-03	Soil	03/08/16
4	KCH067-004**	16C070-04**	Soil	03/08/16
5	KCH067-003MS	16C070-03MS	Soil	03/08/16
6	KCH067-003MSD	16C070-03MSD	Soil	03/08/16
7				
8				
9				
10				
11				
12				
13				

Notes:

	MBLK15						

LDC #: 36282A36 **VALIDATION FINDINGS CHECKLIST** Page: 1 of 2
Reviewer: FR
2nd Reviewer:

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
IIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥0.990?		✓		
Were the RT windows properly established?	✓			
IIb. Initial calibration verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) < 20% or percent recoveries (%R) 80-120%?	✓			
III. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
IV. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.				
V. Field Blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VI. Surrogate spikes				
Were all surrogate percent recovery (%R) within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			

LDC #: 36282A36

VALIDATION FINDINGS CHECKLIST

Reviewer: EJ
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?			✓	
X. Compound quantitation				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC #: 36282A3b

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

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

Level IV/D Only

Y N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Y N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

code = 12

#	Associated Samples	Compound Name	% RPD Bet 2 col Findings ≤ 40	Qualifications
	1	BB	73	J dil / A
	2	AA	56	↓
	3	BB	77	↓
	4	BB	63	↓

Comments: See sample calculation verification worksheet for recalculations

LDC #: 36282A3b

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: FT
2nd Reviewer: A

METHOD: GC ✓ HPLC _____

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C
Average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where: A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (100 std)	Recalculated CF (100 std)	Reported CF (initial)	Recalculated CF (intial)	Reported %RSD	Recalculated %RSD
1	ICAL RTX-CLP1	11/17/15	PCB-1260-1	3097.58	3097.58	3049.208	3049.208	14.2	14.2
	RTX-CLP2	↓	↓	3293.02	3293.02	3326.041	3326.041	13.6	13.6
2									
3									
4									

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

LDC #: 36282A36

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC ✓ HPLC _____

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

% Difference = 100 * (ave. CF -CF)/ave.CF

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(ICAL)/ CCV Conc.	Reported CF/ Conc. CCV	Recalculated CF/ Conc. CCV	Reported %D	Recalculated %D
1	CCV 10:10	3/15/16	PCB-1260	500.0	498.754	498.754	0	0
2								
3								
4								

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

LDC #: 36282A3b

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: FT
2nd reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #4

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
TCMX	RTX CLP1	40.0	38.7	96.8	96.8	0
TCMX	CLP2	↓	42.14	105	105	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound
A	Chlorobenzene (CBZ)	G	Octacosane	M	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	Y	Tetrachloro-m- xylene
B	4-Bromofluorobenzene (BFB)	H	Ortho-Terphenyl	N	Terphenyl-D14	T	3,4-Dinitrotoluene	Z	2-Bromonaphthalene
C	a,a,a-Trifluorotoluene	I	Fluorobenzene (FBZ)	O	Decachlorobiphenyl (DCB)	U	Tripentyltin	AA	Chloro-octadecane
D	Bromochlorobenene	J	n-Triacontane	P	1-methylnaphthalene	V	Tri-n-propyltin	BB	2,4-Dichlorophenylacetic acid
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate	CC	2,5-Dibromotoluene
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate		

LDC #: 36282A3b

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer: A

METHOD: ✓ GC ___HPLC

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

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

RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100

Where

SSC = Spiked sample concentration
SC = Sample concentration
SA = Spike added

MS = Matrix spike
MSD = Matrix spike duplicate

MS/MSD samples: 5 + 6

Compound	Spike Added (ug/kg)		Sample Conc. (ug/kg)	Spike Sample Concentration (ug/kg)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
Phorate (8141A)											
Malathion (8141A)											
Formaldehyde (8315A)											
Aroclor 1260	179	179	155	331	319	98	98	92	92	4	4

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

LDC #: 36282A36

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: FT
2nd Reviewer: AC

METHOD: ✓ GC ___HPLC

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

%Recovery = 100 * (SSC/SA)
RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

Where SSC = Spiked sample concentration
LCS = Laboratory Control Sample
SA = Spike added
LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: 60C011SL/SC

Compound	Spike Added (ug/kg)		Spike Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										
Phorate (8141A)										
Malathion (8141A)										
Formaldehyde (8315A)										
Aroclor 1260	167	167	169	169	101	101	101	101	0	0

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

LDC #: 36282A3b

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer: A

METHOD: ✓ GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. # 4 Compound Name AA

Concentration = $\frac{216.39\ (10)}{(30.01)(0.95)}$ =

= 76 ug/kg

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications
	1254-1 = 59267 / 1689.4	= 35.08	1254-1 =	35.08	
			2 =	48.41	
			3 =	32.74	
			4 =	48.53	
			5 =	51.62	
			Total	= 216.39	

Comments: _____

LDC Report# 36282A4a

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 24, 2016

Parameters: Metals

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C070

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-001	16C070-01	Soil	03/08/16
KCH067-002	16C070-02	Soil	03/08/16
KCH067-003	16C070-03	Soil	03/08/16
KCH067-004**	16C070-04**	Soil	03/08/16
KCH067-005	16C070-05	Soil	03/08/16
KCH067-006	16C070-06	Soil	03/08/16
KCH067-007	16C070-07	Soil	03/08/16
KCH067-008	16C070-08	Soil	03/08/16
KCH067-009	16C070-09	Soil	03/08/16
KCH067-010	16C070-10	Soil	03/08/16
KCH067-011	16C070-11	Soil	03/08/16
KCH067-012	16C070-12	Soil	03/08/16
KCH067-013	16C070-13	Soil	03/08/16
KCH067-014	16C070-14	Soil	03/08/16
KCH067-015	16C070-15	Soil	03/08/16
KCH067-016**	16C070-16**	Soil	03/08/16
KCH067-017	16C070-17	Soil	03/08/16
KCH067-018	16C070-18	Soil	03/08/16
KCH067-003MS	16C070-03MS	Soil	03/08/16
KCH067-003MSD	16C070-03MSD	Soil	03/08/16
KCH067-016MS	16C070-16MS	Soil	03/08/16
KCH067-016MSD	16C070-16MSD	Soil	03/08/16
KCH067-001DL	16C070-01DL	Soil	03/08/16
KCH067-002DL	16C070-02DL	Soil	03/08/16
KCH067-002RE	16C070-02RE	Soil	03/08/16
KCH067-003DL	16C070-03DL	Soil	03/08/16
KCH067-004RE**	16C070-04RE**	Soil	03/08/16

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-009RE	16C070-09RE	Soil	03/08/16
KCH067-010RE	16C070-10RE	Soil	03/08/16
KCH067-011DL	16C070-11DL	Soil	03/08/16
KCH067-016RE**	16C070-16RE**	Soil	03/08/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc by Environmental Protection Agency (EPA) SW 846 Method 6020A
Mercury by EPA SW 846 Method 7471A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits with the following exceptions:

Date	Lab. Reference/ID	Analyte	%R (Limits)	Associated Samples	Flag	A or P
03/29/16	CCV (14:19)	Boron	182 (80-120)	KCH067-002RE KCH067-003DL KCH067-004RE** KCH067-009RE KCH067-011DL	J+ (all detects)	P
03/29/16	CCV (15:11)	Boron	187 (80-120)	KCH067-002RE KCH067-003DL KCH067-004RE** KCH067-009RE KCH067-011DL KCH067-016RE**	J+ (all detects)	P
03/29/16	CCV (16:00)	Boron	184 (80-120)	KCH067-016RE**	J+ (all detects)	P

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Laboratory Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Selenium	0.100 ug/L	KCH067-001 KCH067-002 KCH067-003 KCH067-004** KCH067-005 KCH067-006 KCH067-007 KCH067-008 KCH067-009 KCH067-010 KCH067-011
ICB/CCB	Molybdenum	0.238 ug/L	KCH067-002RE KCH067-003DL KCH067-004RE** KCH067-009RE KCH067-011DL
ICB/CCB	Molybdenum	0.223 ug/L	KCH067-016RE**
ICB/CCB	Antimony	0.294	KCH067-002RE KCH067-003DL KCH067-004RE** KCH067-009RE KCH067-011DL KCH067-016RE**

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
KCH067-001	Selenium	0.130 mg/Kg	0.130U mg/Kg
KCH067-003	Selenium	0.176 mg/Kg	0.176U mg/Kg
KCH067-005	Selenium	0.0595 mg/Kg	0.0993U mg/Kg
KCH067-003DL	Molybdenum	2.92 mg/Kg	2.92U mg/Kg
KCH067-016RE**	Molybdenum	0.244 mg/Kg	0.244U mg/Kg
KCH067-003DL	Antimony	1.15 mg/Kg	2.10U mg/Kg
KCH067-004RE**	Antimony	0.350 mg/Kg	0.350U mg/Kg
KCH067-016RE**	Antimony	0.110 mg/Kg	0.198U mg/Kg

VI. Field Blanks

Sample KCH067-019 (from SDG 16C074) was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
KCH067-019	03/08/16	Boron Calcium Iron Lead Manganese Nickel Sodium	4.65 ug/L 135 ug/L 9.85 ug/L 0.225 ug/L 0.318 ug/L 0.161 ug/L 42.6 ug/L	All samples in SDG 16C070

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated field blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
KCH067-005	Boron	6.80 mg/Kg	6.80U mg/Kg
KCH067-006	Boron	4.94 mg/Kg	5.01U mg/Kg
KCH067-007	Boron	4.62 mg/Kg	4.90U mg/Kg
KCH067-008	Boron	4.50 mg/Kg	4.97U mg/Kg
KCH067-010	Boron	9.71 mg/Kg	9.71U mg/Kg
KCH067-013	Boron	8.91 mg/Kg	8.91U mg/Kg
KCH067-014	Boron	9.15 mg/Kg	9.15U mg/Kg
KCH067-016**	Boron	7.59 mg/Kg	7.59U mg/Kg
KCH067-018	Boron	9.82 mg/Kg	9.82U mg/Kg
KCH067-002DL	Boron	53.3 mg/Kg	53.3U mg/Kg
KCH067-010RE	Boron	9.62 mg/Kg	9.62U mg/Kg
KCH067-016RE**	Boron	7.20 mg/Kg	7.20U mg/Kg

VII. Matrix Spike/Matrix Spike Duplicates

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

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
KCH067-003MS/MSD (KCH067-003 KCH067-003DL)	Antimony	40 (72-124)	38 (72-124)	J- (all detects)	A
	Chromium	46 (83-119)	50 (83-119)	J- (all detects)	
	Copper	68 (84-119)	67 (84-119)	J- (all detects)	
	Lead	-48 (84-118)	-56 (84-118)	J- (all detects)	
	Sodium	75 (79-125)	71 (79-125)	J- (all detects)	
KCH067-016MS/MSD (KCH067-016** KCH067-016RE**)	Antimony	61 (72-124)	60 (72-124)	J- (all detects)	A
	Calcium	85 (86-118)	-	J- (all detects)	
	Chromium	83 (83-119)	-	J- (all detects)	
	Copper	80 (84-119)	78 (84-119)	J- (all detects)	
	Magnesium	56 (80-123)	67 (80-123)	J- (all detects)	
	Potassium	74 (85-119)	84 (85-119)	J- (all detects)	
	Vanadium	36 (82-116)	41 (82-116)	J- (all detects)	

For KCH067-003MS/MSD, no data were qualified for Aluminum, Boron, Calcium, Iron, Magnesium, Manganese, and Zinc percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

For KCH067-016MS/MSD, no data were qualified for Barium, Iron, and Manganese percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

Relative percent differences (RPD) were within QC limits.

VIII. Duplicate Sample Analysis

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

IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met.

X. Laboratory Control Samples

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

XI. Field Duplicates

No field duplicates were identified in this SDG.

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Level IV validation with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
KCH067-001 KCH067-003 KCH067-009 KCH067-016**	Boron	Sample result exceeded linear range.	Reported result should be within linear range.	J (all detects) J (all detects) J (all detects) J (all detects)	A
KCH067-002	Boron Calcium Iron Sodium	Sample result exceeded linear range.	Reported result should be within linear range.	J (all detects) J (all detects) J (all detects) J (all detects)	A
KCH067-002RE	Iron	Sample result exceeded linear range.	Reported result should be within linear range.	J (all detects)	A
KCH067-010	Calcium Iron Sodium	Sample result exceeded linear range.	Reported result should be within linear range.	J (all detects) J (all detects) J (all detects)	A
KCH067-011	Boron Zinc	Sample result exceeded linear range.	Reported result should be within linear range.	J (all detects) J (all detects)	A

Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Analyte	Flag	A or P
KCH067-001 KCH067-003 KCH067-009 KCH067-016**	Boron	R	A
KCH067-002	Boron Calcium Iron Sodium	R R R R	A
KCH067-010	Calcium Iron Sodium	R R R	A
KCH067-011	Boron Zinc	R R	A
KCH067-011DL	All analytes except Boron Zinc	R R	A
KCH067-001DL KCH067-003DL KCH067-004RE** KCH067-009RE KCH067-016RE**	All analytes except Boron	R	A
KCH067-002DL	All analytes except Iron	R	A
KCH067-002RE	All analytes except Boron Calcium Sodium	R	A
KCH067-010RE	All analytes except Calcium Iron Sodium	R	A

Due to calibration and MS/MSD %R, data were qualified as estimated in eight samples.

Due to laboratory blank contamination, data were qualified as not detected in three samples.

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

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

China Lake CTO 067
Metals - Data Qualification Summary - SDG 16C070

Sample	Analyte	Flag	A or P	Reason (Code)
KCH067-002RE KCH067-003DL KCH067-004RE** KCH067-009RE KCH067-011DL KCH067-016RE**	Boron	J+ (all detects)	P	Calibration (CCV) (%R) (5)
KCH067-003	Antimony Chromium Copper Lead Sodium	J- (all detects) J- (all detects) J- (all detects) J- (all detects) J- (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (8)
KCH067-016**	Antimony Calcium Chromium Copper Magnesium Potassium Vanadium	J- (all detects) J- (all detects) J- (all detects) J- (all detects) J- (all detects) J- (all detects) J- (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (8)
KCH067-001 KCH067-003 KCH067-009 KCH067-016**	Boron	R	A	Overall assessment of data (22)
KCH067-002	Boron Calcium Iron Sodium	R R R R	A	Overall assessment of data (22)
KCH067-010	Calcium Iron Sodium	R R R	A	Overall assessment of data (22)
KCH067-011	Boron Zinc	R R	A	Overall assessment of data (22)
KCH067-011DL	All analytes except Boron Zinc	R R	A	Overall assessment of data (22)
KCH067-001DL KCH067-003DL KCH067-004RE** KCH067-009RE KCH067-016RE**	All analytes except Boron	R	A	Overall assessment of data (22)
KCH067-002DL	All analytes except Iron	R	A	Overall assessment of data (22)

Sample	Analyte	Flag	A or P	Reason (Code)
KCH067-002RE	All analytes except Boron Calcium Sodium	R	A	Overall assessment of data (22)
KCH067-010RE	All analytes except Calcium Iron Sodium	R	A	Overall assessment of data (22)

China Lake CTO 067
Metals - Laboratory Blank Data Qualification Summary - SDG 16C070

Sample	Analyte	Modified Final Concentration	A or P	Code
KCH067-001	Selenium	0.130U mg/Kg	A	7
KCH067-003	Selenium	0.176U mg/Kg	A	7
KCH067-005	Selenium	0.0993U mg/Kg	A	7

China Lake CTO 067
Metals - Field Blank Data Qualification Summary - SDG 16C070

Sample	Analyte	Modified Final Concentration	A or P	Code
KCH067-005	Boron	6.80U mg/Kg	A	6
KCH067-006	Boron	5.01U mg/Kg	A	6
KCH067-007	Boron	4.90U mg/Kg	A	6
KCH067-008	Boron	4.97U mg/Kg	A	6
KCH067-010	Boron	9.71U mg/Kg	A	6
KCH067-013	Boron	8.91U mg/Kg	A	6
KCH067-014	Boron	9.15U mg/Kg	A	6
KCH067-018	Boron	9.82U mg/Kg	A	6
KCH067-016RE**	Boron	7.20U mg/Kg	A	6

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-001	Date Analyzed:	03/28/16 15:13
Lab Samp ID:	C070-01	Dilution Factor:	0.98
Lab File ID:	98C11043	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	4.3
Calib. Ref.:	98C11038	Instrument ID :	T-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	8910	102	10.2	20.5
Antimony	0.423J	0.512	0.102	0.205
Arsenic	4.48	0.512	0.0512	0.102
Barium	59.8	0.512	0.0737	0.102
Beryllium	0.315J	0.512	0.0512	0.102
Boron	197E R22	10.2	2.56	5.12
Cadmium	2.28	0.512	0.0584	0.102
Calcium	5050	102	17.4	20.5
Chromium	10.5	0.512	0.0512	0.102
Cobalt	6.08	0.512	0.0512	0.102
Copper	23.9	0.512	0.102	0.205
Iron	14100	102	5.12	10.2
Lead	21.7	0.512	0.0512	0.102
Magnesium	5670	102	10.2	20.5
Manganese	202	0.512	0.157	0.205
Molybdenum	2.24	0.512	0.102	0.205
Nickel	6.34	0.512	0.0645	0.102
Potassium	4280	102	10.2	20.5
Selenium	0.130J U (T)	0.512	0.0512	0.102
Silver	0.0842J	0.512	0.0512	0.102
Sodium	4220	102	10.2	20.5
Thallium	0.117J	0.512	0.0512	0.102
Vanadium	31.6	0.512	0.195	0.256
Zinc	57.5	2.05	0.699	1.02

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-001DL	Date Analyzed:	03/28/16 17:58
Lab Samp ID:	C070-011	Dilution Factor:	9.8
Lab File ID:	98C11080	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	4.3
Calib. Ref.:	98C11074	Instrument ID :	T-I98

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	9280 R22	1020	102	205
Antimony	ND	5.12	1.02	2.05
Arsenic	4.69J	5.12	0.512	1.02
Barium	59.6	5.12	0.737	1.02
Beryllium	ND	5.12	0.512	1.02
Boron	178	102	25.6	51.2
Cadmium	2.32J R22	5.12	0.584	1.02
Calcium	5530	1020	174	205
Chromium	11.2	5.12	0.512	1.02
Cobalt	6.64	5.12	0.512	1.02
Copper	26.8	5.12	1.02	2.05
Iron	15200	1020	51.2	102
Lead	23.1	5.12	0.512	1.02
Magnesium	5880	1020	102	205
Manganese	225	5.12	1.57	2.05
Molybdenum	2.20J	5.12	1.02	2.05
Nickel	6.90	5.12	0.645	1.02
Potassium	4590	1020	102	205
Selenium	ND	5.12	0.512	1.02
Silver	ND	5.12	0.512	1.02
Sodium	4550	1020	102	205
Thallium	ND	5.12	0.512	1.02
Vanadium	32.7	5.12	1.95	2.56
Zinc	63.4	20.5	6.99	10.2

5/17/16

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-002	Date Analyzed:	03/28/16 15:17
Lab Samp ID:	C070-02	Dilution Factor:	0.976
Lab File ID:	98C11044	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	9.0
Calib. Ref.:	98C11038	Instrument ID :	T-I98

PARAMETERS	RESULTS (mg/kg)		LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	15200		107	10.7	21.5
Antimony	0.440J		0.536	0.107	0.215
Arsenic	10.2		0.536	0.0536	0.107
Barium	114		0.536	0.0772	0.107
Beryllium	0.535J		0.536	0.0536	0.107
Boron	53.5E	R22	10.7	2.68	5.36
Cadmium	0.574		0.536	0.0611	0.107
Calcium	16000E	R22	107	18.2	21.5
Chromium	14.3		0.536	0.0536	0.107
Cobalt	11.5		0.536	0.0536	0.107
Copper	38.5		0.536	0.107	0.215
Iron	27100E	R22	107	5.36	10.7
Lead	6.27		0.536	0.0536	0.107
Magnesium	9770		107	10.7	21.5
Manganese	342		0.536	0.164	0.215
Molybdenum	0.805		0.536	0.107	0.215
Nickel	11.0		0.536	0.0676	0.107
Potassium	5390		107	10.7	21.5
Selenium	ND		0.536	0.0536	0.107
Silver	0.0604J		0.536	0.0536	0.107
Sodium	3140E	R22	107	10.7	21.5
Thallium	0.222J		0.536	0.0536	0.107
Vanadium	67.4		0.536	0.204	0.268
Zinc	51.5		2.15	0.733	1.07

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-002RE	Date Analyzed:	03/29/16 14:27
Lab Samp ID:	C070-02N	Dilution Factor:	0.976
Lab File ID:	98C12018	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	9.0
Calib. Ref.:	98C12016	Instrument ID :	T-I98

PARAMETERS	RESULTS (mg/kg)		LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	15100	R22	107	10.7	21.5
Antimony	0.452J		0.536	0.107	0.215
Arsenic	10.3		0.536	0.0536	0.107
Barium	110		0.536	0.0772	0.107
Beryllium	0.545		0.536	0.0536	0.107
Boron	51.5	J+	10.7 (LS)	2.68	5.36
Cadmium	0.524J	R22	0.536	0.0611	0.107
Calcium	16300		107	18.2	21.5
Chromium	14.6	R22	0.536	0.0536	0.107
Cobalt	11.5		0.536	0.0536	0.107
Copper	40.7		0.536	0.107	0.215
Iron	26100E		107	5.36	10.7
Lead	6.38		0.536	0.0536	0.107
Magnesium	10300		107	10.7	21.5
Manganese	337		0.536	0.164	0.215
Molybdenum	0.854		0.536	0.107	0.215
Nickel	10.9		0.536	0.0676	0.107
Potassium	5330		107	10.7	21.5
Selenium	ND		0.536	0.0536	0.107
Silver	0.0623J		0.536	0.0536	0.107
Sodium	3290		107	10.7	21.5
Thallium	0.241J	R22	0.536	0.0536	0.107
Vanadium	69.1		0.536	0.204	0.268
Zinc	53.6		2.15	0.733	1.07

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METHOD SW6020A
METALS BY ICP-MS

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
SDG NO. : 16C070	Date Extracted: 03/17/16 15:19
Sample ID: KCH067-002DL	Date Analyzed: 03/28/16 18:03
Lab Samp ID: C070-02I	Dilution Factor: 4.88
Lab File ID: 98C11081	Matrix : SOIL
Ext Btch ID: IMC031S	% Moisture : 9.0
Calib. Ref.: 98C11074	Instrument ID : T-I98

PARAMETERS	RESULTS (mg/kg)		LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	16500	R2	536	53.6	107
Antimony	ND		2.68	0.536	1.07
Arsenic	10.3		2.68	0.268	0.536
Barium	117		2.68	0.386	0.536
Beryllium	0.553J		2.68	0.268	0.536
Boron	53.3J		53.6	13.4	26.8
Cadmium	0.502J		2.68	0.306	0.536
Calcium	17400		536	91.2	107
Chromium	15.1		2.68	0.268	0.536
Cobalt	12.5		2.68	0.268	0.536
Copper	43.8		2.68	0.536	1.07
Iron	29400		536	26.8	53.6
Lead	6.45	R2	2.68	0.268	0.536
Magnesium	10700		536	53.6	107
Manganese	373		2.68	0.820	1.07
Molybdenum	0.817J		2.68	0.536	1.07
Nickel	11.8		2.68	0.338	0.536
Potassium	5910		536	53.6	107
Selenium	ND		2.68	0.268	0.536
Silver	ND		2.68	0.268	0.536
Sodium	3380		536	53.6	107
Thallium	ND		2.68	0.268	0.536
Vanadium	69.2		2.68	1.02	1.34
Zinc	55.2		10.7	3.66	5.36

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METHOD SW6020A
METALS BY ICP-MS

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
SDG NO. : 16C070	Date Extracted: 03/17/16 15:19
Sample ID: KCH067-003	Date Analyzed: 03/28/16 15:35
Lab Samp ID: C070-03	Dilution Factor: 0.976
Lab File ID: 98C11048	Matrix : SOIL
Ext Btch ID: IMC031S	% Moisture : 6.9
Calib. Ref.: 98C11038	Instrument ID : T-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	11800	105	10.5	21.0
Antimony	0.728 J-(8)	0.524	0.105	0.210
Arsenic	6.99	0.524	0.0524	0.105
Barium	101	0.524	0.0755	0.105
Beryllium	0.418J	0.524	0.0524	0.105
Boron	180E R2	10.5	2.62	5.24
Cadmium	2.22	0.524	0.0598	0.105
Calcium	15600	105	17.8	21.0
Chromium	26.6 J-(8)	0.524	0.0524	0.105
Cobalt	8.28	0.524	0.0524	0.105
Copper	29.4 J-(8)	0.524	0.105	0.210
Iron	18300	105	5.24	10.5
Lead	64.1 J-(8)	0.524	0.0524	0.105
Magnesium	10100	105	10.5	21.0
Manganese	273	0.524	0.160	0.210
Molybdenum	2.72	0.524	0.105	0.210
Nickel	8.54	0.524	0.0660	0.105
Potassium	5190	105	10.5	21.0
Selenium	0.176J U (7)	0.524	0.0524	0.105
Silver	0.0775J	0.524	0.0524	0.105
Sodium	5550 J-(8)	105	10.5	21.0
Thallium	0.172J	0.524	0.0524	0.105
Vanadium	45.5	0.524	0.199	0.262
Zinc	188	2.10	0.716	1.05

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-003DL	Date Analyzed:	03/29/16 14:45
Lab Samp ID:	C070-031	Dilution Factor:	9.76
Lab File ID:	98C12022	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	6.9
Calib. Ref.:	98C12016	Instrument ID :	T-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	12600 R22	1050	105	210
Antimony	1.15J	5.24	1.05	2.10
Arsenic	6.86	5.24	0.524	1.05
Barium	98.4	5.24	0.755	1.05
Beryllium	ND	5.24	0.524	1.05
Boron	149 J+(S)	105	26.2	52.4
Cadmium	1.88J R22	5.24	0.598	1.05
Calcium	16900	1050	178	210
Chromium	28.0	5.24	0.524	1.05
Cobalt	9.28	5.24	0.524	1.05
Copper	34.5	5.24	1.05	2.10
Iron	18900	1050	52.4	105
Lead	71.3	5.24	0.524	1.05
Magnesium	11600	1050	105	210
Manganese	299	5.24	1.60	2.10
Molybdenum	2.92J	5.24	1.05	2.10
Nickel	9.05	5.24	0.660	1.05
Potassium	5600	1050	105	210
Selenium	ND	5.24	0.524	1.05
Silver	ND	5.24	0.524	1.05
Sodium	6250	1050	105	210
Thallium	ND	5.24	0.524	1.05
Vanadium	46.5	5.24	1.99	2.62
Zinc	204	21.0	7.16	10.5

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-004	Date Analyzed:	03/28/16 15:57
Lab Samp ID:	C070-04	Dilution Factor:	0.971
Lab File ID:	98C11053	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	4.9
Calib. Ref.:	98C11050	Instrument ID :	T-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	8900	102	10.2	20.4
Antimony	0.346J	0.511	0.102	0.204
Arsenic	6.46	0.511	0.0511	0.102
Barium	66.9	0.511	0.0735	0.102
Beryllium	0.293J	0.511	0.0511	0.102
Boron	35.0 R2	10.2	2.55	5.11
Cadmium	0.284J	0.511	0.0582	0.102
Calcium	7410	102	17.4	20.4
Chromium	10.9	0.511	0.0511	0.102
Cobalt	7.37	0.511	0.0511	0.102
Copper	19.7	0.511	0.102	0.204
Iron	18700	102	5.11	10.2
Lead	6.19	0.511	0.0511	0.102
Magnesium	5970	102	10.2	20.4
Manganese	193	0.511	0.156	0.204
Molybdenum	0.631	0.511	0.102	0.204
Nickel	6.95	0.511	0.0643	0.102
Potassium	3430	102	10.2	20.4
Selenium	ND	0.511	0.0511	0.102
Silver	ND	0.511	0.0511	0.102
Sodium	2080	102	10.2	20.4
Thallium	0.133J	0.511	0.0511	0.102
Vanadium	48.6	0.511	0.194	0.255
Zinc	34.1	2.04	0.697	1.02

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-004RE	Date Analyzed:	03/29/16 14:54
Lab Samp ID:	C070-04N	Dilution Factor:	0.971
Lab File ID:	98C12024	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	4.9
Calib. Ref.:	98C12016	Instrument ID :	T-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	8760 R22	102	10.2	20.4
Antimony	0.350J	0.511	0.102	0.204
Arsenic	6.61	0.511	0.0511	0.102
Barium	65.7	0.511	0.0735	0.102
Beryllium	0.299J	0.511	0.0511	0.102
Boron	33.5 J+(5)	10.2	2.55	5.11
Cadmium	0.274J R22	0.511	0.0582	0.102
Calcium	7590	102	17.4	20.4
Chromium	11.1	0.511	0.0511	0.102
Cobalt	7.29	0.511	0.0511	0.102
Copper	20.5	0.511	0.102	0.204
Iron	17500	102	5.11	10.2
Lead	6.25	0.511	0.0511	0.102
Magnesium	6230	102	10.2	20.4
Manganese	188	0.511	0.156	0.204
Molybdenum	0.630	0.511	0.102	0.204
Nickel	6.91	0.511	0.0643	0.102
Potassium	3380	102	10.2	20.4
Selenium	ND	0.511	0.0511	0.102
Silver	ND	0.511	0.0511	0.102
Sodium	2210	102	10.2	20.4
Thallium	0.136J	0.511	0.0511	0.102
Vanadium	49.2	0.511	0.194	0.255
Zinc	34.2	2.04	0.697	1.02

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7016

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-005	Date Analyzed:	03/28/16 16:01
Lab Samp ID:	C070-05	Dilution Factor:	0.966
Lab File ID:	98C11054	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	2.7
Calib. Ref.:	98C11050	Instrument ID :	T-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	7320	99.3	9.93	19.9
Antimony	0.116J	0.496	0.0993	0.199
Arsenic	2.64	0.496	0.0496	0.0993
Barium	68.4	0.496	0.0715	0.0993
Beryllium	0.323J	0.496	0.0496	0.0993
Boron	6.80J U(6)	9.93	2.48	4.96
Cadmium	0.139J	0.496	0.0566	0.0993
Calcium	4790	99.3	16.9	19.9
Chromium	6.91	0.496	0.0496	0.0993
Cobalt	4.41	0.496	0.0496	0.0993
Copper	13.4	0.496	0.0993	0.199
Iron	14000	99.3	4.96	9.93
Lead	3.28	0.496	0.0496	0.0993
Magnesium	2860	99.3	9.93	19.9
Manganese	161	0.496	0.152	0.199
Molybdenum	0.168J	0.496	0.0993	0.199
Nickel	4.47	0.496	0.0625	0.0993
Potassium	2240	99.3	9.93	19.9
Selenium	0.0595J 0.0993	0.496 (T)	0.0496	0.0993
Silver	0.0514J	0.496	0.0496	0.0993
Sodium	221	99.3	9.93	19.9
Thallium	0.0880J	0.496	0.0496	0.0993
Vanadium	32.9	0.496	0.189	0.248
Zinc	20.9	1.99	0.678	0.993

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-006	Date Analyzed:	03/28/16 16:06
Lab Samp ID:	C070-06	Dilution Factor:	0.98
Lab File ID:	98C11055	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	2.2
Calib. Ref.:	98C11050	Instrument ID :	T-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	6770	100	10.0	20.0
Antimony	0.116J	0.501	0.100	0.200
Arsenic	2.74	0.501	0.0501	0.100
Barium	73.1	0.501	0.0721	0.100
Beryllium	0.236J	0.501	0.0501	0.100
Boron	4.94J 5.1U	10.0 (16)	2.51	5.01
Cadmium	0.115J	0.501	0.0571	0.100
Calcium	6160	100	17.0	20.0
Chromium	7.83	0.501	0.0501	0.100
Cobalt	5.25	0.501	0.0501	0.100
Copper	13.4	0.501	0.100	0.200
Iron	15200	100	5.01	10.0
Lead	2.78	0.501	0.0501	0.100
Magnesium	2900	100	10.0	20.0
Manganese	220	0.501	0.153	0.200
Molybdenum	0.198J	0.501	0.100	0.200
Nickel	4.57	0.501	0.0631	0.100
Potassium	2280	100	10.0	20.0
Selenium	ND	0.501	0.0501	0.100
Silver	ND	0.501	0.0501	0.100
Sodium	199	100	10.0	20.0
Thallium	0.0811J	0.501	0.0501	0.100
Vanadium	37.6	0.501	0.190	0.251
Zinc	20.7	2.00	0.684	1.00

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METHOD SW6020A
METALS BY ICP-MS

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
SDG NO. : 16C070	Date Extracted: 03/17/16 15:19
Sample ID: KCH067-007	Date Analyzed: 03/28/16 16:10
Lab Samp ID: C070-07	Dilution Factor: 0.962
Lab File ID: 98C11056	Matrix : SOIL
Ext Btch ID: IMC031S	% Moisture : 1.9
Calib. Ref.: 98C11050	Instrument ID : T-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	4640	98.1	9.81	19.6
Antimony	ND	0.490	0.0981	0.196
Arsenic	1.77	0.490	0.0490	0.0981
Barium	66.6	0.490	0.0706	0.0981
Beryllium	0.169J	0.490	0.0490	0.0981
Boron	4.62J 4.90U	9.81 (6)	2.45	4.90
Cadmium	0.0987J	0.490	0.0559	0.0981
Calcium	3570	98.1	16.7	19.6
Chromium	4.75	0.490	0.0490	0.0981
Cobalt	3.12	0.490	0.0490	0.0981
Copper	8.52	0.490	0.0981	0.196
Iron	10600	98.1	4.90	9.81
Lead	2.06	0.490	0.0490	0.0981
Magnesium	2240	98.1	9.81	19.6
Manganese	118	0.490	0.150	0.196
Molybdenum	0.142J	0.490	0.0981	0.196
Nickel	2.84	0.490	0.0618	0.0981
Potassium	1700	98.1	9.81	19.6
Selenium	ND	0.490	0.0490	0.0981
Silver	ND	0.490	0.0490	0.0981
Sodium	115	98.1	9.81	19.6
Thallium	0.0589J	0.490	0.0490	0.0981
Vanadium	23.6	0.490	0.186	0.245
Zinc	15.7	1.96	0.670	0.981

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-008	Date Analyzed:	03/28/16 16:15
Lab Samp ID:	C070-08	Dilution Factor:	0.98
Lab File ID:	98C11057	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	1.5
Calib. Ref.:	98C11050	Instrument ID :	T-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	3920	99.5	9.95	19.9
Antimony	ND	0.497	0.0995	0.199
Arsenic	1.83	0.497	0.0497	0.0995
Barium	41.8	0.497	0.0716	0.0995
Beryllium	0.162J	0.497	0.0497	0.0995
Boron	4.50J 4.9TU	9.95 (6)	2.49	4.97
Cadmium	0.0907J	0.497	0.0567	0.0995
Calcium	2470	99.5	16.9	19.9
Chromium	5.20	0.497	0.0497	0.0995
Cobalt	2.63	0.497	0.0497	0.0995
Copper	6.78	0.497	0.0995	0.199
Iron	10800	99.5	4.97	9.95
Lead	1.99	0.497	0.0497	0.0995
Magnesium	1730	99.5	9.95	19.9
Manganese	85.7	0.497	0.152	0.199
Molybdenum	0.146J	0.497	0.0995	0.199
Nickel	2.60	0.497	0.0627	0.0995
Potassium	1290	99.5	9.95	19.9
Selenium	ND	0.497	0.0497	0.0995
Silver	ND	0.497	0.0497	0.0995
Sodium	281	99.5	9.95	19.9
Thallium	ND	0.497	0.0497	0.0995
Vanadium	25.2	0.497	0.189	0.249
Zinc	11.6	1.99	0.680	0.995

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-009	Date Analyzed:	03/28/16 16:19
Lab Samp ID:	C070-09	Dilution Factor:	0.985
Lab File ID:	98C11058	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	2.9
Calib. Ref.:	98C11050	Instrument ID :	T-198

PARAMETERS	RESULTS (mg/kg)		LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	8380		101	10.1	20.3
Antimony	1.70		0.507	0.101	0.203
Arsenic	2.98		0.507	0.0507	0.101
Barium	90.0		0.507	0.0730	0.101
Beryllium	0.267J		0.507	0.0507	0.101
Boron	31.5E	R22	10.1	2.54	5.07
Cadmium	4.68		0.507	0.0578	0.101
Calcium	3860		101	17.2	20.3
Chromium	19.9		0.507	0.0507	0.101
Cobalt	5.83		0.507	0.0507	0.101
Copper	60.4		0.507	0.101	0.203
Iron	19500		101	5.07	10.1
Lead	64.5		0.507	0.0507	0.101
Magnesium	3110		101	10.1	20.3
Manganese	237		0.507	0.155	0.203
Molybdenum	1.64		0.507	0.101	0.203
Nickel	18.2		0.507	0.0639	0.101
Potassium	2380		101	10.1	20.3
Selenium	ND		0.507	0.0507	0.101
Silver	2.39		0.507	0.0507	0.101
Sodium	187		101	10.1	20.3
Thallium	0.0875J		0.507	0.0507	0.101
Vanadium	34.6		0.507	0.193	0.254
Zinc	242		2.03	0.693	1.01

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-009RE	Date Analyzed:	03/29/16 14:58
Lab Samp ID:	C070-09N	Dilution Factor:	0.985
Lab File ID:	98C12025	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	2.9
Calib. Ref.:	98C12016	Instrument ID :	T-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	8400 R22	101	10.1	20.3
Antimony	1.67	0.507	0.101	0.203
Arsenic	2.99	0.507	0.0507	0.101
Barium	85.0	0.507	0.0730	0.101
Beryllium	0.256J	0.507	0.0507	0.101
Boron	30.3 J+(S)	10.1	2.54	5.07
Cadmium	4.35 R22	0.507	0.0578	0.101
Calcium	3920	101	17.2	20.3
Chromium	19.8	0.507	0.0507	0.101
Cobalt	5.94	0.507	0.0507	0.101
Copper	61.4	0.507	0.101	0.203
Iron	18600	101	5.07	10.1
Lead	64.8	0.507	0.0507	0.101
Magnesium	3290	101	10.1	20.3
Manganese	235	0.507	0.155	0.203
Molybdenum	1.66	0.507	0.101	0.203
Nickel	18.6	0.507	0.0639	0.101
Potassium	2370	101	10.1	20.3
Selenium	ND	0.507	0.0507	0.101
Silver	2.41	0.507	0.0507	0.101
Sodium	204	101	10.1	20.3
Thallium	0.0880J	0.507	0.0507	0.101
Vanadium	34.6	0.507	0.193	0.254
Zinc	248	2.03	0.693	1.01

4/17/16 ✓

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-010	Date Analyzed:	03/28/16 16:25
Lab Samp ID:	C070-10	Dilution Factor:	0.98
Lab File ID:	98C11059	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	3.8
Calib. Ref.:	98C11050	Instrument ID :	T-I98

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	7500	102	10.2	20.4
Antimony	0.178J	0.509	0.102	0.204
Arsenic	1.72	0.509	0.0509	0.102
Barium	105	0.509	0.0733	0.102
Beryllium	0.250J	0.509	0.0509	0.102
Boron	9.71J U(16)	10.2	2.55	5.09
Cadmium	0.284J	0.509	0.0581	0.102
Calcium	3020E R2	102	17.3	20.4
Chromium	8.10	0.509	0.0509	0.102
Cobalt	6.07	0.509	0.0509	0.102
Copper	17.5	0.509	0.102	0.204
Iron	15800E R2	102	5.09	10.2
Lead	4.12	0.509	0.0509	0.102
Magnesium	3730	102	10.2	20.4
Manganese	251	0.509	0.156	0.204
Molybdenum	0.323J	0.509	0.102	0.204
Nickel	5.31	0.509	0.0642	0.102
Potassium	2790	102	10.2	20.4
Selenium	ND	0.509	0.0509	0.102
Silver	0.0746J	0.509	0.0509	0.102
Sodium	200E R2	102	10.2	20.4
Thallium	0.0999J	0.509	0.0509	0.102
Vanadium	36.7	0.509	0.194	0.255
Zinc	35.2	2.04	0.696	1.02

4/17/16 [illegible]

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-010RE	Date Analyzed:	03/28/16 18:11
Lab Samp ID:	C070-10N	Dilution Factor:	0.98
Lab File ID:	98C11083	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	3.8
Calib. Ref.:	98C11074	Instrument ID :	T-I98

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	7510	102	10.2	20.4
Antimony	0.178J	0.509	0.102	0.204
Arsenic	1.73	0.509	0.0509	0.102
Barium	107	0.509	0.0733	0.102
Beryllium	0.240J	0.509	0.0509	0.102
Boron	9.62J	10.2	2.55	5.09
Cadmium	0.307J	0.509	0.0581	0.102
Calcium	2990	102	17.3	20.4
Chromium	8.15	0.509	0.0509	0.102
Cobalt	6.07	0.509	0.0509	0.102
Copper	17.6	0.509	0.102	0.204
Iron	16200	102	5.09	10.2
Lead	4.12	0.509	0.0509	0.102
Magnesium	3670	102	10.2	20.4
Manganese	254	0.509	0.156	0.204
Molybdenum	0.327J	0.509	0.102	0.204
Nickel	5.33	0.509	0.0642	0.102
Potassium	2790	102	10.2	20.4
Selenium	ND	0.509	0.0509	0.102
Silver	0.0746J	0.509	0.0509	0.102
Sodium	197	102	10.2	20.4
Thallium	0.0981J	0.509	0.0509	0.102
Vanadium	36.6	0.509	0.194	0.255
Zinc	34.6	2.04	0.696	1.02

4/7/16 [illegible]

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-011	Date Analyzed:	03/28/16 16:29
Lab Samp ID:	C070-11	Dilution Factor:	0.976
Lab File ID:	98C11060	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	3.1
Calib. Ref.:	98C11050	Instrument ID :	T-I98

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	9370	101	10.1	20.1
Antimony	2.56	0.504	0.101	0.201
Arsenic	2.72	0.504	0.0504	0.101
Barium	83.2	0.504	0.0725	0.101
Beryllium	0.273J	0.504	0.0504	0.101
Boron	46.4E R2	10.1	2.52	5.04
Cadmium	9.34	0.504	0.0574	0.101
Calcium	3830	101	17.1	20.1
Chromium	22.5	0.504	0.0504	0.101
Cobalt	5.71	0.504	0.0504	0.101
Copper	99.7	0.504	0.101	0.201
Iron	22100	101	5.04	10.1
Lead	140	0.504	0.0504	0.101
Magnesium	2750	101	10.1	20.1
Manganese	245	0.504	0.154	0.201
Molybdenum	2.12	0.504	0.101	0.201
Nickel	22.5	0.504	0.0635	0.101
Potassium	2220	101	10.1	20.1
Selenium	ND	0.504	0.0504	0.101
Silver	4.05	0.504	0.0504	0.101
Sodium	283	101	10.1	20.1
Thallium	0.0779J	0.504	0.0504	0.101
Vanadium	35.8	0.504	0.191	0.252
Zinc	413E R2	2.01	0.688	1.01

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METHOD SW6020A
METALS BY ICP-MS

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
SDG NO. : 16C070	Date Extracted: 03/17/16 15:19
Sample ID: KCH067-011DL	Date Analyzed: 03/29/16 15:03
Lab Samp ID: C070-11I	Dilution Factor: 1.95
Lab File ID: 98C12026	Matrix : SOIL
Ext Btch ID: IMC031S	% Moisture : 3.1
Calib. Ref.: 98C12016	Instrument ID : T-I98

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	9390	201	20.1	40.2
Antimony	2.63	1.01	0.201	0.402
Arsenic	2.84	1.01	0.101	0.201
Barium	83.1	1.01	0.145	0.201
Beryllium	0.292J	1.01	0.101	0.201
Boron	47.2	20.1	5.03	10.1
Cadmium	8.61	1.01	0.115	0.201
Calcium	3940	201	34.2	40.2
Chromium	23.4	1.01	0.101	0.201
Cobalt	6.02	1.01	0.101	0.201
Copper	106	1.01	0.201	0.402
Iron	21200	201	10.1	20.1
Lead	143	1.01	0.101	0.201
Magnesium	2940	201	20.1	40.2
Manganese	248	1.01	0.308	0.402
Molybdenum	2.09	1.01	0.201	0.402
Nickel	22.9	1.01	0.127	0.201
Potassium	2250	201	20.1	40.2
Selenium	ND	1.01	0.101	0.201
Silver	4.18	1.01	0.101	0.201
Sodium	310	201	20.1	40.2
Thallium	ND	1.01	0.101	0.201
Vanadium	36.6	1.01	0.382	0.503
Zinc	434	4.02	1.37	2.01

R22 J+(5) R22

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METHOD SW6020A
METALS BY ICP-MS

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
SDG NO. : 16C070	Date Extracted: 03/17/16 15:19
Sample ID: KCH067-012	Date Analyzed: 03/28/16 16:47
Lab Samp ID: C070-12	Dilution Factor: 0.976
Lab File ID: 98C11064	Matrix : SOIL
Ext Btch ID: IMC031S	% Moisture : 3.5
Calib. Ref.: 98C11062	Instrument ID : T-I98

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	6440	101	10.1	20.2
Antimony	0.183J	0.506	0.101	0.202
Arsenic	2.43	0.506	0.0506	0.101
Barium	73.7	0.506	0.0728	0.101
Beryllium	0.253J	0.506	0.0506	0.101
Boron	14.4	10.1	2.53	5.06
Cadmium	0.190J	0.506	0.0576	0.101
Calcium	4550	101	17.2	20.2
Chromium	6.27	0.506	0.0506	0.101
Cobalt	4.19	0.506	0.0506	0.101
Copper	11.7	0.506	0.101	0.202
Iron	12100	101	5.06	10.1
Lead	5.93	0.506	0.0506	0.101
Magnesium	2590	101	10.1	20.2
Manganese	161	0.506	0.155	0.202
Molybdenum	0.235J	0.506	0.101	0.202
Nickel	3.71	0.506	0.0637	0.101
Potassium	1980	101	10.1	20.2
Selenium	ND	0.506	0.0506	0.101
Silver	ND	0.506	0.0506	0.101
Sodium	389	101	10.1	20.2
Thallium	0.0855J	0.506	0.0506	0.101
Vanadium	28.1	0.506	0.192	0.253
Zinc	37.9	2.02	0.691	1.01

METHOD SW6020A
METALS BY ICP-MS

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
SDG NO. : 16C070	Date Extracted: 03/17/16 15:19
Sample ID: KCH067-013	Date Analyzed: 03/28/16 16:52
Lab Samp ID: C070-13	Dilution Factor: 0.966
Lab File ID: 98C11065	Matrix : SOIL
Ext Btch ID: IMC031S	% Moisture : 5.0
Calib. Ref.: 98C11062	Instrument ID : T-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	8330	102	10.2	20.3
Antimony	0.130J	0.508	0.102	0.203
Arsenic	2.17	0.508	0.0508	0.102
Barium	145	0.508	0.0732	0.102
Beryllium	0.261J	0.508	0.0508	0.102
Boron	8.91J ~~B~~ U	10.2 (6)	2.54	5.08
Cadmium	0.110J	0.508	0.0580	0.102
Calcium	5060	102	17.3	20.3
Chromium	9.72	0.508	0.0508	0.102
Cobalt	7.44	0.508	0.0508	0.102
Copper	21.6	0.508	0.102	0.203
Iron	17900	102	5.08	10.2
Lead	3.22	0.508	0.0508	0.102
Magnesium	4360	102	10.2	20.3
Manganese	249	0.508	0.156	0.203
Molybdenum	0.280J	0.508	0.102	0.203
Nickel	5.84	0.508	0.0641	0.102
Potassium	3270	102	10.2	20.3
Selenium	0.0983J	0.508	0.0508	0.102
Silver	ND	0.508	0.0508	0.102
Sodium	471	102	10.2	20.3
Thallium	0.118J	0.508	0.0508	0.102
Vanadium	41.3	0.508	0.193	0.254
Zinc	30.6	2.03	0.695	1.02

4/05/16

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-014	Date Analyzed:	03/28/16 16:56
Lab Samp ID:	C070-14	Dilution Factor:	0.966
Lab File ID:	98C11066	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	3.9
Calib. Ref.:	98C11062	Instrument ID :	T-I98

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	7700	101	10.1	20.1
Antimony	0.133J	0.503	0.101	0.201
Arsenic	2.21	0.503	0.0503	0.101
Barium	174	0.503	0.0724	0.101
Beryllium	0.245J	0.503	0.0503	0.101
Boron	9.15J	10.1 (6)	2.51	5.03
Cadmium	0.123J	0.503	0.0573	0.101
Calcium	3510	101	17.1	20.1
Chromium	9.22	0.503	0.0503	0.101
Cobalt	5.79	0.503	0.0503	0.101
Copper	16.2	0.503	0.101	0.201
Iron	16400	101	5.03	10.1
Lead	3.64	0.503	0.0503	0.101
Magnesium	3610	101	10.1	20.1
Manganese	242	0.503	0.154	0.201
Molybdenum	0.243J	0.503	0.101	0.201
Nickel	5.39	0.503	0.0633	0.101
Potassium	2830	101	10.1	20.1
Selenium	0.0511J	0.503	0.0503	0.101
Silver	ND	0.503	0.0503	0.101
Sodium	325	101	10.1	20.1
Thallium	0.106J	0.503	0.0503	0.101
Vanadium	39.3	0.503	0.191	0.251
Zinc	30.1	2.01	0.687	1.01

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-015	Date Analyzed:	03/28/16 17:01
Lab Samp ID:	C070-15	Dilution Factor:	0.976
Lab File ID:	98C11067	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	3.6
Calib. Ref.:	98C11062	Instrument ID :	T-I98

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	7330	101	10.1	20.2
Antimony	0.108J	0.506	0.101	0.202
Arsenic	2.73	0.506	0.0506	0.101
Barium	80.3	0.506	0.0729	0.101
Beryllium	0.293J	0.506	0.0506	0.101
Boron	14.4	10.1	2.53	5.06
Cadmium	0.131J	0.506	0.0577	0.101
Calcium	4890	101	17.2	20.2
Chromium	8.32	0.506	0.0506	0.101
Cobalt	4.72	0.506	0.0506	0.101
Copper	15.3	0.506	0.101	0.202
Iron	15400	101	5.06	10.1
Lead	2.94	0.506	0.0506	0.101
Magnesium	3110	101	10.1	20.2
Manganese	180	0.506	0.155	0.202
Molybdenum	0.337J	0.506	0.101	0.202
Nickel	5.32	0.506	0.0638	0.101
Potassium	2470	101	10.1	20.2
Selenium	0.0596J	0.506	0.0506	0.101
Silver	ND	0.506	0.0506	0.101
Sodium	491	101	10.1	20.2
Thallium	0.0930J	0.506	0.0506	0.101
Vanadium	33.2	0.506	0.192	0.253
Zinc	23.9	2.02	0.692	1.01

SG 5/7/16

METHOD SW6020A
METALS BY ICP-MS

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
SDG NO. : 16C070	Date Extracted: 03/17/16 15:19
Sample ID: KCH067-016	Date Analyzed: 03/28/16 17:18
Lab Samp ID: C070-16	Dilution Factor: 0.962
Lab File ID: 98C11071	Matrix : SOIL
Ext Btch ID: IMC031S	% Moisture : 2.8
Calib. Ref.: 98C11062	Instrument ID : T-I98

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	7220	99.0	9.90	19.8
Antimony	0.112J J-(8)	0.495	0.0990	0.198
Arsenic	2.48	0.495	0.0495	0.0990
Barium	111	0.495	0.0713	0.0990
Beryllium	0.224J	0.495	0.0495	0.0990
Boron	7.59EJ R-22	9.90	2.47	4.95
Cadmium	0.117J	0.495	0.0564	0.0990
Calcium	5050 J-(8)	99.0	16.8	19.8
Chromium	7.31 J-(8)	0.495	0.0495	0.0990
Cobalt	5.65	0.495	0.0495	0.0990
Copper	16.0 J-(8)	0.495	0.0990	0.198
Iron	15400	99.0	4.95	9.90
Lead	2.39	0.495	0.0495	0.0990
Magnesium	3820 J-(8)	99.0	9.90	19.8
Manganese	221	0.495	0.151	0.198
Molybdenum	0.247J	0.495	0.0990	0.198
Nickel	5.01	0.495	0.0624	0.0990
Potassium	2840 J-(8)	99.0	9.90	19.8
Selenium	ND	0.495	0.0495	0.0990
Silver	ND	0.495	0.0495	0.0990
Sodium	384	99.0	9.90	19.8
Thallium	0.100J	0.495	0.0495	0.0990
Vanadium	36.8 J-(8)	0.495	0.188	0.247
Zinc	23.7	1.98	0.676	0.990

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-016RE	Date Analyzed:	03/29/16 15:33
Lab Samp ID:	C070-16N	Dilution Factor:	0.962
Lab File ID:	98C12033	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	2.8
Calib. Ref.:	98C12028	Instrument ID :	T-I98

PARAMETERS	RESULTS (mg/kg)		LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	7050	R2	99.0	9.90	19.8
Antimony	0.110J		0.495	0.0990	0.198
Arsenic	2.51		0.495	0.0495	0.0990
Barium	105		0.495	0.0713	0.0990
Beryllium	0.227J		0.495	0.0495	0.0990
Boron	7.20J	UJ	9.90 (5,6)	2.47	4.95
Cadmium	0.110J	R2	0.495	0.0564	0.0990
Calcium	5020		99.0	16.8	19.8
Chromium	7.33		0.495	0.0495	0.0990
Cobalt	5.68		0.495	0.0495	0.0990
Copper	16.3		0.495	0.0990	0.198
Iron	14500		99.0	4.95	9.90
Lead	2.46		0.495	0.0495	0.0990
Magnesium	3950		99.0	9.90	19.8
Manganese	214		0.495	0.151	0.198
Molybdenum	0.244J		0.495	0.0990	0.198
Nickel	4.87		0.495	0.0624	0.0990
Potassium	2820		99.0	9.90	19.8
Selenium	ND		0.495	0.0495	0.0990
Silver	ND		0.495	0.0495	0.0990
Sodium	402		99.0	9.90	19.8
Thallium	0.109J		0.495	0.0495	0.0990
Vanadium	36.6		0.495	0.188	0.247
Zinc	24.2		1.98	0.676	0.990

4/17/16

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-017	Date Analyzed:	03/28/16 17:40
Lab Samp ID:	C070-17	Dilution Factor:	0.985
Lab File ID:	98C11076	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	0.0
Calib. Ref.:	98C11074	Instrument ID :	T-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	7350	98.5	9.85	19.7
Antimony	0.142J	0.493	0.0985	0.197
Arsenic	3.34	0.493	0.0493	0.0985
Barium	99.4	0.493	0.0709	0.0985
Beryllium	0.286J	0.493	0.0493	0.0985
Boron	9.94	9.85	2.46	4.93
Cadmium	0.201J	0.493	0.0561	0.0985
Calcium	7640	98.5	16.7	19.7
Chromium	7.30	0.493	0.0493	0.0985
Cobalt	5.17	0.493	0.0493	0.0985
Copper	16.7	0.493	0.0985	0.197
Iron	14300	98.5	4.93	9.85
Lead	9.97	0.493	0.0493	0.0985
Magnesium	3530	98.5	9.85	19.7
Manganese	220	0.493	0.151	0.197
Molybdenum	0.339J	0.493	0.0985	0.197
Nickel	6.22	0.493	0.0621	0.0985
Potassium	2620	98.5	9.85	19.7
Selenium	0.0584J	0.493	0.0493	0.0985
Silver	ND	0.493	0.0493	0.0985
Sodium	250	98.5	9.85	19.7
Thallium	0.102J	0.493	0.0493	0.0985
Vanadium	27.4	0.493	0.187	0.246
Zinc	69.7	1.97	0.673	0.985

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C070	Date Extracted:	03/17/16 15:19
Sample ID:	KCH067-018	Date Analyzed:	03/28/16 17:45
Lab Samp ID:	C070-18	Dilution Factor:	0.976
Lab File ID:	98C11077	Matrix :	SOIL
Ext Btch ID:	IMC031S	% Moisture :	2.1
Calib. Ref.:	98C11074	Instrument ID :	I-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	7500	99.7	9.97	19.9
Antimony	0.132J	0.498	0.0997	0.199
Arsenic	2.48	0.498	0.0498	0.0997
Barium	115	0.498	0.0718	0.0997
Beryllium	0.236J	0.498	0.0498	0.0997
Boron	9.82J ~~1.17U~~	9.97 (6)	2.49	4.98
Cadmium	0.121J	0.498	0.0568	0.0997
Calcium	6990	99.7	16.9	19.9
Chromium	8.61	0.498	0.0498	0.0997
Cobalt	5.91	0.498	0.0498	0.0997
Copper	15.9	0.498	0.0997	0.199
Iron	14200	99.7	4.98	9.97
Lead	2.97	0.498	0.0498	0.0997
Magnesium	3650	99.7	9.97	19.9
Manganese	240	0.498	0.153	0.199
Molybdenum	0.425J	0.498	0.0997	0.199
Nickel	5.78	0.498	0.0628	0.0997
Potassium	2870	99.7	9.97	19.9
Selenium	0.0528J	0.498	0.0498	0.0997
Silver	ND	0.498	0.0498	0.0997
Sodium	434	99.7	9.97	19.9
Thallium	0.107J	0.498	0.0498	0.0997
Vanadium	32.5	0.498	0.189	0.249
Zinc	27.4	1.99	0.681	0.997

8/25/16

METHOD SW7471A
MERCURY BY COLD VAPOR

Client : KLEINFELDER
Project : NAWS CHINA LAKE, CTO 067
Batch No. : 16C070

Matrix : SOIL
InstrumentID : 47

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (mg/kg)	DIL'N FACTOR	MOIST (%)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1S	HGC017SB	ND	1	NA	0.10	0.010	0.020	03/25/1611:12	03/24/1618:05	M47C013011	M47C013	HGC017S	NA	NA
LCS1S	HGC017SL	0.424	1	NA	0.10	0.010	0.020	03/25/1611:14	03/24/1618:05	M47C013012	M47C013	HGC017S	NA	NA
LCD1S	HGC017SC	0.418	1	NA	0.10	0.010	0.020	03/25/1611:16	03/24/1618:05	M47C013013	M47C013	HGC017S	NA	NA
KCH067-003	C070-03	ND	1	6.9	0.11	0.011	0.021	03/25/1611:21	03/24/1618:05	M47C013015	M47C013	HGC017S	03/08/1609:40	03/10/16
KCH067-003MS	C070-03M	0.466	1	6.9	0.11	0.011	0.021	03/25/1611:25	03/24/1618:05	M47C013017	M47C013	HGC017S	03/08/1609:40	03/10/16
KCH067-003MSD	C070-03S	0.466	1	6.9	0.11	0.011	0.021	03/25/1611:28	03/24/1618:05	M47C013018	M47C013	HGC017S	03/08/1609:40	03/10/16
KCH067-016	C070-16	ND	1	2.8	0.10	0.010	0.020	03/25/1611:32	03/24/1618:05	M47C013020	M47C013	HGC017S	03/08/1615:00	03/10/16
KCH067-016MS	C070-16M	0.445	1	2.8	0.10	0.010	0.020	03/25/1611:40	03/24/1618:05	M47C013024	M47C013	HGC017S	03/08/1615:00	03/10/16
KCH067-016MSD	C070-16S	0.445	1	2.8	0.10	0.010	0.020	03/25/1611:43	03/24/1618:05	M47C013025	M47C013	HGC017S	03/08/1615:00	03/10/16
KCH067-001	C070-01	ND	1	4.3	0.10	0.010	0.021	03/25/1611:45	03/24/1618:05	M47C013026	M47C013	HGC017S	03/08/1609:15	03/10/16
KCH067-002	C070-02	ND	1	9.0	0.11	0.011	0.022	03/25/1611:47	03/24/1618:05	M47C013027	M47C013	HGC017S	03/08/1609:30	03/10/16
KCH067-004	C070-04	ND	1	4.9	0.10	0.010	0.021	03/25/1611:49	03/24/1618:05	M47C013028	M47C013	HGC017S	03/08/1609:55	03/10/16
KCH067-005	C070-05	ND	1	2.7	0.10	0.010	0.020	03/25/1611:51	03/24/1618:05	M47C013029	M47C013	HGC017S	03/08/1613:25	03/10/16
KCH067-006	C070-06	ND	1	2.2	0.10	0.010	0.020	03/25/1611:53	03/24/1618:05	M47C013030	M47C013	HGC017S	03/08/1613:40	03/10/16
KCH067-007	C070-07	ND	1	1.9	0.10	0.010	0.020	03/25/1611:55	03/24/1618:05	M47C013031	M47C013	HGC017S	03/08/1613:45	03/10/16
KCH067-008	C070-08	ND	1	1.5	0.099	0.0099	0.020	03/25/1611:58	03/24/1618:05	M47C013032	M47C013	HGC017S	03/08/1613:55	03/10/16
KCH067-009	C070-09	ND	1	2.9	0.10	0.010	0.020	03/25/1612:04	03/24/1618:05	M47C013035	M47C013	HGC017S	03/08/1614:00	03/10/16
KCH067-010	C070-10	ND	1	3.8	0.10	0.010	0.020	03/25/1612:06	03/24/1618:05	M47C013036	M47C013	HGC017S	03/08/1614:05	03/10/16
KCH067-011	C070-11	ND	1	3.1	0.10	0.010	0.020	03/25/1612:08	03/24/1618:05	M47C013037	M47C013	HGC017S	03/08/1614:10	03/10/16
KCH067-012	C070-12	ND	1	3.5	0.10	0.010	0.020	03/25/1612:11	03/24/1618:05	M47C013038	M47C013	HGC017S	03/08/1614:20	03/10/16
KCH067-013	C070-13	ND	1	5.0	0.10	0.010	0.021	03/25/1612:13	03/24/1618:05	M47C013039	M47C013	HGC017S	03/08/1614:25	03/10/16
KCH067-014	C070-14	ND	1	3.9	0.10	0.010	0.020	03/25/1612:15	03/24/1618:05	M47C013040	M47C013	HGC017S	03/08/1614:30	03/10/16
KCH067-015	C070-15	ND	1	3.6	0.10	0.010	0.020	03/25/1612:18	03/24/1618:05	M47C013041	M47C013	HGC017S	03/08/1614:50	03/10/16
KCH067-017	C070-17	ND	1	0.0	0.10	0.010	0.020	03/25/1612:20	03/24/1618:05	M47C013042	M47C013	HGC017S	03/08/1615:20	03/10/16
KCH067-018	C070-18	ND	1	2.1	0.10	0.010	0.020	03/25/1612:22	03/24/1618:05	M47C013043	M47C013	HGC017S	03/08/1615:30	03/10/16

5/17/16

LDC #: 36282A4a

SDG #: 16C070

Laboratory: EMAX Laboratories Inc.

VALIDATION COMPLETENESS WORKSHEET

Standard/Full

Date: 5/9/16

Page: 1 of 2

Reviewer: JO

2nd Reviewer: A

METHOD: Metals (EPA SW 846 Method 6020A/7470A) 1 30

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	3/8/16
II.	ICP/MS Tune	A	
III.	Instrument Calibration	SW	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	SW	EB= KCH067-019 (SDG: 16C074)
VII.	Matrix Spike/Matrix Spike Duplicates	SW	MS/D = (19.20) (21.22)
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS/D
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	Not reviewed for Standard Validation
XIII.	Sample Result Verification 30	SW A	Not reviewed for Standard validation.
XIV.	Overall Assessment of Data ↓	SW A	

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

** Indicates sample underwent Full validation

	Client ID	Lab ID	Matrix	Date
1	KCH067-001	16C070-01	Soil	03/08/16
2	KCH067-002	16C070-02	Soil	03/08/16
3	KCH067-003	16C070-03	Soil	03/08/16
4	KCH067-004**	16C070-04**	Soil	03/08/16
5	KCH067-005	16C070-05	Soil	03/08/16
6	KCH067-006	16C070-06	Soil	03/08/16
7	KCH067-007	16C070-07	Soil	03/08/16
8	KCH067-008	16C070-08	Soil	03/08/16
9	KCH067-009	16C070-09	Soil	03/08/16
10	KCH067-010	16C070-10	Soil	03/08/16
11	KCH067-011	16C070-11	Soil	03/08/16
12	KCH067-012	16C070-12	Soil	03/08/16
13	KCH067-013	16C070-13	Soil	03/08/16
14	KCH067-014	16C070-14	Soil	03/08/16
15	KCH067-015	16C070-15	Soil	03/08/16

LDC #: 36282A4a

SDG #: 16C070

Laboratory: EMAX Laboratories Inc.

VALIDATION COMPLETENESS WORKSHEET

Standard/Full

Date: 5/9/16

Page: 2 of 2

Reviewer: 3D

2nd Reviewer: _____

METHOD: Metals (EPA SW 846 Method 6020A/7470A)

	Client ID	Lab ID	Matrix	Date
16	KCH067-016**	16C070-16**	Soil	03/08/16
17	KCH067-017	16C070-17	Soil	03/08/16
18	KCH067-018	16C070-18	Soil	03/08/16
19	KCH067-003MS	16C070-03MS	Soil	03/08/16
20	KCH067-003MSD	16C070-03MSD	Soil	03/08/16
21	KCH067-016MS	16C070-16MS	Soil	03/08/16
22	KCH067-016MSD	16C070-16MSD	Soil	03/08/16
23	#1DL			
24	#2DL			
25	#2RE			
26	#3DL			
27	#4RE			
28	#9RE			
29	#10RE			
30	#11DL			
31	#16RE			
32				
33				
34				
35				
36				
37				
38				
39				
40				

Notes: _____

LDC #: 36282A4a

VALIDATION FINDINGS CHECKLIST

Reviewer: SD
2nd Reviewer: AL

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?		✓		
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

Validation Area	Yes	No	NA	Findings/Comments
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XIII. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 36282A4q

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Page: 1 of 1
Reviewer: JD
2nd reviewer: A

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-18	S	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
RC.19-22	S	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
23-31	S	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 36282A4a

VALIDATION FINDINGS WORKSHEET
Calibration

Reviewer: SD
2nd Reviewer: 9

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

Y N N/A Were all instruments calibrated daily, each set-up time, and were the proper number of standards used?
Y N N/A Were all initial and continuing calibration verification percent recoveries (%R) within the control limits of 90-110% for all analytes except mercury (80-120%)?

LEVEL IV ONLY:

Y N N/A Was a midrange cyanide standard distilled?
Y N N/A Are all correlation coefficients ≥0.995?
Y N N/A Were recalculated results acceptable? See Level IV Initial and Continuing Calibration Recalculation Worksheet for recalculations.

#	Date	Calibration ID	Analyte	%R	Associated Samples	Qualification of Data
	03/29/16	CCV (14:19)	B	182	25-28, 30	J+det/P (det) (05)
	03/29/16	CCV (15:11)	B	187	25-28, 30-31	J+det/P (det) (05)
	03/29/16	CCV (16:00)	B	184	31	J+det/P (det) (05)

Comments:

LDC #: 36282A4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JD
2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 864 Method 6010/6020/7000) Soil preparation factor applied: 50X

Sample Concentration units, unless otherwise noted: mg/kg Associated Samples: 1-11 (07)

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Blank Action Limit	Sample Identification: 1	3	5							
Se			0.100		0.130/~~0.512~~ U	0.176/~~0.524~~ U	0.0595/~~0.496~~ 0.0993 U							

Sample Concentration units, unless otherwise noted: mg/kg Associated Samples: 25-28, 30 (07)

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Blank Action Limit	Sample Identification: 25	26								
Mo			0.238		~~0.817/2.68~~	2.92/~~5.24~~ U								

Sample Concentration units, unless otherwise noted: mg/kg Associated Samples: 31 (07)

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Blank Action Limit	Sample Identification: 31									
Mo			0.223		0.244/~~0.495~~									

Sample Concentration units, unless otherwise noted: mg/kg Associated Samples: 25-28, 30-31 (07)

Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Blank Action Limit	Sample Identification: 26	27	31							
Sb			0.294		1.15/~~5.24~~ 2.10	0.350/~~0.511~~	0.110/~~0.495~~ 0.198 U							

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 36282A4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: JD
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA Method 200.7/200.8)

Blank units: ug/L **Associated sample units:** mg/kg
Sampling date: 03/08/16 Soil factor applied 50X
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All (06)

Analyte	Blank ID	Sample Identification											
[redacted]	KCH067-019 (SDG: 16C074)	Action Limit	5	6	7	8	10	13	14	16	18	24	
B	4.65		6.80/~~9.93~~	4.94/~~10.6~~	4.62/~~9.81~~	4.50/~~9.95~~	9.71/~~10.2~~	8.91/~~10.2~~	9.15/~~10.1~~	7.59/~~9.90~~	9.82/~~9.97~~	53.3/~~53.6~~	
Ca	135	67.5		5.01	4.90	4.97							
Fe	9.85												
Pb	0.225												
Mn	0.318												
Ni	0.161												
Na	42.6												

Analyte	Blank ID	Sample Identification											
[redacted]	KCH067-019 (SDG: 16C074)	Action Limit	29	31									
B	4.65		9.62/~~10.2~~	7.20/~~9.90~~									
Ca	135	67.5											
Fe	9.85												
Pb	0.225												
Mn	0.318												
Ni	0.161												
Na	42.6												

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 36282A4

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: SB
2nd Reviewer:

METHOD: Trace metals (EPA SW 846 Method 6010/7000)

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

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications	Postspike (75-125)
	19/20	S	Sb	40 (72-124)	38 (72-124)		3, 26	J-/UJ/A (det) (08)	
			Cr	46 (83-119)	50 (83-119)			J-/UJ/A (det) (08)	
			Cu	68 (84-119)	67 (84-119)			J-/UJ/A (det) (08)	
			Pb	-48 (84-118)	-56 (84-118)			J-/UJ/A (det) (08)	104
			Na	75 (79-125)	71 (79-125)			J-/UJ/A (det) (08)	
	21/22	S	Sb	61 (72-124)	60 (72-124)		16, 31	J-/UJ/A (det) (08)	
			Ca	85 (86-118)				J-/UJ/A (det) (08)	
			Cr	83 (83-119)				J-/UJ/A (det) (08)	
			Cu	80 (84-119)	78 (84-119)			J-/UJ/A (det) (08)	
			Mg	56 (80-123)	67 (80-123)			J-/UJ/A (det) (08)	
			K	74 (85-119)	84 (85-119)			J-/UJ/A (det) (08)	
			V	36 (82-116)	41 (82-116)			J-/UJ/A (det) (08)	

Comments: 19/20: Al, B, Ca, Fe, Mg, Mn, Zn > 4X
21/22: Ba, Fe, Mn,

LDC #: 36282C4a

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: JD
2nd Reviewer: 9

METHOD: Metals (EPA SW 846 Method 6010/6020/7000)

#	Sample ID	Analyte	Result (units)	RL (units)	Finding	Qualifications
	1	B			> Linear range	J/A (20)
	2	B, Ca, Fe, Na			> Linear range	J/A (20)
	25	Fe			> Linear range	J/A (20)
	3	B			> Linear range	J/A (20)
	9	B			> Linear range	J/A (20)
	10	Ca, Fe, Na			> Linear range	J/A (20)
	11	B, Zn			> Linear range	J/A (20)
	16	B			> Linear range	J/A (20)

Comments:

LDC #: 36282C4a

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: JD
2nd Reviewer: Q

METHOD: Trace Metals (EPA CLP SOW ILM02.1)

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

(Y) N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		1	B (exceeds calibration range)	1	R/A (22)
		2	B, Ca, Fe, Na (exceeds calibration range)	2	R/A (22)
		25	Fe (exceeds calibration range)	25	R/A (22)
		3	B (exceeds calibration range)	3	R/A (22)
		9	B (exceeds calibration range)	9	R/A (22)
		10	Ca, Fe, Na (exceeds calibration range)	10	R/A (22)
		11	B, Zn (exceeds calibration range)	11	R/A (22)
		16	B (exceeds calibration range)	16	R/A (22)

LDC #: 36282C4a

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: 3D
2nd Reviewer: Q

METHOD: Trace Metals (EPA CLP SOW ILM02.1)

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable? All except... = 6020 only Do not include Hg

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		23	All Except B (Dilution not neccesary)	23	R/A (22)
		24	All Except Fe (Dilution not necessary)	24	R/A (22)
		25	All Except B, Ca, Na, (Reanalysis not necessary for other analytes except Fe exceeds calibration range)	25	R/A (22)
		26	All Except B (Dilution not necesary)	26	R/A (22)
		27	All Except B (Designated as more technically sound by lab)	27	R/A (22)
		28	All Except B (Reanalysis not necessary)	28	R/A (22)
		29	All Except Ca, Fe, Na (Reanalysis not necessary)	29	R/A (22)
		30	All Except B (Dilution not necessary)	30	R/A (22)

LDC #: 36282C4a

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: JD
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA CLP SOW ILM02.1)

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		31	All Except B (Reanalysis not necessary)	31	R/A (22)

Comments:

LDC #: 36282A4q

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: JD
2nd Reviewer: JC

METHOD: Trace Metals (See cover)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 / True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV 12:43	ICP/MS (Initial calibration)	Co	296.5 ug/L	300 ug/L	99%R	99%R	Y
ICV 11:03	CVAA (Initial calibration)	Hg	2.05 ug/L	2 ug/L	103%R	103%R	↓
	ICP (Continuing calibration)						
CCV (5) 16:38	ICP/MS (Continuing calibration)	Cu	230.5 ug/L	250 ug/L	92%R	92%R	Y
CCV 11:34	CVAA (Contining calibration)	Hg	2.03 ug/L	2 ug/L	102%R	102%R	↓
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: _____

LDC #: 36282A4a

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Reviewer: JD
2nd Reviewer: JC

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICSAB 13:05	ICP interference check	Cr	20.08 ug/L	20 ug/L	100%R	100%R	Y
LCS 11:14	Laboratory control sample	Hg	0.425 mg/kg	0.414 mg/kg	103%R	102%R	Y*
MS 17:05	Matrix spike	Se	(SSR-SR) 18.1 mg/kg	19.9 mg/kg	91%R	91%R	Y
MSD 17:09	Duplicate	Ag	18.92 mg/kg	18.73 mg/kg	1%RPD	1%RPD	↓
SER 17:23	ICP serial dilution	K	6095 ug/L	5744 ug/L	6%D	6%D	↓

Comments: *Rounding

LDC #: 36282A1q

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: JD
2nd reviewer: AA

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for (4) Al were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)(\%\ solids)}$

Prep factor ↓
Dil = 10x
RD = 17430 ug/L
FV = 100ml
In W = 2.06g
% solids = 0.951

Recalculation: $\frac{(17430\ ug/L)(100ml)(10)}{(2.06g)(0.951)} \times \frac{1mg}{1000ug} = 8900\ mg/kg$

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	4	Al	8900	8900	Y
	10	V	36.8	36.8	Y
	27	B	33.5	33.5	Y
	31	B	7.20	7.20	Y

Note: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 12, 2016

Parameters: Hexavalent Chromium

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C070

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-001	16C070-01	Soil	03/08/16
KCH067-002	16C070-02	Soil	03/08/16
KCH067-003	16C070-03	Soil	03/08/16
KCH067-004**	16C070-04**	Soil	03/08/16
KCH067-005	16C070-05	Soil	03/08/16
KCH067-006	16C070-06	Soil	03/08/16
KCH067-007	16C070-07	Soil	03/08/16
KCH067-008	16C070-08	Soil	03/08/16
KCH067-009	16C070-09	Soil	03/08/16
KCH067-010	16C070-10	Soil	03/08/16
KCH067-011	16C070-11	Soil	03/08/16
KCH067-012	16C070-12	Soil	03/08/16
KCH067-013	16C070-13	Soil	03/08/16
KCH067-014	16C070-14	Soil	03/08/16
KCH067-015	16C070-15	Soil	03/08/16
KCH067-016**	16C070-16**	Soil	03/08/16
KCH067-017	16C070-17	Soil	03/08/16
KCH067-018	16C070-18	Soil	03/08/16
KCH067-003MS	16C070-03MS	Soil	03/08/16
KCH067-003MSD	16C070-03MSD	Soil	03/08/16
KCH067-003DUP	16C070-03DUP	Soil	03/08/16
KCH067-016MS	16C070-16MS	Soil	03/08/16
KCH067-016MSD	16C070-16MSD	Soil	03/08/16
KCH067-016DUP	16C070-16DUP	Soil	03/08/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Hexavalent Chromium by Environmental Protection Agency (EPA) SW 846 Method 7199

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

IV. Laboratory Blanks

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

V. Field Blanks

Sample KCH067-019 (from SDG 16C074) was identified as an equipment blank. No contaminants were found.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

Duplicate (DUP) sample analysis was performed on an associated project sample. Results were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

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

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

China Lake CTO 067
Hexavalent Chromium - Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

China Lake CTO 067
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

China Lake CTO 067
Hexavalent Chromium - Field Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

METHOD SW7199
HEXAVALENT CHROMIUM

Client : KLEINFELDER
Project : NAWS CHINA LAKE, CTO 067
Batch No. : 16C070

Matrix : SOIL
InstrumentID : 59

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (ug/kg)	DIL'N. FACTOR	MOIST (%)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1S	HCC002SB	ND	1	NA	100	13	40	03/18/1612:06	03/16/1614:01	IC19003	IC19001	HCC002S	NA	NA
LCS1S	CSC002SL	981	1	NA	100	13	40	03/18/1612:27	03/16/1614:01	IC19005	IC19001	HCC002S	NA	NA
KCH067-003	C070-03	1750	1	6.9	107	14	43	03/18/1613:08	03/16/1614:01	IC19009	IC19001	HCC002S	03/08/1609:40	03/10/16
KCH067-003DUP	C070-03D	1770	1	6.9	107	14	43	03/18/1613:29	03/16/1614:01	IC19011	IC19001	HCC002S	03/08/1609:40	03/10/16
KCH067-003MS	C070-03M	3840	1	6.9	107	14	43	03/18/1614:11	03/16/1614:01	IC19015	IC19013	HCC002S	03/08/1609:40	03/10/16
KCH067-003MSD	C070-03S	3730	1	6.9	107	14	43	03/18/1614:32	03/16/1614:01	IC19017	IC19013	HCC002S	03/08/1609:40	03/10/16
KCH067-001	C070-01	1780	1	4.3	104	13.6	41.8	03/18/1615:34	03/16/1614:01	IC19023	IC19013	HCC002S	03/08/1609:15	03/10/16
KCH067-002	C070-02	275	1	9.0	110	14.3	44	03/18/1616:25	03/16/1614:01	IC19027	IC19025	HCC002S	03/08/1609:30	03/10/16
KCH067-004	C070-04	424	1	4.9	105	13.7	42.1	03/18/1616:46	03/16/1614:01	IC19029	IC19025	HCC002S	03/08/1609:55	03/10/16
KCH067-005	C070-05	ND	1	2.7	103	13.4	41.1	03/18/1617:07	03/16/1614:01	IC19031	IC19025	HCC002S	03/08/1613:25	03/10/16
KCH067-006	C070-06	ND	1	2.2	102	13.3	40.9	03/18/1617:27	03/16/1614:01	IC19033	IC19025	HCC002S	03/08/1613:40	03/10/16
KCH067-007	C070-07	ND	1	1.9	102	13.3	40.8	03/18/1617:48	03/16/1614:01	IC19035	IC19025	HCC002S	03/08/1613:45	03/10/16
KCH067-008	C070-08	ND	1	1.5	102	13.2	40.6	03/18/1618:30	03/16/1614:01	IC19039	IC19037	HCC002S	03/08/1613:55	03/10/16
KCH067-009	C070-09	ND	1	2.9	103	13.4	41.2	03/18/1618:51	03/16/1614:01	IC19041	IC19037	HCC002S	03/08/1614:00	03/10/16
KCH067-010	C070-10	ND	1	3.8	104	13.5	41.6	03/18/1619:11	03/16/1614:01	IC19043	IC19037	HCC002S	03/08/1614:05	03/10/16
KCH067-011	C070-11	ND	1	3.1	103	13.4	41.3	03/18/1619:32	03/16/1614:01	IC19045	IC19037	HCC002S	03/08/1614:10	03/10/16
KCH067-012	C070-12	ND	1	3.5	104	13.5	41.5	03/18/1619:53	03/16/1614:01	IC19047	IC19037	HCC002S	03/08/1614:20	03/10/16
KCH067-013	C070-13	ND	1	5.0	105	13.7	42.1	03/18/1620:35	03/16/1614:01	IC19051	IC19049	HCC002S	03/08/1614:25	03/10/16
KCH067-014	C070-14	ND	1	3.9	104	13.5	41.6	03/18/1620:55	03/16/1614:01	IC19053	IC19049	HCC002S	03/08/1614:30	03/10/16
KCH067-015	C070-15	ND	1	3.6	104	13.5	41.5	03/18/1621:16	03/16/1614:01	IC19055	IC19049	HCC002S	03/08/1614:50	03/10/16
KCH067-017	C070-17	57.5J	1	0.0	100	13	40	03/18/1621:37	03/16/1614:01	IC19057	IC19049	HCC002S	03/08/1615:20	03/10/16
KCH067-018	C070-18	ND	1	2.1	102	13.3	40.9	03/18/1621:58	03/16/1614:01	IC19059	IC19049	HCC002S	03/08/1615:30	03/10/16
KCH067-016	C070-16	ND	1	2.8	103	13.4	41.2	03/18/1622:40	03/16/1614:01	IC19063	IC19061	HCC002S	03/08/1615:00	03/10/16
KCH067-016DUP	C070-16D	ND	1	2.8	103	13.4	41.2	03/18/1623:00	03/16/1614:01	IC19065	IC19061	HCC002S	03/08/1615:00	03/10/16
KCH067-016MS	C070-16M	1840	1	2.8	103	13.4	41.2	03/18/1623:21	03/16/1614:01	IC19067	IC19061	HCC002S	03/08/1615:00	03/10/16
KCH067-016MSD	C070-16S	1680	1	2.8	103	13.4	41.2	03/18/1623:42	03/16/1614:01	IC19069	IC19061	HCC002S	03/08/1615:00	03/10/16
KCH067-002R	C070-02R	127	1	9.0	110	14.3	44	03/22/1615:44	03/16/1614:01	IC22003	IC22001	HCC002S	03/08/1609:30	03/10/16

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LDC #: 36282A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/8/16
SDG #: 16C070 Standard/Full Page: 1 of 2
Laboratory: EMAX Laboratories Inc. Reviewer: JD
2nd Reviewer: A

METHOD: (Analyte) Hexavalent Chromium (EPA SW846 Method 7199)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	3/8/16
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	ND	FB = KCH067-019 (SDG: 16C074)
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/D = (9,20) (22,23)
VII.	Duplicate sample analysis	A	DUP
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Sample result verification	A	Not reviewed for Standard validation.
XI	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-001	16C070-01	Soil	03/08/16
2	KCH067-002	16C070-02	Soil	03/08/16
3	KCH067-003	16C070-03	Soil	03/08/16
4	KCH067-004**	16C070-04**	Soil	03/08/16
5	KCH067-005	16C070-05	Soil	03/08/16
6	KCH067-006	16C070-06	Soil	03/08/16
7	KCH067-007	16C070-07	Soil	03/08/16
8	KCH067-008	16C070-08	Soil	03/08/16
9	KCH067-009	16C070-09	Soil	03/08/16
10	KCH067-010	16C070-10	Soil	03/08/16
11	KCH067-011	16C070-11	Soil	03/08/16
12	KCH067-012	16C070-12	Soil	03/08/16
13	KCH067-013	16C070-13	Soil	03/08/16
14	KCH067-014	16C070-14	Soil	03/08/16
15	KCH067-015	16C070-15	Soil	03/08/16
16	KCH067-016**	16C070-16**	Soil	03/08/16
17	KCH067-017	16C070-17	Soil	03/08/16

LDC #: 36282A6 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/11/16
SDG #: 16C070 Standard/Full Page: 2 of 2
Laboratory: EMAX Laboratories Inc. Reviewer: JO
2nd Reviewer: M

METHOD: (Analyte) Hexavalent Chromium (EPA SW846 Method 7199)

	Client ID	Lab ID	Matrix	Date
18	KCH067-018	16C070-18	Soil	03/08/16
19	KCH067-003MS	16C070-03MS	Soil	03/08/16
20	KCH067-003MSD	16C070-03MSD	Soil	03/08/16
21	KCH067-003DUP	16C070-03DUP	Soil	03/08/16
22	KCH067-016MS	16C070-16MS	Soil	03/08/16
23	KCH067-016MSD	16C070-16MSD	Soil	03/08/16
24	KCH067-016DUP	16C070-16DUP	Soil	03/08/16
25				
26				
27				
28				
29				

Notes:

LDC #: 36282A6

VALIDATION FINDINGS CHECKLIST

Reviewer: JD
2nd Reviewer: AC

Method: Inorganics (EPA Method See Cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC #: 36282A6

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: JD
2nd Reviewer: AL

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr^{+6} was recalculated. Calibration date: 11/20/16

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found X 100 / True

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution

True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (ug/l)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	Cr^{+6}	s1	0	0	*0.9998*	0.9998	Y
		s2	0.2	0.0000157			
		s3	0.5	0.0000504			
		s4	1	0.0001022			
		s5	2	0.000194			
		s6	5	0.0005014			
		s7	7.5	0.0007527			
		s8	10	0.0010231			
ICV 13:57 Calibration verification	Cr^{+6}	Found 3.725ug/L J	True 4ug/L J		93%R	93%R	
CCV 18:09 Calibration verification	Cr^{+6}	1.900ug/L	2ug/L		95%R	95%R	
Calibration verification							

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

LDC #: 36282A6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: JD
2nd Reviewer: 2

METHOD: Inorganics, Method See Cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found x 100 / True Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = |S-D| x 100 / (S+D)/2 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS 12:27	Laboratory control sample	Cr^{+6}	981.3 ug/kg	1000 ug/kg	98%R	98%R	Y
MS	Matrix spike sample		(SSR-SR) 1838 ug/kg	2000 ug/kg	92%R	92%R	
DUP	Duplicate sample		ND	ND	0%RPD	0%RPD	

Comments: _____

LDC #: 36282A6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: SD
2nd reviewer: M

METHOD: Inorganics, Method See Cover

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for (4) Cr^{+6} reported with a positive detect were recalculated and verified using the following equation:

Concentration = $\frac{A-(-0.0000035)}{0.0001018}$

Recalculation: $\frac{0.0000787-(-0.0000035)}{0.0001018} = 0.807 ug/L$

A= 0.0000787 In. W= 12.507g FV= 100ml %solids= 0.951 Prep factor = 62.5

$\frac{(0.807 ug/L)(100ml)(62.5)}{(12.507g)(0.951)} = 424 ug/kg$

#	Sample ID	Analyte	Reported Concentration (ug/kg)	Calculated Concentration (ug/kg)	Acceptable (Y/N)
	4	Cr^{+6}	424	424	Y

Note: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 11, 2016

Parameters: Total Petroleum Hydrocarbons as Gasoline

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C070

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-002	16C070-02	Soil	03/08/16
KCH067-004**	16C070-04**	Soil	03/08/16
KCH067-006	16C070-06	Soil	03/08/16
KCH067-008	16C070-08	Soil	03/08/16
KCH067-010	16C070-10	Soil	03/08/16
KCH067-011	16C070-11	Soil	03/08/16
KCH067-013	16C070-13	Soil	03/08/16
KCH067-014	16C070-14	Soil	03/08/16
KCH067-016**	16C070-16**	Soil	03/08/16
KCH067-018	16C070-18	Soil	03/08/16
KCH067-020	16C070-19	Water	03/08/16
KCH067-016MS	16C070-16MS	Soil	03/08/16
KCH067-016MSD	16C070-16MSD	Soil	03/08/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Total Petroleum Hydrocarbons (TPH) as Gasoline by Environmental Protection Agency (EPA) SW 846 Method 8015B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

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

V. Field Blanks

Sample KCH067-020 was identified as a trip blank. No contaminants were found.

Sample KCH067-019 (from SDG 16C074) was identified as an equipment blank. No contaminants were found.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

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

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

China Lake CTO 067
Total Petroleum Hydrocarbons as Gasoline - Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

China Lake CTO 067
Total Petroleum Hydrocarbons as Gasoline - Laboratory Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

China Lake CTO 067
Total Petroleum Hydrocarbons as Gasoline - Field Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

METHOD SW5035A/8015B
TOTAL PETROLEUM HYDROCARBONS BY PURGE AND TRAP

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/11/16 00:42
Sample ID:	KCH067-002	Date Analyzed:	03/11/16 00:42
Lab Samp ID:	C070-02	Dilution Factor:	0.97
Lab File ID:	EC10023A	Matrix :	SOIL
Ext Btch ID:	GMC009S	% Moisture :	9.0
Calib. Ref.:	EC10014A	Instrument ID :	GCT039

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
GASOLINE	ND	1.1	0.27	0.53

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
4-BROMOFLUOROBENZENE	1.76	2.132	82.4	67-134

Parameter	H-C Range
Gasoline	C6-C10

METHANOL EXTRACTION: 03/10/16 15:06

3/25/16

METHOD SW5035A/8015B
TOTAL PETROLEUM HYDROCARBONS BY PURGE AND TRAP

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/11/16 01:21
Sample ID:	KCH067-004	Date Analyzed:	03/11/16 01:21
Lab Samp ID:	C070-04	Dilution Factor:	0.85
Lab File ID:	EC10024A	Matrix :	SOIL
Ext Btch ID:	GMC009S	% Moisture :	4.9
Calib. Ref.:	EC10014A	Instrument ID :	GCT039

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
GASOLINE	ND	0.89	0.22	0.45

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
4-BROMOFLUOROBENZENE	1.48	1.788	82.9	67-134

Parameter	H-C Range
Gasoline	C6-C10

METHANOL EXTRACTION: 03/10/16 15:06

3/25/16

METHOD SW5035A/8015B
TOTAL PETROLEUM HYDROCARBONS BY PURGE AND TRAP

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/11/16 02:39
Sample ID:	KCH067-006	Date Analyzed:	03/11/16 02:39
Lab Samp ID:	C070-06	Dilution Factor:	1
Lab File ID:	EC10026A	Matrix :	SOIL
Ext Btch ID:	GMC009S	% Moisture :	2.2
Calib. Ref.:	EC10025A	Instrument ID :	GCT039

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
GASOLINE	ND	1.0	0.26	0.51

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
4-BROMOFLUOROBENZENE	1.44	2.045	70.6	67-134

Parameter	H-C Range
Gasoline	C6-C10

METHANOL EXTRACTION: 03/10/16 15:06

8/15/16

METHOD SW5035A/8015B
TOTAL PETROLEUM HYDROCARBONS BY PURGE AND TRAP

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/11/16 03:18
Sample ID:	KCH067-008	Date Analyzed:	03/11/16 03:18
Lab Samp ID:	C070-08	Dilution Factor:	1.04
Lab File ID:	EC10027A	Matrix :	SOIL
Ext Btch ID:	GMC009S	% Moisture :	1.5
Calib. Ref.:	EC10025A	Instrument ID :	GCT039

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
GASOLINE	ND	1.1	0.26	0.53

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
4-BROMOFLUOROBENZENE	1.55	2.112	73.4	67-134

Parameter	H-C Range
Gasoline	C6-C10

METHANOL EXTRACTION: 03/10/16 15:06

8051716

METHOD SW5035A/8015B
TOTAL PETROLEUM HYDROCARBONS BY PURGE AND TRAP

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/11/16 03:56
Sample ID:	KCH067-010	Date Analyzed:	03/11/16 03:56
Lab Samp ID:	C070-10	Dilution Factor:	0.86
Lab File ID:	EC10028A	Matrix :	SOIL
Ext Btch ID:	GMC009S	% Moisture :	3.8
Calib. Ref.:	EC10025A	Instrument ID :	GCT039

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
GASOLINE	ND	0.89	0.22	0.45

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
4-BROMOFLUOROBENZENE	1.34	1.788	75.0	67-134

Parameter	H-C Range
Gasoline	C6-C10

METHANOL EXTRACTION: 03/10/16 15:08

3/25/16

METHOD SW5035A/8015B
TOTAL PETROLEUM HYDROCARBONS BY PURGE AND TRAP

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/11/16 04:35
Sample ID:	KCH067-011	Date Analyzed:	03/11/16 04:35
Lab Samp ID:	C070-11	Dilution Factor:	0.92
Lab File ID:	EC10029A	Matrix :	SOIL
Ext Btch ID:	GMC009S	% Moisture :	3.1
Calib. Ref.:	EC10025A	Instrument ID :	GCT039

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
GASOLINE	ND	0.95	0.24	0.47

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
4-BROMOFLUOROBENZENE	1.36	1.899	71.5	67-134

Parameter	H-C Range
Gasoline	C6-C10

METHANOL EXTRACTION: 03/10/16 15:08

3/15/16

METHOD SW5035A/8015B
TOTAL PETROLEUM HYDROCARBONS BY PURGE AND TRAP

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/11/16 05:14
Sample ID:	KCH067-013	Date Analyzed:	03/11/16 05:14
Lab Samp ID:	C070-13	Dilution Factor:	0.87
Lab File ID:	EC10030A	Matrix :	SOIL
Ext Btch ID:	GMC009S	% Moisture :	5.0
Calib. Ref.:	EC10025A	Instrument ID :	GCT039

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
GASOLINE	ND	0.92	0.23	0.46

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
4-BROMOFLUOROBENZENE	1.29	1.832	70.6	67-134

Parameter	H-C Range
Gasoline	C6-C10

METHANOL EXTRACTION: 03/10/16 15:08

SLQ 5/17/16

METHOD SW5035A/8015B
TOTAL PETROLEUM HYDROCARBONS BY PURGE AND TRAP

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/11/16 05:52
Sample ID:	KCH067-014	Date Analyzed:	03/11/16 05:52
Lab Samp ID:	C070-14	Dilution Factor:	0.85
Lab File ID:	EC10031A	Matrix :	SOIL
Ext Btch ID:	GMC009S	% Moisture :	3.9
Calib. Ref.:	EC10025A	Instrument ID :	GCT039

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
GASOLINE	ND	0.88	0.22	0.44

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
4-BROMOFLUOROBENZENE	1.22	1.769	69.1	67-134

Parameter	H-C Range
Gasoline	C6-C10

METHANOL EXTRACTION: 03/10/16 15:08

3/5/16

METHOD SW5035A/8015B
TOTAL PETROLEUM HYDROCARBONS BY PURGE AND TRAP

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/11/16 07:10
Sample ID:	KCH067-016	Date Analyzed:	03/11/16 07:10
Lab Samp ID:	C070-16	Dilution Factor:	0.88
Lab File ID:	EC10033A	Matrix :	SOIL
Ext Btch ID:	GMC009S	% Moisture :	2.8
Calib. Ref.:	EC10025A	Instrument ID :	GCT039

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
GASOLINE	ND	0.91	0.23	0.45

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
4-BROMOFLUOROBENZENE	1.39	1.811	77.0	67-134

Parameter	H-C Range
Gasoline	C6-C10

METHANOL EXTRACTION: 03/10/16 15:08

3/21/16

METHOD SW5035A/8015B
TOTAL PETROLEUM HYDROCARBONS BY PURGE AND TRAP

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/11/16 06:31
Sample ID:	KCH067-018	Date Analyzed:	03/11/16 06:31
Lab Samp ID:	C070-18	Dilution Factor:	0.94
Lab File ID:	EC10032A	Matrix :	SOIL
Ext Btch ID:	GMC009S	% Moisture :	2.1
Calib. Ref.:	EC10025A	Instrument ID :	GCT039

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
GASOLINE	ND	0.96	0.24	0.48

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
4-BROMOFLUOROBENZENE	1.43	1.920	74.4	67-134

Parameter	H-C Range
Gasoline	C6-C10

METHANOL EXTRACTION: 03/10/16 15:08

3/15/16

METHOD SW5030B/8015B
TOTAL PETROLEUM HYDROCARBONS BY PURGE AND TRAP

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/12/16 01:36
Sample ID:	KCH067-020	Date Analyzed:	03/12/16 01:36
Lab Samp ID:	C070-19	Dilution Factor:	1
Lab File ID:	EC11022A	Matrix :	WATER
Ext Btch ID:	VG39C07	% Moisture :	NA
Calib. Ref.:	EC11017A	Instrument ID :	GCT039

PARAMETERS	RESULTS (mg/L)	LOQ (mg/L)	DL (mg/L)	LOD (mg/L)
GASOLINE	ND	0.10	0.010	0.020

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
4-BROMOFLUOROBENZENE	0.0347	0.04000	86.6	69-133

Parameter	H-C Range
Gasoline	C6-C10

3/25/16

LDC #: 36282A7 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/9/16
SDG #: 16C070 Standard/Full Page: 1 of 1
Laboratory: EMAX Laboratories Inc. Reviewer: EJ
2nd Reviewer: MC

METHOD: GC TPH as Gasoline (EPA SW 846 Method 8015B)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / Δ	
II.	Initial calibration/ICV	A / Δ	%RSD / ICV ≤ 20
III.	Continuing calibration	Δ	CCV ≤ 20
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	EB = KCH067-019 (SDG # 16C070-14) TB = 11
VI.	Surrogate spikes	Δ	
VII.	Matrix spike/Matrix spike duplicates	Δ	
VIII.	Laboratory control samples	Δ	LCS ID
IX.	Field duplicates	N	
X.	Compound quantitation RL/LOQ/LODs	Δ	Not reviewed for Standard validation.
XI.	Target compound identification	Δ	Not reviewed for Standard validation.
XII	Overall assessment of data	Δ	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-002	16C070-02	Soil	03/08/16
2	KCH067-004**	16C070-04**	Soil	03/08/16
3	KCH067-006	16C070-06	Soil	03/08/16
4	KCH067-008	16C070-08	Soil	03/08/16
5	KCH067-010	16C070-10	Soil	03/08/16
6	KCH067-011	16C070-11	Soil	03/08/16
7	KCH067-013	16C070-13	Soil	03/08/16
8	KCH067-014	16C070-14	Soil	03/08/16
9	KCH067-016**	16C070-16**	Soil	03/08/16
10	KCH067-018	16C070-18	Soil	03/08/16
11	KCH067-020 TB	16C070-19	Water	03/08/16
12	KCH067-016MS	16C070-16MS	Soil	03/08/16
13	KCH067-016MSD	16C070-16MSD	Soil	03/08/16
14				
15				
16	MBLK1W			
17	MBLK1S			

LDC #: 36282A7

VALIDATION FINDINGS CHECKLIST

Page: 1 of 1
Reviewer: EZ
2nd Reviewer: EZ

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
IIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥0.990?		✓		
Were the RT windows properly established?			✓	
IIb. Initial calibration verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) < 20% or percent recoveries (%R) 80-120%?	✓			
III. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
IV. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. Field Blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VI. Surrogate spikes				
Were all surrogate percent recovery (%R) within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			

LDC #: 36282A7

VALIDATION FINDINGS CHECKLIST

Reviewer: EJ
2nd Reviewer: AC

Validation Area	Yes	No	NA	Findings/Comments
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?			✓	
X. Compound quantitation				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC #: 36282A7

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: FT
2nd Reviewer:

METHOD: GC ✓ HPLC _____

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C
Average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where: A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (500 std)	Recalculated CF (500 std)	Reported CF (initial)	Recalculated CF (intial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/18/16	GRO (C_6-C_{10})	17177	17177	16318.3	16318.3	4.6	4.6
2									
3									
4									

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

LDC #: 36282A7

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: FT
2nd Reviewer: AC

METHOD: GC ✓ HPLC _____

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

% Difference = 100 * (ave. CF -CF)/ave.CF

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(ICAL)/ CCV Conc.	Reported CF/ Conc. CCV	Recalculated CF/ Conc. CCV	Reported %D	Recalculated %D
1	ccv 18:53	3/10/16	GRO C_6-C_{10}	500.0	478.39	478.39	4	4
2	ccv 0200	3/11/16	↓	500.0	431.66	431.66	14	14
3								
4								

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

LDC #: 36282A7

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: FT
2nd reviewer: TC

METHOD: ✓ GC ___ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #9

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
4-BFB	✓	40	30.79	77	77	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound
A	Chlorobenzene (CBZ)	G	Octacosane	M	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	Y	Tetrachloro-m- xylene
B	4-Bromofluorobenzene (BFB)	H	Ortho-Terphenyl	N	Terphenyl-D14	T	3,4-Dinitrotoluene	Z	2-Bromonaphthalene
C	a,a,a-Trifluorotoluene	I	Fluorobenzene (FBZ)	O	Decachlorobiphenyl (DCB)	U	Tripentyltin	AA	Chloro-octadecane
D	Bromochlorobenene	J	n-Triacontane	P	1-methylnaphthalene	V	Tri-n-propyltin	BB	2,4-Dichlorophenylacetic acid
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate	CC	2,5-Dibromotoluene
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate		

LDC #: 36282A7

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer:

METHOD: ✓ GC __HPLC

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

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

RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100

Where SSC = Spiked sample concentration; SC = Sample concentration; SA = Spike added; MS = Matrix spike; MSD = Matrix spike duplicate

MS/MSD samples: 12 + 13

Compound	Spike Added (mg/kg)		Sample Conc. (mg/kg)	Spike Sample Concentration (mg/kg)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	22.9	23.1	ND	19.4	20.8	85	85	90	90	6	6
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
Phorate (8141A)											
Malathion (8141A)											
Formaldehyde (8315A)											

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

LDC #: 36282A7

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

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

%Recovery = 100 * (SSC/SA)
RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

Where SSC = Spiked sample concentration; LCS = Laboratory Control Sample; SA = Spike added; LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: GMC0095L/SC

Compound	Spike Added (mg/kg)		Spike Sample Concentration (mg/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)	25.0	25.0	21.9	25.0	87	87	100	100	13	13
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										
Phorate (8141A)										
Malathion (8141A)										
Formaldehyde (8315A)										

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

LDC #: 36282A7

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: ___ GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. GMC0095L Compound Name gasoline C_6-C_{10}

Concentration = $\frac{(7135846.0)(5)(5)}{(16318.3)(5.01)(0.1)}$ = 21.82 mg/kg

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 13, 2016

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C070

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-001	16C070-01	Soil	03/08/16
KCH067-002	16C070-02	Soil	03/08/16
KCH067-003	16C070-03	Soil	03/08/16
KCH067-004**	16C070-04**	Soil	03/08/16
KCH067-005	16C070-05	Soil	03/08/16
KCH067-006	16C070-06	Soil	03/08/16
KCH067-007	16C070-07	Soil	03/08/16
KCH067-008	16C070-08	Soil	03/08/16
KCH067-009	16C070-09	Soil	03/08/16
KCH067-010	16C070-10	Soil	03/08/16
KCH067-011	16C070-11	Soil	03/08/16
KCH067-012	16C070-12	Soil	03/08/16
KCH067-013	16C070-13	Soil	03/08/16
KCH067-014	16C070-14	Soil	03/08/16
KCH067-015	16C070-15	Soil	03/08/16
KCH067-016**	16C070-16**	Soil	03/08/16
KCH067-017	16C070-17	Soil	03/08/16
KCH067-018	16C070-18	Soil	03/08/16
KCH067-003MS	16C070-03MS	Soil	03/08/16
KCH067-003MSD	16C070-03MSD	Soil	03/08/16
KCH067-016MS	16C070-16MS	Soil	03/08/16
KCH067-016MSD	16C070-16MSD	Soil	03/08/16
KCH067-001DL	16C070-01DL	Soil	03/08/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Total Petroleum Hydrocarbons (TPH) as Extractables by Environmental Protection Agency (EPA) SW 846 Method 8015B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

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

V. Field Blanks

Sample KCH067-019 (from SDG 16C074) was identified as an equipment blank. No contaminants were found.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

The analysis was conducted within all specifications of the method.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Compound	Flag	A or P
KCH067-001DL	All compounds	R	A

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

China Lake CTO 067
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 16C070

Sample	Compound	Flag	A or P	Reason (Code)
KCH067-001DL	All compounds	R	A	Overall assessment of data (22)

China Lake CTO 067
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

China Lake CTO 067
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID:	KCH067-001	Date Analyzed:	03/16/16 12:52
Lab Samp ID:	C070-01N	Dilution Factor:	1
Lab File ID:	LC16007A	Matrix	: SOIL
Ext Btch ID:	DSC012S	% Moisture	: 4.3
Calib. Ref.:	LC16004A	Instrument ID	: D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	ND	10	2.6	5.2
JP-5	3.1J	21	2.6	5.2
MOTOR OIL	91	21	2.6	5.2

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	97.0	104.5	92.8	60-130
HEXACOSANE	29.5	26.12	113	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

3/25/16

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID:	KCH067-001	Date Analyzed:	03/15/16 19:55
Lab Samp ID:	C070-01I	Dilution Factor:	2
Lab File ID:	LC15017A	Matrix :	SOIL
Ext Btch ID:	DSC012S	% Moisture :	4.3
Calib. Ref.:	LC15011A	Instrument ID :	D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	ND R(22)	21	5.2	10
JP-5	ND	42	5.2	10
MOTOR OIL	62	42	5.2	10

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	93.8	104.5	89.8	60-130
HEXACOSANE	31.8	26.13	121.7	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

3/15/16

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID	: KCH067-002	Date Analyzed:	03/15/16 20:12
Lab Samp ID	: C070-02	Dilution Factor:	1
Lab File ID	: LC15018A	Matrix	: SOIL
Ext Btch ID	: DSC012S	% Moisture	: 9.0
Calib. Ref.	: LC15011A	Instrument ID	: D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	ND	11	2.7	5.5
JP-5	ND	22	2.7	5.5
MOTOR OIL	ND	22	2.7	5.5

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	103	109.9	93.5	60-130
HEXACOSANE	30.9	27.47	113	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

3/25/16

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID:	KCH067-003	Date Analyzed:	03/16/16 13:09
Lab Samp ID:	C070-03N	Dilution Factor:	1
Lab File ID:	LC16008A	Matrix :	SOIL
Ext Btch ID:	DSC012S	% Moisture :	6.9
Calib. Ref.:	LC16004A	Instrument ID :	D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	ND	11	2.7	5.4
JP-5	ND	21	2.7	5.4
MOTOR OIL	160	21	2.7	5.4

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	104	107.4	96.7	60-130
HEXACOSANE	29.3	26.85	109	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

SCS 17/16

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID:	KCH067-004	Date Analyzed:	03/15/16 21:20
Lab Samp ID:	C070-04	Dilution Factor:	1
Lab File ID:	LC15022A	Matrix	: SOIL
Ext Btch ID:	DSC012S	% Moisture	: 4.9
Calib. Ref.:	LC15011A	Instrument ID	: D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	ND	11	2.6	5.3
JP-5	ND	21	2.6	5.3
MOTOR OIL	ND	21	2.6	5.3

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	95.4	105.2	90.7	60-130
HEXACOSANE	27.6	26.29	105	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

8/25/16

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID:	KCH067-005	Date Analyzed:	03/15/16 22:27
Lab Samp ID:	C070-05	Dilution Factor:	1
Lab File ID:	LC15026A	Matrix :	SOIL
Ext Btch ID:	DSC012S	% Moisture :	2.7
Calib. Ref.:	LC15024A	Instrument ID :	D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	ND	10	2.6	5.1
JP-5	ND	21	2.6	5.1
MOTOR OIL	2.6J	21	2.6	5.1

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	89.8	102.8	87.3	60-130
HEXACOSANE	26.4	25.69	103	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

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METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID:	KCH067-006	Date Analyzed:	03/15/16 22:44
Lab Samp ID:	C070-06	Dilution Factor:	1
Lab File ID:	LC15027A	Matrix :	SOIL
Ext Btch ID:	DSC012S	% Moisture :	2.2
Calib. Ref.:	LC15024A	Instrument ID :	D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	ND	10	2.6	5.1
JP-5	ND	20	2.6	5.1
MOTOR OIL	ND	20	2.6	5.1

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	88.1	102.2	86.1	60-130
HEXACOSANE	26.6	25.56	104	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

8/05/16

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID:	KCH067-007	Date Analyzed:	03/15/16 23:01
Lab Samp ID:	C070-07	Dilution Factor:	1
Lab File ID:	LC15028A	Matrix	: SOIL
Ext Btch ID:	DSC012S	% Moisture	: 1.9
Calib. Ref.:	LC15024A	Instrument ID	: D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	ND	10	2.5	5.1
JP-5	ND	20	2.5	5.1
MOTOR OIL	ND	20	2.5	5.1

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	88.0	101.9	86.4	60-130
HEXACOSANE	26.3	25.48	103	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

3/17/16

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
Batch No. : 16C070	Date Extracted: 03/15/16 13:30
Sample ID: KCH067-008	Date Analyzed: 03/15/16 23:18
Lab Samp ID: C070-08	Dilution Factor: 1
Lab File ID: LC15029A	Matrix : SOIL
Ext Btch ID: DSC012S	% Moisture : 1.5
Calib. Ref.: LC15024A	Instrument ID : D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	ND	10	2.5	5.1
JP-5	ND	20	2.5	5.1
MOTOR OIL	ND	20	2.5	5.1

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	84.2	101.5	82.9	60-130
HEXACOSANE	26.4	25.38	104	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

3/25/16

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID:	KCH067-009	Date Analyzed:	03/15/16 23:18
Lab Samp ID:	C070-09N	Dilution Factor:	1
Lab File ID:	LC16011A	Matrix :	SOIL
Ext Btch ID:	DSC012S	% Moisture :	2.9
Calib. Ref.:	LC16004A	Instrument ID :	D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	210	10	2.6	5.1
JP-5	180	21	2.6	5.1
MOTOR OIL	ND	21	2.6	5.1

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	94.4	103.0	91.7	60-130
HEXACOSANE	27.6	25.75	107	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

3/25/16

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID:	KCH067-010	Date Analyzed:	03/16/16 14:17
Lab Samp ID:	C070-10N	Dilution Factor:	1
Lab File ID:	LC16012A	Matrix	: SOIL
Ext Btch ID:	DSC012S	% Moisture	: 3.8
Calib. Ref.:	LC16004A	Instrument ID	: D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	84	10	2.6	5.2
JP-5	83	21	2.6	5.2
MOTOR OIL	ND	21	2.6	5.2

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	89.3	104.0	85.9	60-130
HEXACOSANE	25.0	25.99	96.2	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

5/25/16

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID	: KCH067-011	Date Analyzed:	03/16/16 14:34
Lab Samp ID	: C070-11N	Dilution Factor:	1
Lab File ID	: LC16013A	Matrix	: SOIL
Ext Btch ID	: DSC012S	% Moisture	: 3.1
Calib. Ref.	: LC16004A	Instrument ID	: D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	180	10	2.6	5.2
JP-5	150	21	2.6	5.2
MOTOR OIL	ND	21	2.6	5.2

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	93.7	103.2	90.8	60-130
HEXACOSANE	27.9	25.80	108	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

3/17/16

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID:	KCH067-012	Date Analyzed:	03/16/16 00:26
Lab Samp ID:	C070-12	Dilution Factor:	1
Lab File ID:	LC15033A	Matrix :	SOIL
Ext Btch ID:	DSC012S	% Moisture :	3.5
Calib. Ref.:	LC15024A	Instrument ID :	D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	ND	10	2.6	5.2
JP-5	ND	21	2.6	5.2
MOTOR OIL	ND	21	2.6	5.2

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	88.2	103.6	85.1	60-130
HEXACOSANE	25.7	25.91	99.2	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

8/05/16

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID	: KCH067-013	Date Analyzed:	03/16/16 00:43
Lab Samp ID	: C070-13	Dilution Factor:	1
Lab File ID	: LC15034A	Matrix :	SOIL
Ext Btch ID	: DSC012S	% Moisture :	5.0
Calib. Ref.	: LC15024A	Instrument ID :	D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	ND	11	2.6	5.3
JP-5	ND	21	2.6	5.3
MOTOR OIL	ND	21	2.6	5.3

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	89.0	105.3	84.6	60-130
HEXACOSANE	26.1	26.32	99.1	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

SG 5/17/16

5030

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID	: KCH067-014	Date Analyzed:	03/16/16 14:51
Lab Samp ID	: C070-14N	Dilution Factor:	1
Lab File ID	: LC16014A	Matrix :	SOIL
Ext Btch ID	: DSC012S	% Moisture :	3.9
Calib. Ref.	: LC16004A	Instrument ID :	D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	8.8J	10	2.6	5.2
JP-5	7.9J	21	2.6	5.2
MOTOR OIL	ND	21	2.6	5.2

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	94.7	104.1	91.0	60-130
HEXACOSANE	28.1	26.01	108	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

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METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID	: KCH067-015	Date Analyzed:	03/16/16 01:50
Lab Samp ID	: C070-15	Dilution Factor:	1
Lab File ID	: LC15038A	Matrix :	SOIL
Ext Btch ID	: DSC012S	% Moisture :	3.6
Calib. Ref.	: LC15036A	Instrument ID :	D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	ND	10	2.6	5.2
JP-5	ND	21	2.6	5.2
MOTOR OIL	ND	21	2.6	5.2

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	88.4	103.7	85.2	60-130
HEXACOSANE	24.8	25.93	95.7	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

3/25/16

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID:	KCH067-016	Date Analyzed:	03/16/16 02:07
Lab Samp ID:	C070-16	Dilution Factor:	1
Lab File ID:	LC15039A	Matrix :	SOIL
Ext Btch ID:	DSC012S	% Moisture :	2.8
Calib. Ref.:	LC15036A	Instrument ID :	D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	ND	10	2.6	5.1
JP-5	ND	21	2.6	5.1
MOTOR OIL	ND	21	2.6	5.1

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	89.7	102.9	87.2	60-130
HEXACOSANE	25.3	25.72	98.5	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

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METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID:	KCH067-017	Date Analyzed:	03/16/16 15:08
Lab Samp ID:	C070-17N	Dilution Factor:	1
Lab File ID:	LC16015A	Matrix :	SOIL
Ext Btch ID:	DSC012S	% Moisture :	0.0
Calib. Ref.:	LC16004A	Instrument ID :	D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	ND	10	2.5	5.0
JP-5	ND	20	2.5	5.0
MOTOR OIL	69	20	2.5	5.0

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	90.4	100.0	90.4	60-130
HEXACOSANE	26.9	25.00	108	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

3/16/16

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 13:30
Sample ID	: KCH067-018	Date Analyzed:	03/16/16 03:15
Lab Samp ID	: C070-18	Dilution Factor:	1
Lab File ID	: LC15043A	Matrix	: SOIL
Ext Btch ID	: DSC012S	% Moisture	: 2.1
Calib. Ref.	: LC15036A	Instrument ID	: D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	ND	10	2.6	5.1
JP-5	ND	20	2.6	5.1
MOTOR OIL	ND	20	2.6	5.1

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	85.1	102.1	83.3	60-130
HEXACOSANE	24.3	25.54	95.0	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

4/05/16

LDC #: 36282A8 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/9/16
SDG #: 16C070 Standard/Full Page: 1 of 2
Laboratory: EMAX Laboratories Inc. Reviewer: EF
2nd Reviewer: AC

METHOD: GC TPH as Extractables (EPA SW 846 Method 8015B)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	Initial calibration/ICV	A / A	%RSD/ICV ≤20
III.	Continuing calibration	A	CCV ≤20
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	EB = KCH067-019 (SDG# 16C074)
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	
X.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Standard validation.
XI.	Target compound identification	A	Not reviewed for Standard validation.
XII	Overall assessment of data	SW	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-001	16C070-01	Soil	03/08/16
2	KCH067-002	16C070-02	Soil	03/08/16
3	KCH067-003	16C070-03	Soil	03/08/16
4	KCH067-004**	16C070-04**	Soil	03/08/16
5	KCH067-005	16C070-05	Soil	03/08/16
6	KCH067-006	16C070-06	Soil	03/08/16
7	KCH067-007	16C070-07	Soil	03/08/16
8	KCH067-008	16C070-08	Soil	03/08/16
9	KCH067-009	16C070-09	Soil	03/08/16
10	KCH067-010	16C070-10	Soil	03/08/16
11	KCH067-011	16C070-11	Soil	03/08/16
12	KCH067-012	16C070-12	Soil	03/08/16
13	KCH067-013	16C070-13	Soil	03/08/16
14	KCH067-014	16C070-14	Soil	03/08/16
15	KCH067-015	16C070-15	Soil	03/08/16
16	KCH067-016**	16C070-16**	Soil	03/08/16
17	KCH067-017	16C070-17	Soil	03/08/16

LDC #: 36282A8 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/9/16
SDG #: 16C070 Standard/Full Page: 2 of 2
Laboratory: EMAX Laboratories Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC TPH as Extractables (EPA SW 846 Method 8015B)

	Client ID	Lab ID	Matrix	Date
18	KCH067-018	16C070-18	Soil	03/08/16
19	KCH067-003MS	16C070-03MS	Soil	03/08/16
20	KCH067-003MSD	16C070-03MSD	Soil	03/08/16
21	KCH067-016MS	16C070-16MS	Soil	03/08/16
22	KCH067-016MSD	16C070-16MSD	Soil	03/08/16
23	# 1DL	16C070-01 DL	SOIL	3/8/16
24				
25				
26				
27				

Notes:

LDC #: 36287A8

VALIDATION FINDINGS CHECKLIST

Reviewer: P
2nd Reviewer: R

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
IIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥0.990?		✓		
Were the RT windows properly established?			✓	
IIb. Initial calibration verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) < 20% or percent recoveries (%R) 80-120%?	✓			
III. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
IV. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.			✓	
V. Field Blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VI. Surrogate spikes				
Were all surrogate percent recovery (%R) within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			

LDC #: 36282AX

VALIDATION FINDINGS CHECKLIST

Reviewer: RP
2nd Reviewer: AC

Validation Area	Yes	No	NA	Findings/Comments
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?			✓	
X. Compound quantitation				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC #: 36282A8

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: ✓ **GC** __ **HPLC**

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

Level IV/D Only

Y N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Y N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results? Code # 22

#	Associated Samples	Compound Name	Findings	Qualifications
	23	all	diluted	P/A

Comments: See sample calculation verification worksheet for recalculations

LDC #: 36282A4

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer: KC

METHOD: GC ✓ HPLC ____

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C
Average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where: A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (50.0 std)	Recalculated CF (50.0 std)	Reported CF (initial)	Recalculated CF (intial)	Reported %RSD	Recalculated %RSD
1	ICAL	3/9/16	Diesel C10-C24	33825	33825	31896.9	31896.9	12.9	12.9
2									
3									
4									

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

LDC #: 36282A8

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC ✓ HPLC _____

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

% Difference = 100 * (ave. CF -CF)/ave.CF

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(ICAL)/ CCV Conc.	Reported	Recalculated	Reported	Recalculated
					CF/ Conc. CCV	CF/ Conc. CCV	%D	%D
1	CCV 14:48	3/15/16	Diesel $C_{10}-C_{24}$	500.0	489.25	489.25	2	2
2	CCV 0116	3/16/16	↓	500.0	493.21	493.21	1	1
3	CCV 1149	3/16/16	↓	500.0	478.36	478.36	4	4
4								

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

LDC #: 36282AS

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: FT
2nd reviewer: PC

METHOD: ___ GC ___ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #16

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Bromobenzene	✓	100	87.167	87.2	87.2	0
Hexacosane		25	24.635	98.5	98.5	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound
A	Chlorobenzene (CBZ)	G	Octacosane	M	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	Y	Tetrachloro-m- xylene
B	4-Bromofluorobenzene (BFB)	H	Ortho-Terphenyl	N	Terphenyl-D14	T	3,4-Dinitrotoluene	Z	2-Bromonaphthalene
C	a,a,a-Trifluorotoluene	I	Fluorobenzene (FBZ)	O	Decachlorobiphenyl (DCB)	U	Tripentyltin	AA	Chloro-octadecane
D	Bromochlorobenene	J	n-Triacontane	P	1-methylnaphthalene	V	Tri-n-propyltin	BB	2,4-Dichlorophenylacetic acid
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate	CC	2,5-Dibromotoluene
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate		

LDC #: 36282A8

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: __ GC __HPLC

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

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

RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100

Where SSC = Spiked sample concentration
SC = Sample concentration
SA = Spike added
MS = Matrix spike
MSD = Matrix spike duplicate

MS/MSD samples: 19 + 20

Compound	Spike Added (mg/kg)		Sample Conc. (mg/kg)	Spike Sample Concentration (mg/kg)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)	537	537	ND	519	547	97	97	102	102	5	5
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)											
2,4,6-Trinitrotoluene (8330)											
Phorate (8141A)											
Malathion (8141A)											
Formaldehyde (8315A)											

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

LDC #: 36282T8

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: FT
2nd Reviewer:

METHOD: ✓ GC ___HPLC

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

%Recovery = 100 * (SSC/SA)
RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

Where SSC = Spiked sample concentration
LCS = Laboratory Control Sample
SA = Spike added
LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: DSC012SL /SC

Compound	Spike Added (mg/kg)		Spike Sample Concentration (mg/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)	500	500	571	523	114	114	105	105	9	9
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										
Phorate (8141A)										
Malathion (8141A)										
Formaldehyde (8315A)										

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

LDC #: 36282AJ

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. DSC012SL Compound Name Diesel C10 - C 24

Concentration = $\frac{1822.3298 \ (10)}{31896.87324 \ (10)}$ =

= 571 mg/kg

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments:

SAMPCLC_r1.wpd

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 11, 2016

Parameters: Explosives

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C070

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-005	16C070-05	Soil	03/08/16
KCH067-006	16C070-06	Soil	03/08/16
KCH067-007	16C070-07	Soil	03/08/16
KCH067-008	16C070-08	Soil	03/08/16
KCH067-009	16C070-09	Soil	03/08/16
KCH067-010	16C070-10	Soil	03/08/16
KCH067-011	16C070-11	Soil	03/08/16
KCH067-012	16C070-12	Soil	03/08/16
KCH067-013	16C070-13	Soil	03/08/16
KCH067-014	16C070-14	Soil	03/08/16
KCH067-015	16C070-15	Soil	03/08/16
KCH067-016**	16C070-16**	Soil	03/08/16
KCH067-017	16C070-17	Soil	03/08/16
KCH067-018	16C070-18	Soil	03/08/16
KCH067-016MS	16C070-16MS	Soil	03/08/16
KCH067-016MSD	16C070-16MSD	Soil	03/08/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Explosives by Environmental Protection Agency (EPA) SW 846 Method 8330A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 15.0% for all compounds.

Retention time windows were established as required by the method for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 15.0% for all compounds.

Retention times of all compounds in the calibration standards were within the established retention time windows for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

IV. Laboratory Blanks

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

V. Field Blanks

Sample KCH067-019 (from SDG 16C074) was identified as an equipment blank. No contaminants were found.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

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

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

China Lake CTO 067
Explosives - Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

China Lake CTO 067
Explosives - Laboratory Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

China Lake CTO 067
Explosives - Field Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 16:30
Sample ID	: KCH067-005	Date Analyzed:	03/16/16 19:42
Lab Samp ID	: C070-05	Dilution Factor:	1
Lab File ID	: XC16007A	Matrix :	SOIL
Ext Btch ID	: EXC006S	% Moisture :	NA
Calib. Ref.	: XC16002A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2140	2000	107	60-140

Note: All positive results are confirmed by Biphenyl column

SL 3/17/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 16:30
Sample ID	: KCH067-006	Date Analyzed:	03/16/16 20:18
Lab Samp ID	: C070-06	Dilution Factor:	1
Lab File ID	: XC16008A	Matrix :	SOIL
Ext Btch ID	: EXC006S	% Moisture :	NA
Calib. Ref.	: XC16002A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2310	2000	116	60-140

Note: All positive results are confirmed by Biphenyl column

3/17/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 16:30
Sample ID	: KCH067-007	Date Analyzed:	03/16/16 21:01
Lab Samp ID	: C070-07	Dilution Factor:	1
Lab File ID	: XC16009A	Matrix :	SOIL
Ext Btch ID	: EXC006S	% Moisture :	NA
Calib. Ref.	: XC16002A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2170	2000	108	60-140

Note: All positive results are confirmed by Biphenyl column

SC 051716

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 16:30
Sample ID:	KCH067-008	Date Analyzed:	03/16/16 21:38
Lab Samp ID:	C070-08	Dilution Factor:	1
Lab File ID:	XC16010A	Matrix :	SOIL
Ext Btch ID:	EXC006S	% Moisture :	NA
Calib. Ref.:	XC16002A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2130	2000	106	60-140

Note: All positive results are confirmed by Biphenyl column

Sl 03/17/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 16:30
Sample ID	: KCH067-009	Date Analyzed:	03/16/16 22:21
Lab Samp ID	: C070-09	Dilution Factor:	1
Lab File ID	: XC16011A	Matrix :	SOIL
Ext Btch ID	: EXC006S	% Moisture :	NA
Calib. Ref.	: XC16002A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	280J	400	50	100
RDX	4600	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2060	2000	103	60-140

Note: All positive results are confirmed by Biphenyl column

SG 5/7/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 16:30
Sample ID:	KCH067-010	Date Analyzed:	03/16/16 22:58
Lab Samp ID:	C070-10	Dilution Factor:	1
Lab File ID:	XC16012A	Matrix :	SOIL
Ext Btch ID:	EXC006S	% Moisture :	NA
Calib. Ref.:	XC16002A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2140	2000	107	60-140

Note: All positive results are confirmed by Biphenyl column

3/25/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 16:30
Sample ID	: KCH067-011	Date Analyzed:	03/16/16 23:41
Lab Samp ID	: C070-11	Dilution Factor:	1
Lab File ID	: XC16013A	Matrix :	SOIL
Ext Btch ID	: EXC006S	% Moisture :	NA
Calib. Ref.	: XC16002A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	440	400	50	100
RDX	2000	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2100	2000	105	60-140

Note: All positive results are confirmed by Biphenyl column

3/17/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 16:30
Sample ID:	KCH067-012	Date Analyzed:	03/17/16 02:21
Lab Samp ID:	C070-12	Dilution Factor:	1
Lab File ID:	XC16017A	Matrix :	SOIL
Ext Btch ID:	EXC006S	% Moisture :	NA
Calib. Ref.:	XC16015A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	390J	400	50	100
RDX	620	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2250	2000	113	60-140

Note: All positive results are confirmed by Biphenyl column

8/17/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 16:30
Sample ID:	KCH067-013	Date Analyzed:	03/17/16 02:58
Lab Samp ID:	C070-13	Dilution Factor:	1
Lab File ID:	XC16018A	Matrix :	SOIL
Ext Btch ID:	EXC006S	% Moisture :	NA
Calib. Ref.:	XC16015A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2120	2000	106	60-140

Note: All positive results are confirmed by Biphenyl column

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 16:30
Sample ID:	KCH067-014	Date Analyzed:	03/17/16 03:41
Lab Samp ID:	C070-14	Dilution Factor:	1
Lab File ID:	XC16019A	Matrix	: SOIL
Ext Btch ID:	EXC006S	% Moisture	: NA
Calib. Ref.:	XC16015A	Instrument ID	: T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	92J	400	50	100
RDX	150J	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2180	2000	109	60-140

Note: All positive results are confirmed by Biphenyl column

SC05/7/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 16:30
Sample ID	: KCH067-015	Date Analyzed:	03/17/16 04:18
Lab Samp ID	: C070-15	Dilution Factor:	1
Lab File ID	: XC16020A	Matrix :	SOIL
Ext Btch ID	: EXC006S	% Moisture :	NA
Calib. Ref.	: XC16015A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2150	2000	107	60-140

Note: All positive results are confirmed by Biphenyl column

8/6/17/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 16:30
Sample ID:	KCH067-016	Date Analyzed:	03/17/16 05:01
Lab Samp ID:	C070-16	Dilution Factor:	1
Lab File ID:	XC16021A	Matrix :	SOIL
Ext Btch ID:	EXC006S	% Moisture :	NA
Calib. Ref.:	XC16015A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2050	2000	102	60-140

Note: All positive results are confirmed by Biphenyl column

3/25/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 16:30
Sample ID:	KCH067-017	Date Analyzed:	03/17/16 06:58
Lab Samp ID:	C070-17	Dilution Factor:	1
Lab File ID:	XC16024A	Matrix :	SOIL
Ext Btch ID:	EXC006S	% Moisture :	NA
Calib. Ref.:	XC16015A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2100	2000	105	60-140

Note: All positive results are confirmed by Biphenyl column.

3/21/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C070	Date Extracted:	03/15/16 16:30
Sample ID	: KCH067-018	Date Analyzed:	03/17/16 07:41
Lab Samp ID	: C070-18	Dilution Factor:	1
Lab File ID	: XC16025A	Matrix :	SOIL
Ext Btch ID	: EXC006S	% Moisture :	NA
Calib. Ref.	: XC16015A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2120	2000	106	60-140

Note: All positive results are confirmed by Biphenyl column

SK 5/17/16

LDC #: 36282A40 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/9/16
SDG #: 16C070 Standard/Full Page: 1 of 1
Laboratory: EMAX Laboratories Inc. Reviewer: EJ
2nd Reviewer:

METHOD: HPLC Explosives (EPA SW 846 Method 8330)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	Initial calibration/ICV	A / A	%D ≤ 20 ICV ≤ ~~20~~ 15 CCV ≤ ~~20~~ 15 (F7)
III.	Continuing calibration	A	
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	EB- KCH067-019 (16C074)
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS ID
IX.	Field duplicates	N	
X.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Standard validation.
XI.	Target compound identification	A	Not reviewed for Standard validation.
XII.	System performance	A	Not reviewed for Standard validation.
XIII.	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-005	16C070-05	Soil	03/08/16
2	KCH067-006	16C070-06	Soil	03/08/16
3	KCH067-007	16C070-07	Soil	03/08/16
4	KCH067-008	16C070-08	Soil	03/08/16
5	KCH067-009	16C070-09	Soil	03/08/16
6	KCH067-010	16C070-10	Soil	03/08/16
7	KCH067-011	16C070-11	Soil	03/08/16
8	KCH067-012	16C070-12	Soil	03/08/16
9	KCH067-013	16C070-13	Soil	03/08/16
10	KCH067-014	16C070-14	Soil	03/08/16
11	KCH067-015	16C070-15	Soil	03/08/16
12	KCH067-016**	16C070-16**	Soil	03/08/16
13	KCH067-017	16C070-17	Soil	03/08/16
14	KCH067-018	16C070-18	Soil	03/08/16
15	KCH067-016MS	16C070-16MS	Soil	03/08/16
16	KCH067-016MSD	16C070-16MSD	Soil	03/08/16

LDC #: 36282A40 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/9/16

SDG #: 16C070 Standard/Full Page: 2 of 2

Laboratory: EMAX Laboratories Inc. Reviewer:

2nd Reviewer:

METHOD: HPLC Explosives (EPA SW 846 Method 8330)

	Client ID	Lab ID	Matrix	Date
17				
18				
19				
20				
21				

Notes:

	MBLK1S						

LDC #: 36282A40

VALIDATION FINDINGS CHECKLIST

Reviewer:
2nd Reviewer:

Method: X GC ____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
IIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥0.990?			✓	
Were the RT windows properly established?	✓			
IIb. Initial calibration verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 15%?	✓			
III. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 15%?	✓			
Were all the retention times within the acceptance windows?	✓			
IV. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. Field Blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VI. Surrogate spikes				
Were all surrogate percent recovery (%R) within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			

LDC #: 36282A4U

VALIDATION FINDINGS CHECKLIST

Reviewer: EF
2nd Reviewer: Q

Validation Area	Yes	No	NA	Findings/Comments
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?			✓	
X. Compound quantitation				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC #: 36282A40

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC ~~HPLC~~ HPLC

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C
Average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where: A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (100 std)	Recalculated CF (100 std)	Reported CF (initial)	Recalculated CF (intial)	Reported %RSD	Recalculated %RSD
1	ICAL	1/27/16	HMX (C18)	145	145.15	151.7	151.7	6.9	6.9
			2,4,6 TNT	430	429.84	410.8	410.8	6.3	6.3
2	ICAL	1/20/16	HMX (Biphenyl)	124	123.6	122.9	122.9	9.8	9.8
			2,4,6 TNT	321	320.7	322.0	322.0	6.1	6.1
3									
4									

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

LDC #: 36282A40

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC ~~X~~ HPLC

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

% Difference = 100 * (ave. CF -CF)/ave.CF

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(ICAL)/ CCV Conc.	Reported CF/ Conc. CCV	Recalculated CF/ Conc. CCV	Reported %D	Recalculated %D
1	CCV 1618	3/16/16	HMX (C18)	400.0	F1 ~~151.7~~ 403.75	403.75	1	1
			2,4,6-TNT	400.0	384.47	384.47	4	4
2	CCV 01:01	3/17/17	HMX (C18)	400.0	F1 ~~151.7~~ 418.33	418.33	5	5
			2,4,6-TNT	400.0	392.95	392.95	2	2
3	CCV 1246	3/22/16	HMX (Biphenyl)	200.0	219.40	219.40	10	10
			2,4,6-TNT	200.0	183.57	183.57	8	8
4								

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

LDC #: 36282A40

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: EJ
2nd reviewer: DC

METHOD: ~~GC~~ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #12

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
3,4- Dinitrotoluene	C-18 ch A	2050	2000	102	102	0

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

Sample ID:

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

LDC #: 36282A40

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: FT
2nd Reviewer: A

METHOD: ~~GC~~ HPLC

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

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

RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100

Where SSC = Spiked sample concentration; SC = Sample concentration; SA = Spike added; MS = Matrix spike; MSD = Matrix spike duplicate

MS/MSD samples: 15 + 16

Compound	Spike Added (ug/kg)		Sample Conc. (ug/kg)	Spike Sample Concentration (ug/kg)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)											
Diesel (8015)											
Benzene (8021B)											
Methane (RSK-175)											
2,4-D (8151)											
Dinoseb (8151)											
Naphthalene (8310)											
Anthracene (8310)											
HMX (8330)	2000	2000	ND	2360	2150	118	118	107	107	10	10
2,4,6-Trinitrotoluene (8330)	2000	2000	ND	1980	2020	99	99	101	101	2	2
Phorate (8141A)											
Malathion (8141A)											
Formaldehyde (8315A)											

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

LDC #: 36282A40

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: ~~GC~~ HPLC

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

%Recovery = 100 * (SSC/SA)
RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

Where SSC = Spiked sample concentration; SA = Spike added
LCS = Laboratory Control Sample; LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: EX C0060SL/SC

Compound	Spike Added (ug/kg)		Spike Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)	2000	2000	2190	2300	109	109	115	115	5	5
2,4,6-Trinitrotoluene (8330)	↓	↓	2110	2080	106	106	104	104	2	2
Phorate (8141A)										
Malathion (8141A)										
Formaldehyde (8315A)										

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

LDC #: 36282A40

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: ✓ GC ___ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. LCS Compound Name HMX

Concentration = $\frac{(33210)(20)}{(151.7)(2)}$

= 2190 ug/kg

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments:

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 12, 2016

Parameters: Perchlorate

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C070

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-005	16C070-05	Soil	03/08/16
KCH067-006	16C070-06	Soil	03/08/16
KCH067-007	16C070-07	Soil	03/08/16
KCH067-008	16C070-08	Soil	03/08/16
KCH067-009	16C070-09	Soil	03/08/16
KCH067-010	16C070-10	Soil	03/08/16
KCH067-011	16C070-11	Soil	03/08/16
KCH067-012	16C070-12	Soil	03/08/16
KCH067-013	16C070-13	Soil	03/08/16
KCH067-014	16C070-14	Soil	03/08/16
KCH067-015	16C070-15	Soil	03/08/16
KCH067-016**	16C070-16**	Soil	03/08/16
KCH067-017	16C070-17	Soil	03/08/16
KCH067-018	16C070-18	Soil	03/08/16
KCH067-016MS	16C070-16MS	Soil	03/08/16
KCH067-016MSD	16C070-16MSD	Soil	03/08/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perchlorate by Environmental Protection Agency (EPA) SW 846 Method 6850

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance check was performed prior to initial calibration.

All perchlorate ion signal to noise ratio requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

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

The isotope ratios were within QC limits.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 15.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 15.0% for all compounds.

The percent differences (%D) of the limit of detection verification (LODV) standard were less than or equal to 30.0%.

The isotope ratios were within QC limits.

V. Laboratory Blanks

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

VI. Field Blanks

Sample KCH067-019 (from SDG 16C074) was identified as an equipment blank. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

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

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

China Lake CTO 067
Perchlorate - Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

China Lake CTO 067
Perchlorate - Laboratory Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

China Lake CTO 067
Perchlorate - Field Blank Data Qualification Summary - SDG 16C070

No Sample Data Qualified in this SDG

METHOD SW6850
PERCHLORATE

Client : KLEINFELDER
Project : NAWS CHINA LAKE, CTO 067
Batch No. : 16C070

Matrix : SOIL
InstrumentID : G0

Client SAMPLE ID	EMAX SAMPLE ID	RESULT (ug/kg)	DIL'N. FACTOR	MOIST (%)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1S	PLC002SB	ND	1	NA	4	0.5	1	03/23/1615:38	03/15/1610:37	16MC23024	MC23021	16PLC002S	NA	NA
LCS1S	PLC002SL	4.50	1	NA	4	0.5	1	03/23/1615:53	03/15/1610:37	16MC23025	MC23021	16PLC002S	NA	NA
LCD1S	PLC002SC	4.48	1	NA	4	0.5	1	03/23/1616:08	03/15/1610:37	16MC23026	MC23021	16PLC002S	NA	NA
KCH067-005	C070-05	ND	1	2.7	4.11	0.514	1.03	03/23/1616:25	03/15/1610:37	16MC23027	MC23021	16PLC002S	03/08/1613:25	03/10/16
KCH067-006	C070-06	ND	1	2.2	4.09	0.511	1.02	03/23/1616:40	03/15/1610:37	16MC23028	MC23021	16PLC002S	03/08/1613:40	03/10/16
KCH067-007	C070-07	ND	1	1.9	4.08	0.51	1.02	03/23/1616:55	03/15/1610:37	16MC23029	MC23021	16PLC002S	03/08/1613:45	03/10/16
KCH067-008	C070-08	ND	1	1.5	4.06	0.508	1.02	03/23/1617:10	03/15/1610:37	16MC23030	MC23021	16PLC002S	03/08/1613:55	03/10/16
KCH067-009	C070-09	ND	1	2.9	4.12	0.515	1.03	03/23/1617:24	03/15/1610:37	16MC23031	MC23021	16PLC002S	03/08/1614:00	03/10/16
KCH067-010	C070-10	ND	1	3.8	4.16	0.52	1.04	03/23/1617:39	03/15/1610:37	16MC23032	MC23021	16PLC002S	03/08/1614:05	03/10/16
KCH067-011	C070-11	1.63J	1	3.1	4.13	0.516	1.03	03/23/1617:53	03/15/1610:37	16MC23033	MC23021	16PLC002S	03/08/1614:10	03/10/16
KCH067-012	C070-12	22.4	1	3.5	4.15	0.518	1.04	03/24/1611:54	03/15/1610:37	16MC23051	MC23046	16PLC002S	03/08/1614:20	03/10/16
KCH067-013	C070-13	2.17J	1	5.0	4.21	0.526	1.05	03/24/1612:09	03/15/1610:37	16MC23052	MC23046	16PLC002S	03/08/1614:25	03/10/16
KCH067-014	C070-14	4.79	1	3.9	4.16	0.52	1.04	03/24/1612:23	03/15/1610:37	16MC23053	MC23046	16PLC002S	03/08/1614:30	03/10/16
KCH067-015	C070-15	ND	1	3.6	4.15	0.519	1.04	03/24/1612:38	03/15/1610:37	16MC23054	MC23046	16PLC002S	03/08/1614:50	03/10/16
KCH067-016	C070-16	2.53J	1	2.8	4.12	0.514	1.03	03/24/1612:52	03/15/1610:37	16MC23055	MC23046	16PLC002S	03/08/1615:00	03/10/16
KCH067-016MS	C070-16M	7.10	1	2.8	4.12	0.514	1.03	03/24/1613:07	03/15/1610:37	16MC23056	MC23046	16PLC002S	03/08/1615:00	03/10/16
KCH067-016MSD	C070-16S	7.04	1	2.8	4.12	0.514	1.03	03/24/1613:21	03/15/1610:37	16MC23057	MC23046	16PLC002S	03/08/1615:00	03/10/16
KCH067-017	C070-17	24.4	1	0.0	4	0.5	1	03/24/1613:36	03/15/1610:37	16MC23058	MC23046	16PLC002S	03/08/1615:20	03/10/16
KCH067-018	C070-18	5.13	1	2.1	4.09	0.511	1.02	03/24/1613:51	03/15/1610:37	16MC23059	MC23046	16PLC002S	03/08/1615:30	03/10/16

L05/7/6

8003

LDC #: 36282A87 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/10/16
SDG #: 16C070 Standard/Full Page: 1 of 2
Laboratory: EMAX Laboratories Inc. Reviewer: FM
2nd Reviewer: AC

METHOD: LC/MS Perchlorate (EPA SW846 Method 6850)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	auto Tune
III.	Initial calibration/ICV	A/A	~~%RSD ≤20 r²~~ FM ICV ≤15 CCV ≤15 LODV ≤30
IV.	Continuing calibration	A	
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB= KCH067-019 (16C074)
VII.	Surrogate spikes	N	not required
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS IP
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Standard validation.
XIII.	Target compound identification	A	Not reviewed for Standard validation.
XIV.	System performance	A	Not reviewed for Standard validation.
XV.	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-005	16C070-05	Soil	03/08/16
2	KCH067-006	16C070-06	Soil	03/08/16
3	KCH067-007	16C070-07	Soil	03/08/16
4	KCH067-008	16C070-08	Soil	03/08/16
5	KCH067-009	16C070-09	Soil	03/08/16
6	KCH067-010	16C070-10	Soil	03/08/16
7	KCH067-011	16C070-11	Soil	03/08/16
8	KCH067-012	16C070-12	Soil	03/08/16
9	KCH067-013	16C070-13	Soil	03/08/16
10	KCH067-014	16C070-14	Soil	03/08/16
11	KCH067-015	16C070-15	Soil	03/08/16
12	KCH067-016**	16C070-16**	Soil	03/08/16
13	KCH067-017	16C070-17	Soil	03/08/16

LDC #: 36282A87 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/10/16
SDG #: 16C070 Standard/Full Page: 2 of 2
Laboratory: EMAX Laboratories Inc. Reviewer: FJ
2nd Reviewer: MC

METHOD: LC/MS Perchlorate (EPA SW846 Method 6850)

	Client ID	Lab ID	Matrix	Date
14	KCH067-018	16C070-18	Soil	03/08/16
15	KCH067-016MS	16C070-16MS	Soil	03/08/16
16	KCH067-016MSD	16C070-16MSD	Soil	03/08/16
17				
18				
19				
20				
21				

Notes:

LDC #: 36282A87

VALIDATION FINDINGS CHECKLIST

Reviewer: EZ
2nd Reviewer: fa

Method: Perchlorate (EPA SW 846 Method 6850)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were the Perchlorate ions within ±0.3 m/z of mass 99,101 and 107?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓		✓	
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?	✓			
Was the isotope ratio of $^{35}Cl/^{37}Cl$ or m/z 99/101 within 2.3 to 3.8?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 15%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the mid-range continuing calibration ≤ 15%?	✓			
Were all percent differences (%D) of the low-range continuing calibration ≤ 50%?	✓			
Was the isotope ratio of $^{35}Cl/^{37}Cl$ or m/z 99/101 within 2.3 to 3.8?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			

LDC #: 36282A87

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: FD
2nd Reviewer: AC

Validation Area	Yes	No	NA	Findings/Comments
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?.			✓	
XI. Internal standards				
Were internal standard area counts within ± 50% of the associated calibration standard?	✓			
Were retention times of m/z 89 ($Cl^{18}O_3^-$) within 0.2 minutes of m/z 83 (ClO_3^-)?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within 0.98 to 1.02?	✓			
Was the isotope ratio of $^{35}Cl/^{37}Cl$ or m/z 99/101 within 2.3 to 3.8?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC#: 36282A87
SDG#: pe cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: PD
2nd Reviewer: AL

Method: LCMS Perchlorate (Method 6850)

Calibration Date	System	Compound	Standard	(Y) Response	(X) Concentration
3/3/2016	LCMS	Perchlorate	1	0.092049784	0.1
			2	0.181001406	0.2
			3	0.473018348	0.5
			4	0.958156512	1
			5	1.944112791	2
			6	4.823551117	5
			7	6.972141437	7.5

Regression Output		*Reported*
Constant	*0.022419*	*-0.002295*
Std Err of Y Est		
R Squared	*0.999451*	*0.999500*
Degrees of Freedom		
X Coefficient(s)	*0.937859*	*0.948471*
Std Err of Coef.		
Correlation Coefficient	*0.999725*	
Coefficient of Determination (r^2)	*0.999451*	*0.999500*

LDC #: 36282187

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Reviewer: PR
2nd Reviewer: [illegible]

METHOD: LC/MS Perchlorate (EPA Method 6850)

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

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

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

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	MC23021	3/23/16	Perchlorate	2.0	1.970	1.970	1.5	1.5
	CCV							
2	MC23046	3/24/16	Perchlorate	2.0	2.031	2.031	1.6	1.6
	CCV							
3								

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

LDC #: 36282A87

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer: AC

METHOD: LC/MS perchlorate(EPA Method 6850)

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

% Recovery = 100 * (SSR - SR)/SA Where: SSR = Spiked sample result, SR = Sample result
SA = Spike added

RPD = | MSR - MSDR | * 2/(MSR + MSDR) MSR = Matrix spike percent recovery MSDR = Matrix spike duplicate percent recovery

MS/MSD samples: 15 + 16

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		Reported RPD	Recalculated RPD
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	----	----
Perchlorate	4.115	4.115	2.53	7.10	7.04	111	111	110	110	1	1

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

LDC #: 36282187

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer: DC

METHOD: LC/MS Perchlorate (EPA Method 6850)

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

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration
SA = Spike added

RPD = | LCS - LCSD | * 2/(LCS + LCSD) LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: lcs ID

Compound	Spike Added (ug/kg)		Spiked Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCSD		LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Perchlorate	4	4	4.50	4.48	112	112	112	112	0	0

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

LDC #: 36282A87

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: FT
2nd reviewer: A

METHOD: LCMS (EPA SW 846 Method 6850)

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

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

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

Example:

Sample I.D. #12, Perchlorate

Conc. = $\frac{\left(\frac{14039}{122932} + 0.00229468\right)(40)}{(0.948471)(2)(0.972)}$

=

2.53 ug/kg

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 11, 2016

Parameters: Volatiles

Validation Level: Level III

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C074

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-019	16C074-01	Water	03/08/16
KCH067-021	16C074-02	Water	03/08/16

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

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

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

Average relative response factors (RRF) for all compounds were within validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
02/26/16	tert-Butyl alcohol	0.007 (≥0.01)	All samples in SDG 16C074	UJ (all non-detects)	A

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
03/14/16	tert-Butyl alcohol	0.007 (≥0.01)	All samples in SDG 16C074	UJ (all non-detects)	A

V. Laboratory Blanks

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

VI. Field Blanks

Sample KCH067-021 was identified as a trip blank. No contaminants were found.

Sample KCH067-019 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
KCH067-019	03/08/16	Carbon disulfide	0.40 ug/L	No associated samples in this SDG

Sample KCH067-042 (from SDG 16C129) was identified as a source blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
KCH067-042	03/15/16	Acetone	4.1 ug/L	KCH067-019

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated laboratory blanks.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

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

IX. Laboratory Control Samples

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

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

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

Due to initial calibration and continuing calibration RRF, data were qualified as estimated in two samples.

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

China Lake CTO 067
Volatiles - Data Qualification Summary - SDG 16C074

Sample	Compound	Flag	A or P	Reason (Code)
KCH067-019 KCH067-021	tert-Butyl alcohol	UJ (all non-detects)	A	Initial calibration (RRF) (5)
KCH067-019 KCH067-021	tert-Butyl alcohol	UJ (all non-detects)	A	Continuing calibration (RRF) (5)

China Lake CTO 067
Volatiles - Laboratory Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

China Lake CTO 067
Volatiles - Field Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

METHOD SW5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
Batch No. : 16C074	Date Extracted: 03/14/16 20:46
Sample ID: KCH067-019	Date Analyzed: 03/14/16 20:46
Lab Samp ID: C074-01	Dilution Factor: 1
Lab File ID: RCC281	Matrix : WATER
Ext Btch ID: V067C11	% Moisture : NA
Calib. Ref.: RBC337	Instrument ID : 67

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,1,1,2-TETRACHLOROETHANE	ND	1.0	0.10	0.20
1,1,1-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.11	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHENE	ND	1.0	0.10	0.20
1,1-DICHLOROPROPENE	ND	1.0	0.10	0.20
1,2,3-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2,3-TRICHLOROPROPANE	ND	2.0	0.25	0.50
1,2,4-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2,4-TRIMETHYLBENZENE	ND	1.0	0.11	0.20
1,2-DIBROMO-3-CHLOROPROPANE	ND	2.0	0.25	0.50
1,2-DIBROMOETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROBENZENE	ND	1.0	0.10	0.20
1,2-DICHLOROETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,3,5-TRIMETHYLBENZENE	ND	1.0	0.13	0.20
1,3-DICHLOROBENZENE	ND	1.0	0.11	0.20
1,3-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,4-DICHLOROBENZENE	ND	1.0	0.10	0.20
2,2-DICHLOROPROPANE	ND	1.0	0.16	0.30
2-BUTANONE	ND	10	2.0	5.0
2-CHLOROTOLUENE	ND	1.0	0.12	0.20
2-HEXANONE	ND	10	2.3	5.0
4-CHLOROTOLUENE	ND	1.0	0.11	0.20
ACETONE	ND	10	2.6	5.0
BENZENE	ND	1.0	0.10	0.20
BROMOBENZENE	ND	1.0	0.10	0.20
BROMOCHLOROMETHANE	ND	1.0	0.11	0.20
BROMODICHLOROMETHANE	ND	1.0	0.10	0.20
BROMOFORM	ND	1.0	0.15	0.30
BROMOMETHANE	ND	1.0	0.16	0.30
CARBON DISULFIDE	0.40J	1.0	0.25	0.50
CARBON TETRACHLORIDE	ND	1.0	0.10	0.20
CHLOROBENZENE	ND	1.0	0.10	0.20
CHLOROETHANE	ND	1.0	0.27	0.30
CHLOROFORM	ND	1.0	0.10	0.20
CHLOROMETHANE	ND	1.0	0.15	0.30
CIS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.10	0.20
DIBROMOCHLOROMETHANE	ND	1.0	0.10	0.20
DIBROMOMETHANE	ND	1.0	0.10	0.20
DICHLORODIFLUOROMETHANE	ND	1.0	0.15	0.30
ETHYLBENZENE	ND	1.0	0.10	0.20
HEXACHLOROBUTADIENE	ND	1.0	0.22	0.30
ISOPROPYLBENZENE	ND	1.0	0.10	0.20
M/P-XYLENES	ND	2.0	0.21	0.40
4-METHYL-2-PENTANONE	ND	10	2.1	5.0
METHYLENE CHLORIDE	ND	2.0	0.50	1.0
METHYL TERT-BUTYL ETHER	ND	1.0	0.13	0.20
NAPHTHALENE	ND	2.0	0.50	1.0
N-BUTYLBENZENE	ND	1.0	0.17	0.30
N-PROPYLBENZENE	ND	1.0	0.13	0.20
O-XYLENE	ND	1.0	0.10	0.20
P-ISOPROPYLTOLUENE	ND	1.0	0.14	0.20
SEC-BUTYLBENZENE	ND	1.0	0.13	0.20
STYRENE	ND	1.0	0.25	0.50
TERT-BUTYLBENZENE	ND	1.0	0.13	0.20
TETRACHLOROETHENE	ND	1.0	0.15	0.20
TOLUENE	ND	1.0	0.10	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.11	0.20
TRICHLOROETHENE	ND	1.0	0.10	0.20
TRICHLOROFLUOROMETHANE	ND	1.0	0.15	0.30
VINYL CHLORIDE	ND	1.0	0.12	0.20
TERTIARY BUTYL ALCOHOL	ND UJ(5)	10	2.5	5.0

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	10.0	10.00	100	81-118
4-BROMOFLUOROBENZENE	9.88	10.00	98.8	85-114
TOLUENE-D8	10.1	10.00	101	89-112
DIBROMOFLUOROMETHANE	10.1	10.00	101	80-119

SL 03/16

METHOD SW5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C074	Date Extracted:	03/14/16 14:24
Sample ID:	KCH067-021	Date Analyzed:	03/14/16 14:24
Lab Samp ID:	C074-02	Dilution Factor:	1
Lab File ID:	RCC266	Matrix	: WATER
Ext Btch ID:	V067C11	% Moisture	: NA
Calib. Ref.:	RBC337	Instrument ID	: 67

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,1,1,2-TETRACHLOROETHANE	ND	1.0	0.10	0.20
1,1,1-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.11	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHENE	ND	1.0	0.10	0.20
1,1-DICHLOROPROPENE	ND	1.0	0.10	0.20
1,2,3-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2,3-TRICHLOROPROPANE	ND	2.0	0.25	0.50
1,2,4-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2,4-TRIMETHYLBENZENE	ND	1.0	0.11	0.20
1,2-DIBROMO-3-CHLOROPROPANE	ND	2.0	0.25	0.50
1,2-DIBROMOETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROBENZENE	ND	1.0	0.10	0.20
1,2-DICHLOROETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,3,5-TRIMETHYLBENZENE	ND	1.0	0.13	0.20
1,3-DICHLOROBENZENE	ND	1.0	0.11	0.20
1,3-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,4-DICHLOROBENZENE	ND	1.0	0.10	0.20
2,2-DICHLOROPROPANE	ND	1.0	0.16	0.30
2-BUTANONE	ND	10	2.0	5.0
2-CHLOROTOLUENE	ND	1.0	0.12	0.20
2-HEXANONE	ND	10	2.3	5.0
4-CHLOROTOLUENE	ND	1.0	0.11	0.20
ACETONE	ND	10	2.6	5.0
BENZENE	ND	1.0	0.10	0.20
BROMOBENZENE	ND	1.0	0.10	0.20
BROMOCHLOROMETHANE	ND	1.0	0.11	0.20
BROMODICHLOROMETHANE	ND	1.0	0.10	0.20
BROMOFORM	ND	1.0	0.15	0.30
BROMOMETHANE	ND	1.0	0.16	0.30
CARBON DISULFIDE	ND	1.0	0.25	0.50
CARBON TETRACHLORIDE	ND	1.0	0.10	0.20
CHLOROBENZENE	ND	1.0	0.10	0.20
CHLOROETHANE	ND	1.0	0.27	0.30
CHLOROFORM	ND	1.0	0.10	0.20
CHLOROMETHANE	ND	1.0	0.15	0.30
CIS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.10	0.20
DIBROMOCHLOROMETHANE	ND	1.0	0.10	0.20
DIBROMOMETHANE	ND	1.0	0.10	0.20
DICHLORODIFLUOROMETHANE	ND	1.0	0.15	0.30
ETHYLBENZENE	ND	1.0	0.10	0.20
HEXACHLOROBUTADIENE	ND	1.0	0.22	0.30
ISOPROPYLBENZENE	ND	1.0	0.10	0.20
M/P-XYLENES	ND	2.0	0.21	0.40
4-METHYL-2-PENTANONE	ND	10	2.1	5.0
METHYLENE CHLORIDE	ND	2.0	0.50	1.0
METHYL TERT-BUTYL ETHER	ND	1.0	0.13	0.20
NAPHTHALENE	ND	2.0	0.50	1.0
N-BUTYLBENZENE	ND	1.0	0.17	0.30
N-PROPYLBENZENE	ND	1.0	0.13	0.20
O-XYLENE	ND	1.0	0.10	0.20
P-ISOPROPYLTOLUENE	ND	1.0	0.14	0.20
SEC-BUTYLBENZENE	ND	1.0	0.13	0.20
STYRENE	ND	1.0	0.25	0.50
TERT-BUTYLBENZENE	ND	1.0	0.13	0.20
TETRACHLOROETHENE	ND	1.0	0.15	0.20
TOLUENE	ND	1.0	0.10	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.11	0.20
TRICHLOROETHENE	ND	1.0	0.10	0.20
TRICHLOROFLUOROMETHANE	ND	1.0	0.15	0.30
VINYL CHLORIDE	ND	1.0	0.12	0.20
TERTIARY BUTYL ALCOHOL	ND UJ(5)	10	2.5	5.0

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	9.73	10.00	97.3	81-118
4-BROMOFLUOROBENZENE	9.85	10.00	98.5	85-114
TOLUENE-D8	10.1	10.00	101	89-112
DIBROMOFLUOROMETHANE	9.91	10.00	99.1	80-119

8/05/16

LDC #: 36282B1 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/9/16
SDG #: 16C074 Standard Page: 1 of 1
Laboratory: EMAX Laboratories Inc. Reviewer: EF
2nd Reviewer: AL

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	SW / A	% RSD ≤ 15 ICV ≤ 20
IV.	Continuing calibration / ending CCV	SW	CCV ≤ 20
V.	Laboratory Blanks	A	SB= KCH067-042 (16C129)
VI.	Field blanks	SW	EB= 1 *TB= 2
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	QC Sample
IX.	Laboratory control samples	A	LCS ID
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-019	16C074-01	Water	03/08/16
2	KCH067-021	16C074-02	Water	03/08/16
3				
4				
5				
6				
7				
8				
9				

Notes:

	MBLKIW						

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methyl cyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 36282B 1

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A Did the laboratory perform a 5 point calibration prior to sample analysis?
Y N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
Y N N/A Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation?_____
Y N N/A Did the initial calibration meet the acceptance criteria?
Y N N/A Were all %RSDs and RRFs within the validation criteria of ≤30/15 %RSD and ≥0.05 RRF ? cont- 5

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30/15%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	2/26/16	V867B26-ICAL	ZZZ		0.007 (≥0.01)	All	J+/UJ/A (ND)

INICAL.wpd

LDC #: 36282B1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

wdl = 5

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	3/14/16	RCC257-CCV	ZZZ		0.007 (≥0.05)	all	J/UJ/A (ND)

CONCAL.wpd

LDC #: 36282B 1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: FT
2nd Reviewer: X

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Blank units: ug/L **Associated sample units:** NA
Sampling date: 3/8/16
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: EB Associated Samples: none

Compound	Blank ID	Sample Identification								
	1									
G	0.40									

Blank units: ug/L **Associated sample units:** ug/L SB = KCH067-042
Sampling date: 3/15/16
Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: SB Associated Samples: 1 (ND)

Compound	Blank ID	Sample Identification								
	SB									
F	4.1									

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 12, 2016

Parameters: Polynuclear Aromatic Hydrocarbons

Validation Level: Level III

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C074

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-019	16C074-01	Water	03/08/16

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polynuclear Aromatic Hydrocarbons (PAHs) by Environmental Protection Agency (EPA) SW 846 Method 8270C using Selected Ion Monitoring (SIM)

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

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

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

VI. Field Blanks

Sample KCH067-019 was identified as an equipment blank. No contaminants were found.

Sample KCH067-042 (from SDG 16C129) was identified as a source blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

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

IX. Laboratory Control Samples

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

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

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

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

China Lake CTO 067
Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

China Lake CTO 067
Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

China Lake CTO 067
Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

METHOD SW3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS SIM

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C074	Date Extracted:	03/14/16 13:45
Sample ID:	KCH067-019	Date Analyzed:	03/16/16 15:33
Lab Samp ID:	C074-01	Dilution Factor:	0.98
Lab File ID:	RCH084	Matrix	: WATER
Ext Btch ID:	SVC011W	% Moisture	: NA
Calib. Ref.:	RAH047	Instrument ID	: T-0E7

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
ACENAPHTHENE	ND	0.49	0.049	0.098
ACENAPHTHYLENE	ND	0.49	0.049	0.098
ANTHRACENE	ND	0.49	0.049	0.098
BENZO(A)ANTHRACENE	ND	0.49	0.088	0.20
BENZO(A)PYRENE	ND	0.49	0.049	0.098
BENZO(B)FLUORANTHENE	ND	0.49	0.049	0.098
BENZO(K)FLUORANTHENE	ND	0.49	0.049	0.098
BENZO(G,H,I)PERYLENE	ND	0.49	0.049	0.098
CHRYSENE	ND	0.49	0.059	0.20
DIBENZO(A,H)ANTHRACENE	ND	0.49	0.049	0.098
FLUORANTHENE	ND	0.49	0.049	0.098
FLUORENE	ND	0.49	0.049	0.098
INDENO(1,2,3-CD)PYRENE	ND	0.49	0.049	0.098
NAPHTHALENE	ND	0.49	0.049	0.098
PHENANTHRENE	ND	0.49	0.049	0.098
PYRENE	ND	0.49	0.049	0.098
2-METHYLNAPHTHALENE	ND	0.49	0.049	0.098
1-METHYLNAPHTHALENE	ND	0.49	0.049	0.098

SURROGATE PARAMETERS	RESULTS	SPK AMT	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	14.0	19.60	71.5	53-106
NITROBENZENE-D5	15.4	19.60	78.3	55-111
TERPHENYL-D14	15.3	19.60	78.2	58-132

3/16

LDC #: 36282B2b **VALIDATION COMPLETENESS WORKSHEET** Date: 5/9/16
SDG #: 16C074 Standard Page: 1 of 1
Laboratory: EMAX Laboratories Inc. Reviewer: FJ
2nd Reviewer: JL

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270C-SIM)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A /A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A /A	%RSD ≤ 15, r² ICV ≤ 20
IV.	Continuing calibration /ending CCV	A	CCV ≤ 20
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB = 1 SB = KCH067-042 (16C129)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	QC sample
IX.	Laboratory control samples	A	Lab ID
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-019	16C074-01	Water	03/08/16
2				
3				
4				
5				
6				
7				
8				
9				

Notes:

	MBLK1W						

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 12, 2016

Parameters: Chlorinated Pesticides

Validation Level: Level III

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C074

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-019	16C074-01	Water	03/08/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Chlorinated Pesticides by Environmental Protection Agency (EPA) SW 846 Method 8081A

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

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. GC Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
03/15/16	CCV	RTX-CLP2	alpha-BHC gamma-BHC delta-BHC	28 21 21	All samples in SDG 16C074	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A

V. Laboratory Blanks

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

VI. Field Blanks

Sample KCH067-019 was identified as an equipment blank. No contaminants were found.

Sample KCH067-042 (from SDG 16C129) was identified as a source blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

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

IX. Laboratory Control Samples

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

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Compound Quantitation

Raw data were not reviewed for Level III validation.

XII. Target Compound Identification

Raw data were not reviewed for Level III validation.

XIII. System Performance

Raw data were not reviewed for Level III validation.

XIII. Overall Assessment of Data

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

Due to continuing calibration %D, data were qualified as estimated in one sample.

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

China Lake CTO 067
Chlorinated Pesticides - Data Qualification Summary - SDG 16C074

Sample	Compound	Flag	A or P	Reason (Code)
KCH067-019	alpha-BHC gamma-BHC delta-BHC	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D) (5)

China Lake CTO 067
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

China Lake CTO 067
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

METHOD SW3520C/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
Batch No. : 16C074	Date Extracted: 03/14/16 11:45
Sample ID: KCH067-019	Date Analyzed: 03/15/16 15:50
Lab Samp ID: C074-01	Dilution Factor: 1
Lab File ID: RC15012A	Matrix : WATER
Ext Btch ID: CPC010W	% Moisture : NA
Calib. Ref.: RC15005A	Instrument ID : F9

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
ALPHA-BHC	(ND) | ND UJ(S)	0.10	0.0050	0.010
GAMMA-BHC (LINDANE)	(ND) | ND ↓	0.10	0.0050	0.010
BETA-BHC	(ND) | ND	0.10	0.0070	0.010
HEPTACHLOR	(ND) | ND	0.10	0.0070	0.010
DELTA-BHC	(ND) | ND UJ(S)	0.10	0.0070	0.010
ALDRIN	(ND) | ND	0.10	0.0050	0.010
HEPTACHLOR EPOXIDE	(ND) | ND	0.10	0.0050	0.010
GAMMA-CHLORDANE	(ND) | ND	0.10	0.0050	0.010
ALPHA-CHLORDANE	(ND) | ND	0.10	0.0050	0.010
ENDOSULFAN I	(ND) | ND	0.10	0.0080	0.010
4,4'-DDE	(ND) | ND	0.10	0.0050	0.010
DIELDRIN	(ND) | ND	0.10	0.0050	0.010
ENDRIN	(ND) | ND	0.10	0.0080	0.010
4,4'-DDD	(ND) | ND	0.10	0.0050	0.010
ENDOSULFAN II	(ND) | ND	0.10	0.0050	0.010
4,4'-DDT	(ND) | ND	0.10	0.0050	0.010
ENDRIN ALDEHYDE	(ND) | ND	0.10	0.0050	0.010
ENDOSULFAN SULFATE	(ND) | ND	0.10	0.0050	0.010
ENDRIN KETONE	(ND) | ND	0.10	0.0050	0.010
METHOXYCHLOR	(ND) | ND	1.0	0.050	0.10
TOXAPHENE	(ND) | ND	2.0	0.25	0.50
TECHNICAL CHLORDANE	(ND) | ND	1.0	0.25	0.50

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.3390 | (0.4145)	0.4000	84.8 | (104)	44-124

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

Note: Technical Chlordane result was reported from analysis run data file ID RC22008 associated with calibration file ID RC22005.

4/07/16

LDC #: 36282B3a
SDG #: 16C074
Laboratory: EMAX Laboratories Inc.

VALIDATION COMPLETENESS WORKSHEET
Standard

Date: 5/9/16
Page: 1 of 1
Reviewer: FD
2nd Reviewer: R

METHOD: GC Chlorinated Pesticides (EPA SW846 Method 8081A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC Instrument Performance Check	A	
III.	Initial calibration/ICV	A / A	%RSD/ICV ≤ 20
IV.	Continuing calibration	SW	CCV ≤ 20
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB = 1 SB= KCH067-042 (16C129)
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	QC sample
IX.	Laboratory control samples	A	LCS ID
X.	Field duplicates	N	
XI.	Compound quantitation/RL/LOQ/LODs	N	
XII.	Target compound identification	N	
XIII.	System Performance	N	
XIV.	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-019	16C074-01	Water	03/08/16
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				

Notes:

	MBLKW						

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPA SW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG. Chlordane
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH. Chlordane (Technical)
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	II. Arochlor 1262
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ. Aroclor 1268
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. 2,4'-DDD	KK. Oxychlordane
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. 2,4'-DDE	LL. trans-Nonachlor
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. 2,4'-DDT	MM. cis-Nonachlor
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF. Hexachlorobenzene	NN.

Notes:_____

LDC #: 36282B3a

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Reviewer: FT
2nd Reviewer: PR

METHOD: ✓ **GC** __ **HPLC**

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
What type of continuing calibration calculation was performed? ___%D or ___%R
Y N N/A Were continuing calibration standards analyzed at the required frequencies?
Y N N/A Did the continuing calibration standards meet the %D / %R validation criteria of ≤20.0% / 80-120%?
Level IV Only
Y N N/A Were the retention times for all calibrated compounds within their respective acceptance windows?

cont = 5

#	Date	Standard ID	Detector/ Column	Compound	%D (Limit ≤ 20.0)	RT (limit)	Associated Samples	Qualifications
	3/15/16	RC15005B-CCV	RTX-CLP2	A	28		All	J/UJ/A ND
				D	21		↓	↓
				C	21		↓	↓

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 11, 2016

Parameters: Polychlorinated Biphenyls

Validation Level: Level III

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C074

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-019	16C074-01	Water	03/08/16

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Biphenyls (PCBs) by Environmental Protection Agency (EPA) SW 846 Method 8082

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

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

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

V. Field Blanks

Sample KCH067-019 was identified as an equipment blank. No contaminants were found.

Sample KCH067-042 (from SDG 16C129) was identified as a source blank. No contaminants were found.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identification

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

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

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

China Lake CTO 067
Polychlorinated Biphenyls - Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

China Lake CTO 067
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

China Lake CTO 067
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

METHOD SW3520C/8082
PCBs

Client : KLEINFELDER	Date Collected: 03/08/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/10/16
Batch No. : 16C074	Date Extracted: 03/14/16 11:45
Sample ID: KCH067-019	Date Analyzed: 03/15/16 14:12
Lab Samp ID: C074-01	Dilution Factor: 1
Lab File ID: SC15016A	Matrix : WATER
Ext Btch ID: CPC010W	% Moisture : NA
Calib. Ref.: SC15002A	Instrument ID : GCT008

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
AROCLOR 1016	(ND)|ND	1.0	0.45	0.50
AROCLOR 1221	(ND)|ND	1.0	0.29	0.50
AROCLOR 1232	(ND)|ND	1.0	0.25	0.50
AROCLOR 1242	(ND)|ND	1.0	0.25	0.50
AROCLOR 1248	(ND)|ND	1.0	0.25	0.50
AROCLOR 1254	(ND)|ND	1.0	0.25	0.50
AROCLOR 1260	(ND)|ND	1.0	0.31	0.50

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.3434|(0.3751)	0.4000	85.8|(93.8)	60-130

Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )
* Out side of QC Limit

3/15/16

LDC #: 36282B3b
SDG #: 16C074
Laboratory: EMAX Laboratories Inc.

VALIDATION COMPLETENESS WORKSHEET
Standard

Date: 5/9/16
Page: 1 of 1
Reviewer: EF
2nd Reviewer: IK

METHOD: GC Polychlorinated Biphenyls (EPA SW846 Method 8082)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	Initial calibration/ICV	A / A	%D/ICV ≤ 20
III.	Continuing calibration	A	CCV ≤ 20
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	EB = 1 SB = KCH067-042 (16C129)
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	QC sample
VIII.	Laboratory control samples	A	LCS ID
IX.	Field duplicates	N	
X.	Compound quantitation/RL/LOQ/LODs	N	
XI.	Target compound identification	N	
XII.	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-019	16C074-01	Water	03/08/16
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

Notes:

	MBLKW						

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 13, 2016

Parameters: Metals

Validation Level: Level III

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C074

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-019	16C074-01	Water	03/08/16

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc by Environmental Protection Agency (EPA) SW 846 Method 6020A
Mercury by EPA SW 846 Method 7470A

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

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Laboratory Blank ID	Analyte	Maximum Concentration	Associated Samples
ICB/CCB	Iron	5.17 ug/L	All samples in SDG 16C074

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
KCH067-019	Iron	9.85 ug/L	10.0U ug/L

VI. Field Blanks

Sample KCH067-019 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
KCH067-019	03/08/16	Boron Calcium Iron Lead Manganese Nickel Sodium	4.65 ug/L 135 ug/L 9.85 ug/L 0.225 ug/L 0.318 ug/L 0.161 ug/L 42.6 ug/L	No associated samples in this SDG

Sample KCH067-042 (from SDG 16C129) was identified as a source blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
KCH067-042	03/15/16	Barium Boron Calcium Chromium Copper Lead Magnesium Sodium	0.277 ug/L 4.00 ug/L 34.7 ug/L 0.101 ug/L 0.811 ug/L 0.0528 ug/L 7.51 ug/L 35.3 ug/L	All samples in SDG 16C074

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated field blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
KCH067-019	Boron Lead Sodium	4.65 ug/L 0.225 ug/L 42.6 ug/L	5.00U ug/L 0.225U ug/L 50.0U ug/L

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Duplicate Sample Analysis

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

IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met.

X. Laboratory Control Samples

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

XI. Field Duplicates

No field duplicates were identified in this SDG.

XII. Internal Standards (ICP-MS)

ICP-MS was not utilized in this SDG.

XIII. Sample Result Verification

Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

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

Due to laboratory blank contamination, data were qualified as not detected in one sample.

Due to source blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

China Lake CTO 067
Metals - Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

China Lake CTO 067
Metals - Laboratory Blank Data Qualification Summary - SDG 16C074

Sample	Analyte	Modified Final Concentration	A or P	Code
KCH067-019	Iron	10.0U ug/L	A	7

China Lake CTO 067
Metals - Field Blank Data Qualification Summary - SDG 16C074

Sample	Analyte	Modified Final Concentration	A or P	Code
KCH067-019	Boron Lead Sodium	5.00U ug/L 0.225U ug/L 50.0U ug/L	A	6

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
SDG NO.	: 16C074	Date Extracted:	03/16/16 11:07
Sample ID:	KCH067-019	Date Analyzed:	03/24/16 12:39
Lab Samp ID:	C074-01	Dilution Factor:	1
Lab File ID:	F6C08022	Matrix :	WATER
Ext Btch ID:	IMC027W	% Moisture :	NA
Calib. Ref.:	F6C08016	Instrument ID :	T-IF6

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Aluminum	ND	100	10.0	20.0
Antimony	ND	1.00	0.250	0.500
Arsenic	ND	1.00	0.100	0.200
Barium	ND	1.00	0.250	0.500
Beryllium	ND	1.00	0.0500	0.100
Boron	4.65J 5.00 U	10.0 (6)	2.50	5.00
Cadmium	ND	1.00	0.100	0.200
Calcium	135	100	13.0	25.0
Chromium	ND	1.00	0.100	0.200
Cobalt	ND	1.00	0.100	0.200
Copper	ND	1.00	0.250	0.500
Iron	9.85J 10.0 U	100 (7)	5.00	10.0
Lead	0.225J U	1.00 (6)	0.0500	0.100
Magnesium	ND	100	5.00	10.0
Manganese	0.318J	1.00	0.100	0.200
Molybdenum	ND	2.00	0.250	0.500
Nickel	0.161J	1.00	0.100	0.200
Potassium	ND	100	10.0	20.0
Selenium	ND	1.00	0.150	0.300
Silver	ND	1.00	0.100	0.200
Sodium	42.6J 50.0 U	100 (6)	25.0	50.0
Thallium	ND	1.00	0.100	0.200
Vanadium	ND	1.00	0.250	0.500
Zinc	ND	20.0	5.00	10.0

5/17/16

METHOD SW7470A
MERCURY BY COLD VAPOR

Client : KLEINFELDER
Project : NAWS CHINA LAKE, CTO 067
Batch No. : 16C074

Matrix : WATER
InstrumentID : 47

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (ug/L)	DIL'N FACTOR	MOIST (%)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1W	HGC014WB	ND	1	NA	0.50	0.050	0.10	03/23/1610:11	03/22/1616:30	M47C011011	M47C011	HGC014W	NA	NA
LCS1W	HGC014WL	2.38	1	NA	0.50	0.050	0.10	03/23/1610:13	03/22/1616:30	M47C011012	M47C011	HGC014W	NA	NA
LCD1W	HGC014WC	2.40	1	NA	0.50	0.050	0.10	03/23/1610:15	03/22/1616:30	M47C011013	M47C011	HGC014W	NA	NA
KCH067-019	C074-01	ND	1	NA	0.50	0.050	0.10	03/23/1610:42	03/22/1616:30	M47C011025	M47C011	HGC014W	03/08/1617:35	03/10/16

7064

LDC #: 36282B4a
SDG #: 16C074
Laboratory: EMAX Laboratories Inc.

VALIDATION COMPLETENESS WORKSHEET
Standard

Date: 5/10/16
Page: 1 of 1
Reviewer: JD
2nd Reviewer: M

METHOD: Metals (EPA SW 846 Method 6020A/7470A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	03/08/16
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	SW	EB= (-); SB=KCH067-042 (SDG: 16C129)
VII.	Matrix Spike/Matrix Spike Duplicates	N	CS
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCS/D
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	N	Not Reviewed
XIII.	Sample Result Verification	N	
XIV.	Overall Assessment of Data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-019	16C074-01	Water	03/08/16
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

Notes:

LDC #: 36828B4

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JD
2nd reviewer: [illegible]

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 36282B4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JD
2nd Reviewer: AC

METHOD: Metals (EPA SW 864 Method 6010/6020/7000) Soil preparation factor applied: ____
Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All (or)

					Sample Identification									
Analyte	**Maximum PB[a] (mg/Kg)**	**Maximum PB[a] (ug/L)**	**Maximum ICB/CCB[a] (ug/L)**	**Blank Action Limit**	1									
Fe			5.17		9.85/~~100~~ 10.0 U									

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".
Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 36282B4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JD
2nd Reviewer: AK

METHOD: Trace Metals (EPA Method 200.7/200.8)

Blank units: ug/L **Associated sample units:** mg/kg
Sampling date: 03/08/16 Soil factor applied ~~50X~~
Field blank type: (circle one) Field Blank / Rinsate / Other: (EB) Associated Samples: None (06)

Analyte	Blank ID	Sample Identification											
	1	Action Limit	No Qual.										
B	4.65												
Ca	135	67.5											
Fe	9.85												
Pb	0.225												
Mn	0.318												
Ni	0.161												
Na	42.6												

Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 03/15/16 Soil factor applied
Field blank type: (circle one) Field Blank / Rinsate / Other: (SB) Associated Samples: All (06)

Analyte	Blank ID	Sample Identification											
	KCH067-042 (SDG:16C129)	Action Limit	1										
Ba	0.277												
B	4.00		4.65/~~10.0~~										
Ca	34.7												
Cr	0.101												
Cu	0.811												
Pb	0.0528		0.225/~~1.00~~										
Mg	7.51												
Na	35.3		42.6/~~100~~										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 12, 2016

Parameters: Hexavalent Chromium

Validation Level: Level III

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C074

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-019	16C074-01	Water	03/08/16
KCH067-019MS	16C074-01MS	Water	03/08/16
KCH067-019MSD	16C074-01MSD	Water	03/08/16

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Hexavalent Chromium by Environmental Protection Agency (EPA) SW 846 Method 7199

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

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

IV. Laboratory Blanks

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

V. Field Blanks

Sample KCH067-019 was identified as an equipment blank. No contaminants were found.

Sample KCH067-042 (from SDG 16C129) was identified as a source blank. No contaminants were found.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

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

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

China Lake CTO 067
Hexavalent Chromium - Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

China Lake CTO 067
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

China Lake CTO 067
Hexavalent Chromium - Field Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

METHOD SW7199
HEXAVALENT CHROMIUM

Client : KLEINFELDER
Project : NAWS CHINA LAKE, CTO 067
Batch No. : 16C074

Matrix : WATER
InstrumentID : 59

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (ug/L)	DIL'N. FACTOR	MOIST (%)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1W	HCC005WB	ND	1	NA	0.2	0.05	0.1	03/15/1616:18	03/15/1616:10	IC15003	IC15001	HCC005W	NA	NA
LCS1W	HCC005WL	1.90	1	NA	0.2	0.05	0.1	03/15/1616:38	03/15/1616:10	IC15005	IC15001	HCC005W	NA	NA
LCD1W	HCC005WC	1.98	1	NA	0.2	0.05	0.1	03/15/1616:59	03/15/1616:10	IC15007	IC15001	HCC005W	NA	NA
KCH067-019	C074-01	ND	1	NA	0.2	0.05	0.1	03/15/1617:20	03/15/1616:10	IC15009	IC15001	HCC005W	03/08/1617:35	03/10/16
KCH067-019MS	C074-01M	1.10	1	NA	0.2	0.05	0.1	03/15/1618:02	03/15/1616:10	IC15013	IC15011	HCC005W	03/08/1617:35	03/10/16
KCH067-019MSD	C074-01S	1.01	1	NA	0.2	0.05	0.1	03/15/1618:22	03/15/1616:10	IC15015	IC15011	HCC005W	03/08/1617:35	03/10/16

C 051716

8047

LDC #: 36282B6 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/10/16
SDG #: 16C074 Standard Page: 1 of 1
Laboratory: EMAX Laboratories Inc. Reviewer: JD
2nd Reviewer: [illegible]

METHOD: (Analyte) Hexavalent Chromium (EPA SW846 Method 7199)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	3/8/16 *
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	ND	EB=(1); SB=KCH067-042(SDG.16C129)
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/D=(2,3)
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	
X.	Sample result verification	N	
XI	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-019	16C074-01	Water	03/08/16
2	KCH067-019MS	16C074-01MS	Water	03/08/16
3	KCH067-019MSD	16C074-01MSD	Water	03/08/16
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Notes: *preserved with ammonium buffer per email

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 11, 2016

Parameters: Total Petroleum Hydrocarbons as Gasoline

Validation Level: Level III

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C074

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-019	16C074-01	Water	03/08/16
KCH067-021	16C074-02	Water	03/08/16

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Total Petroleum Hydrocarbons (TPH) as Gasoline by Environmental Protection Agency (EPA) SW 846 Method 8015B

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

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

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

V. Field Blanks

Sample KCH067-021 was identified as a trip blank. No contaminants were found.

Sample KCH067-019 was identified as an equipment blank. No contaminants were found.

Sample KCH067-042 (from SDG 16C129) was identified as a source blank. No contaminants were found.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

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

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

China Lake CTO 067
Total Petroleum Hydrocarbons as Gasoline - Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

China Lake CTO 067
Total Petroleum Hydrocarbons as Gasoline - Laboratory Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

China Lake CTO 067
Total Petroleum Hydrocarbons as Gasoline - Field Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

METHOD SW5030B/8015B
TOTAL PETROLEUM HYDROCARBONS BY PURGE AND TRAP

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C074	Date Extracted:	03/16/16 14:42
Sample ID	: KCH067-019	Date Analyzed:	03/16/16 14:42
Lab Samp ID	: C074-01	Dilution Factor:	1
Lab File ID	: EC16008A	Matrix	: WATER
Ext Btch ID	: VG39C08	% Moisture	: NA
Calib. Ref.	: EC16003A	Instrument ID	: GCT039

PARAMETERS	RESULTS (mg/L)	LOQ (mg/L)	DL (mg/L)	LOD (mg/L)
GASOLINE	ND	0.10	0.010	0.020

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
4-BROMOFLUOROBENZENE	0.0329	0.04000	82.2	69-133

Parameter	H-C Range
Gasoline	C6-C10

SCT 3/17/16

METHOD SW5030B/8015B
TOTAL PETROLEUM HYDROCARBONS BY PURGE AND TRAP

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C074	Date Extracted:	03/16/16 15:21
Sample ID	: KCH067-021	Date Analyzed:	03/16/16 15:21
Lab Samp ID	: C074-02	Dilution Factor:	1
Lab File ID	: EC16009A	Matrix	: WATER
Ext Btch ID	: VG39C08	% Moisture	: NA
Calib. Ref.	: EC16003A	Instrument ID	: GCT039

PARAMETERS	RESULTS (mg/L)	LOQ (mg/L)	DL (mg/L)	LOD (mg/L)
GASOLINE	ND	0.10	0.010	0.020

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
4-BROMOFLUOROBENZENE	0.0304	0.04000	76.1	69-133

Parameter	H-C Range
Gasoline	C6-C10

3/5/16

LDC #: 36282B7 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/9/16
SDG #: 16C074 Standard Page: 1 of 1
Laboratory: EMAX Laboratories Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC TPH as Gasoline (EPA SW 846 Method 8015B)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A /A	
II.	Initial calibration/ICV	A /A	
III.	Continuing calibration	A	
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	EB = 1 TB = 2
VI.	Surrogate spikes	A	SB= KCH067-042 (SDG 16C129)
VII.	Matrix spike/Matrix spike duplicates	N	QC sample
VIII.	Laboratory control samples	A	LCS ID
IX.	Field duplicates	N	
X.	Compound quantitation RL/LOQ/LODs	N	
XI.	Target compound identification	N	
XII.	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-019	16C074-01	Water	03/08/16
2	KCH067-021	16C074-02	Water	03/08/16
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

Notes:

	MBLK1W						

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 13, 2016

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Level III

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C074

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-019	16C074-01	Water	03/08/16

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Total Petroleum Hydrocarbons (TPH) as Extractables by Environmental Protection Agency (EPA) SW 846 Method 8015B

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

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

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

V. Field Blanks

Sample KCH067-019 was identified as an equipment blank. No contaminants were found.

Sample KCH067-042 (from SDG 16C129) was identified as a source blank. No contaminants were found.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

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

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

China Lake CTO 067
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

China Lake CTO 067
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

China Lake CTO 067
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

METHOD SW3520C/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C074	Date Extracted:	03/14/16 12:00
Sample ID:	KCH067-019	Date Analyzed:	03/15/16 14:14
Lab Samp ID:	C074-01	Dilution Factor:	0.94
Lab File ID:	LC15009A	Matrix :	WATER
Ext Btch ID:	DSC011W	% Moisture :	NA
Calib. Ref.:	LC15004A	Instrument ID :	D5

PARAMETERS	RESULTS (mg/L)	LOQ (mg/L)	DL (mg/L)	LOD (mg/L)
DIESEL	ND	0.47	0.047	0.094
JP-5	ND	0.47	0.047	0.094
MOTOR OIL	ND	0.47	0.047	0.094

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	0.957	0.9400	102	60-130
HEXACOSANE	0.253	0.2350	108	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

3/17/16

LDC #: 36282B8 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/9/16
SDG #: 16C074 Standard Page: 1 of 1
Laboratory: EMAX Laboratories Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC TPH as Extractables (EPA SW 846 Method 8015B)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	Initial calibration/ICV	A/A	%RSD/ICV ≤ 20
III.	Continuing calibration	A	CCV ≤ 20
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	EB = 1 SB = KCH067-042 (SDG # 16C129)
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	CS
VIII.	Laboratory control samples	A	LCS ID
IX.	Field duplicates	N	
X.	Compound quantitation RL/LOQ/LODs	N	
XI.	Target compound identification	N	
XII.	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-019	16C074-01	Water	03/08/16
2				
3				
4				
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10				
11				
12				
13				

Notes:

	MBLK1W						

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 11, 2016

Parameters: Explosives

Validation Level: Level III

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C074

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-019	16C074-01	Water	03/08/16

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Explosives by Environmental Protection Agency (EPA) SW 846 Method 8330A

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

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 15.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 15.0% for all compounds.

IV. Laboratory Blanks

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

V. Field Blanks

Sample KCH067-019 was identified as an equipment blank. No contaminants were found.

Sample KCH067-042 (from SDG 16C129) was identified as a source blank. No contaminants were found.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

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

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

China Lake CTO 067
Explosives - Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

China Lake CTO 067
Explosives - Laboratory Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

China Lake CTO 067
Explosives - Field Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/08/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/10/16
Batch No.	: 16C074	Date Extracted:	03/11/16 12:40
Sample ID	: KCH067-019	Date Analyzed:	03/14/16 23:57
Lab Samp ID	: C074-01	Dilution Factor:	1
Lab File ID	: XC14021A	Matrix	: WATER
Ext Btch ID	: EXC004W	% Moisture	: NA
Calib. Ref.	: XC14014A	Instrument ID	: T-081

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
HMX	ND	1.0	0.10	0.20
RDX	ND	1.0	0.16	0.40
1,3,5-TNB	ND	1.0	0.10	0.20
1,3-DNB	ND	1.0	0.10	0.20
TETRYL	ND	1.0	0.10	0.20
NITROBENZENE	ND	1.0	0.10	0.20
2,4,6-TNT	ND	1.0	0.16	0.40
4-AM-2,6-DNT	ND	1.0	0.20	0.20
2-AM-4,6-DNT	ND	1.0	0.10	0.20
2,6-DNT	ND	1.0	0.10	0.20
2,4-DNT	ND	1.0	0.12	0.20
2-NITROTOLUENE	ND	1.0	0.11	0.20
3-NITROTOLUENE	ND	1.0	0.16	0.40
4-NITROTOLUENE	ND	1.0	0.10	0.20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	4.07	4.000	102	60-140

Note: All positive results are confirmed by Biphenyl column

3/15/16

LDC #: 36282B40 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/9/16
SDG #: 16C074 Standard Page: 1 of 1
Laboratory: EMAX Laboratories Inc. Reviewer: F
2nd Reviewer: F

METHOD: HPLC Explosives (EPA SW 846 Method 8330A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	Initial calibration/ICV	A / A	%RSD ≤ 20 ICV ≤ 15
III.	Continuing calibration	A	CCV ≤ 15
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	EB = 1 SB = KCH067-042 (SDG 16C129)
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	QC sample
VIII.	Laboratory control samples	A	LCS ID
IX.	Field duplicates	N	
X.	Compound quantitation RL/LOQ/LODs	N	
XI.	Target compound identification	N	
XII.	System performance	N	
XIII.	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-019	16C074-01	Water	03/08/16
2				
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12				

Notes:

	MBLK 1W						

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 12, 2016

Parameters: Perchlorate

Validation Level: Level III

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C074

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-019	16C074-01	Water	03/08/16

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perchlorate by Environmental Protection Agency (EPA) SW 846 Method 6850

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

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance check was performed prior to initial calibration.

All perchlorate ion signal to noise ratio requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

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

The isotope ratios were within QC limits.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 15.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 15.0% for all compounds.

The percent differences (%D) of the limit of detection verification (LODV) standard were less than or equal to 30.0%.

The isotope ratios were within QC limits.

V. Laboratory Blanks

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

VI. Field Blanks

Sample KCH067-019 was identified as an equipment blank. No contaminants were found.

Sample KCH067-042 (from SDG 16C129) was identified as a source blank. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Compound Quantitation

Raw data were not reviewed for Level III validation.

XII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIII. System Performance

Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

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

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

China Lake CTO 067
Perchlorate - Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

China Lake CTO 067
Perchlorate - Laboratory Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

China Lake CTO 067
Perchlorate - Field Blank Data Qualification Summary - SDG 16C074

No Sample Data Qualified in this SDG

METHOD SW6850
PERCHLORATE

Client : KLEINFELDER
Project : NAWS CHINA LAKE, CTO 067
Batch No. : 16C074

Matrix : WATER
InstrumentID : G0

Client SAMPLE ID	EMAX SAMPLE ID	RESULT (ug/L)	DIL'N. FACTOR	MOIST (%)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1W	PLC006WB	ND	1	NA	0.5	0.1	0.2	03/23/1611:28	NA	16MC23007	MC23004	16PLC006W	NA	NA
LCS1W	PLC006WL	0.588	1	NA	0.5	0.1	0.2	03/23/1611:45	NA	16MC23008	MC23004	16PLC006W	NA	NA
LCD1W	PLC006WC	0.550	1	NA	0.5	0.1	0.2	03/23/1611:59	NA	16MC23009	MC23004	16PLC006W	NA	NA
KCH067-019	C074-01	ND	1	NA	0.5	0.1	0.2	03/23/1612:14	NA	16MC23010	MC23004	16PLC006W	03/08/1617:35	03/10/16

K 05/7/16

LDC #: 36282B87 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/9/16
SDG #: 16C074 Standard Page: 1 of 1
Laboratory: EMAX Laboratories Inc. Reviewer: PD
2nd Reviewer: R

METHOD: LC/MS Perchlorate (EPA SW846 Method 6850)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	GC/MS Instrument performance check	A	auto tune
III.	Initial calibration/ICV	A/A	r^2 ICV ≤ 15
IV.	Continuing calibration	A	CCV ≤ 15 LODV ≤ 30
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB = 1 SB= KCH067-042 (SDG 16C129)
VII.	Surrogate spikes	N	not required
VIII.	Matrix spike/Matrix spike duplicates	N	QC sample
IX.	Laboratory control samples	A	LCS ID
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-019	16C074-01	Water	03/08/16
2				
3				
4				
5				
6				
7				
8				
9				

Notes:

	MBLK1W						

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 11, 2016

Parameters: Volatiles

Validation Level: Level III

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C129

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-042	16C129-19	Water	03/15/16
KCH067-043	16C129-20	Water	03/15/16

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Volatile Organic Compounds (VOCs) by Environmental Protection Agency (EPA) SW 846 Method 8260B

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

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A bromofluorobenzene (BFB) tune was performed at 12 hour intervals.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

Average relative response factors (RRF) for all compounds were within validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
02/26/16	tert-Butyl alcohol	0.007 (≥0.01)	All samples in SDG 16C129	UJ (all non-detects)	A

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria with the following exceptions:

Date	Compound	RRF (Limits)	Associated Samples	Flag	A or P
03/22/16	tert-Butyl alcohol	0.007 (≥0.01)	All samples in SDG 16C129	UJ (all non-detects)	A

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Analysis Date	Compound	Concentration	Associated Samples
MBLK1W	03/22/16	Methylene chloride	0.91 ug/L	All samples in SDG 16C129

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated laboratory blanks.

VI. Field Blanks

Sample KCH067-043 was identified as a trip blank. No contaminants were found.

Sample KCH067-042 was identified as a source blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
KCH067-042	03/15/16	Acetone	4.1 ug/L	No associated samples in this SDG

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

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

IX. Laboratory Control Samples

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

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

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

Due to initial calibration and continuing calibration RRF, data were qualified as estimated in two samples.

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

China Lake CTO 067
Volatiles - Data Qualification Summary - SDG 16C129

Sample	Compound	Flag	A or P	Reason (Code)
KCH067-042 KCH067-043	tert-Butyl alcohol	UJ (all non-detects)	A	Initial calibration (RRF) (5)
KCH067-042 KCH067-043	tert-Butyl alcohol	UJ (all non-detects)	A	Continuing calibration (RRF) (5)

China Lake CTO 067
Volatiles - Laboratory Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

China Lake CTO 067
Volatiles - Field Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

METHOD SW5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/22/16 15:34
Sample ID: KCH067-042	Date Analyzed: 03/22/16 15:34
Lab Samp ID: C129-19N	Dilution Factor: 1
Lab File ID: RCC442	Matrix : WATER
Ext Btch ID: V067C17	% Moisture : NA
Calib. Ref.: RBC337	Instrument ID : 67

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,1,1,2-TETRACHLOROETHANE	ND	1.0	0.10	0.20
1,1,1-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.11	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHENE	ND	1.0	0.10	0.20
1,1-DICHLOROPROPENE	ND	1.0	0.10	0.20
1,2,3-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2,3-TRICHLOROPROPANE	ND	2.0	0.25	0.50
1,2,4-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2,4-TRIMETHYLBENZENE	ND	1.0	0.11	0.20
1,2-DIBROMO-3-CHLOROPROPANE	ND	2.0	0.25	0.50
1,2-DIBROMOETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROBENZENE	ND	1.0	0.10	0.20
1,2-DICHLOROETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,3,5-TRIMETHYLBENZENE	ND	1.0	0.13	0.20
1,3-DICHLOROBENZENE	ND	1.0	0.11	0.20
1,3-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,4-DICHLOROBENZENE	ND	1.0	0.10	0.20
2,2-DICHLOROPROPANE	ND	1.0	0.16	0.30
2-BUTANONE	ND	10	2.0	5.0
2-CHLOROTOLUENE	ND	1.0	0.12	0.20
2-HEXANONE	ND	10	2.3	5.0
4-CHLOROTOLUENE	ND	1.0	0.11	0.20
ACETONE	4.1J	10	2.6	5.0
BENZENE	ND	1.0	0.10	0.20
BROMOBENZENE	ND	1.0	0.10	0.20
BROMOCHLOROMETHANE	ND	1.0	0.11	0.20
BROMODICHLOROMETHANE	ND	1.0	0.10	0.20
BROMOFORM	ND	1.0	0.15	0.30
BROMOMETHANE	ND	1.0	0.16	0.30
CARBON DISULFIDE	ND	1.0	0.25	0.50
CARBON TETRACHLORIDE	ND	1.0	0.10	0.20
CHLOROBENZENE	ND	1.0	0.10	0.20
CHLOROETHANE	ND	1.0	0.27	0.30
CHLOROFORM	ND	1.0	0.10	0.20
CHLOROMETHANE	ND	1.0	0.15	0.30
CIS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.10	0.20
DIBROMOCHLOROMETHANE	ND	1.0	0.10	0.20
DIBROMOMETHANE	ND	1.0	0.10	0.20
DICHLORODIFLUOROMETHANE	ND	1.0	0.15	0.30
ETHYLBENZENE	ND	1.0	0.10	0.20
HEXACHLOROBUTADIENE	ND	1.0	0.22	0.30
ISOPROPYLBENZENE	ND	1.0	0.10	0.20
M/P-XYLENES	ND	2.0	0.21	0.40
4-METHYL-2-PENTANONE	ND	10	2.1	5.0
METHYLENE CHLORIDE	ND	2.0	0.50	1.0
METHYL TERT-BUTYL ETHER	ND	1.0	0.13	0.20
NAPHTHALENE	ND	2.0	0.50	1.0
N-BUTYLBENZENE	ND	1.0	0.17	0.30
N-PROPYLBENZENE	ND	1.0	0.13	0.20
O-XYLENE	ND	1.0	0.10	0.20
P-ISOPROPYLTOLUENE	ND	1.0	0.14	0.20
SEC-BUTYLBENZENE	ND	1.0	0.13	0.20
STYRENE	ND	1.0	0.25	0.50
TERT-BUTYLBENZENE	ND	1.0	0.13	0.20
TETRACHLOROETHENE	ND	1.0	0.15	0.20
TOLUENE	ND	1.0	0.10	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.11	0.20
TRICHLOROETHENE	ND	1.0	0.10	0.20
TRICHLOROFLUOROMETHANE	ND	1.0	0.15	0.30
VINYL CHLORIDE	ND	1.0	0.12	0.20
TERTIARY BUTYL ALCOHOL	ND UJ(S)	10	2.5	5.0

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	9.56	10.00	95.6	81-118
4-BROMOFLUOROBENZENE	9.53	10.00	95.3	85-114
TOLUENE-D8	9.73	10.00	97.3	89-112
DIBROMOFLUOROMETHANE	9.93	10.00	99.3	80-119

5/5/16

METHOD SW5030B/8260B
VOLATILE ORGANICS BY GC/MS

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/22/16 16:00
Sample ID: KCH067-043	Date Analyzed: 03/22/16 16:00
Lab Samp ID: C129-20N	Dilution Factor: 1
Lab File ID: RCC443	Matrix : WATER
Ext Btch ID: V067C17	% Moisture : NA
Calib. Ref.: RBC337	Instrument ID : 67

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
1,1,1,2-TETRACHLOROETHANE	ND	1.0	0.10	0.20
1,1,1-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1,2,2-TETRACHLOROETHANE	ND	1.0	0.11	0.20
1,1,2-TRICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHANE	ND	1.0	0.10	0.20
1,1-DICHLOROETHENE	ND	1.0	0.10	0.20
1,1-DICHLOROPROPENE	ND	1.0	0.10	0.20
1,2,3-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2,3-TRICHLOROPROPANE	ND	2.0	0.25	0.50
1,2,4-TRICHLOROBENZENE	ND	1.0	0.15	0.30
1,2,4-TRIMETHYLBENZENE	ND	1.0	0.11	0.20
1,2-DIBROMO-3-CHLOROPROPANE	ND	2.0	0.25	0.50
1,2-DIBROMOETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROBENZENE	ND	1.0	0.10	0.20
1,2-DICHLOROETHANE	ND	1.0	0.10	0.20
1,2-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,3,5-TRIMETHYLBENZENE	ND	1.0	0.13	0.20
1,3-DICHLOROBENZENE	ND	1.0	0.11	0.20
1,3-DICHLOROPROPANE	ND	1.0	0.10	0.20
1,4-DICHLOROBENZENE	ND	1.0	0.10	0.20
2,2-DICHLOROPROPANE	ND	1.0	0.16	0.30
2-BUTANONE	ND	10	2.0	5.0
2-CHLOROTOLUENE	ND	1.0	0.12	0.20
2-HEXANONE	ND	10	2.3	5.0
4-CHLOROTOLUENE	ND	1.0	0.11	0.20
ACETONE	ND	10	2.6	5.0
BENZENE	ND	1.0	0.10	0.20
BROMOBENZENE	ND	1.0	0.10	0.20
BROMOCHLOROMETHANE	ND	1.0	0.11	0.20
BROMODICHLOROMETHANE	ND	1.0	0.10	0.20
BROMOFORM	ND	1.0	0.15	0.30
BROMOMETHANE	ND	1.0	0.16	0.30
CARBON DISULFIDE	ND	1.0	0.25	0.50
CARBON TETRACHLORIDE	ND	1.0	0.10	0.20
CHLOROBENZENE	ND	1.0	0.10	0.20
CHLOROETHANE	ND	1.0	0.27	0.30
CHLOROFORM	ND	1.0	0.10	0.20
CHLOROMETHANE	ND	1.0	0.15	0.30
CIS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
CIS-1,3-DICHLOROPROPENE	ND	1.0	0.10	0.20
DIBROMOCHLOROMETHANE	ND	1.0	0.10	0.20
DIBROMOMETHANE	ND	1.0	0.10	0.20
DICHLORODIFLUOROMETHANE	ND	1.0	0.15	0.30
ETHYLBENZENE	ND	1.0	0.10	0.20
HEXACHLOROBUTADIENE	ND	1.0	0.22	0.30
ISOPROPYLBENZENE	ND	1.0	0.10	0.20
M/P-XYLENES	ND	2.0	0.21	0.40
4-METHYL-2-PENTANONE	ND	10	2.1	5.0
METHYLENE CHLORIDE	ND	2.0	0.50	1.0
METHYL TERT-BUTYL ETHER	ND	1.0	0.13	0.20
NAPHTHALENE	ND	2.0	0.50	1.0
N-BUTYLBENZENE	ND	1.0	0.17	0.30
N-PROPYLBENZENE	ND	1.0	0.13	0.20
O-XYLENE	ND	1.0	0.10	0.20
P-ISOPROPYLTOLUENE	ND	1.0	0.14	0.20
SEC-BUTYLBENZENE	ND	1.0	0.13	0.20
STYRENE	ND	1.0	0.25	0.50
TERT-BUTYLBENZENE	ND	1.0	0.13	0.20
TETRACHLOROETHENE	ND	1.0	0.15	0.20
TOLUENE	ND	1.0	0.10	0.20
TRANS-1,2-DICHLOROETHENE	ND	1.0	0.10	0.20
TRANS-1,3-DICHLOROPROPENE	ND	1.0	0.11	0.20
TRICHLOROETHENE	ND	1.0	0.10	0.20
TRICHLOROFLUOROMETHANE	ND	1.0	0.15	0.30
VINYL CHLORIDE	ND	1.0	0.12	0.20
TERTIARY BUTYL ALCOHOL	ND UJ(S)	10	2.5	5.0

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
1,2-DICHLOROETHANE-D4	9.62	10.00	96.2	81-118
4-BROMOFLUOROBENZENE	9.54	10.00	95.4	85-114
TOLUENE-D8	9.69	10.00	97.0	89-112
DIBROMOFLUOROMETHANE	9.95	10.00	99.5	80-119

8/25/16

LDC #: 36282C1 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/10/16
SDG #: 16C129 Standard Page: 1 of 1
Laboratory: EMAX Laboratories Inc. Reviewer: FJ
2nd Reviewer: AC

METHOD: GC/MS Volatiles (EPA SW 846 Method 8260B)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	SW A	%D RSD ≤ 15 ICV ≤ 20
IV.	Continuing calibration / ending ccv	SW	ccv ≤ 20
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	SB = 1 TB = 2*
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	QC Sample
IX.	Laboratory control samples	A	LCS ID
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-042 SB	16C129-19	Water	03/15/16
2	KCH067-043 TB	16C129-20	Water	03/15/16
3				
4				
5				
6				
7				
8				
9				

Notes:

	MBLKIW						

TARGET COMPOUND WORKSHEET

METHOD: VOA

A. Chloromethane	AA. Tetrachloroethene	AAA. 1,3,5-Trimethylbenzene	AAAA. Ethyl tert-butyl ether	A1. 1,3-Butadiene
B. Bromomethane	BB. 1,1,2,2-Tetrachloroethane	BBB. 4-Chlorotoluene	BBBB. tert-Amyl methyl ether	B1. Hexane
C. Vinyl choride	CC. Toluene	CCC. tert-Butylbenzene	CCCC. 1-Chlorohexane	C1. Heptane
D. Chloroethane	DD. Chlorobenzene	DDD. 1,2,4-Trimethylbenzene	DDDD. Isopropyl alcohol	D1. Propylene
E. Methylene chloride	EE. Ethylbenzene	EEE. sec-Butylbenzene	EEEE. Acetonitrile	E1. Freon 11
F. Acetone	FF. Styrene	FFF. 1,3-Dichlorobenzene	FFFF. Acrolein	F1. Freon 12
G. Carbon disulfide	GG. Xylenes, total	GGG. p-Isopropyltoluene	GGGG. Acrylonitrile	G1. Freon 113
H. 1,1-Dichloroethene	HH. Vinyl acetate	HHH. 1,4-Dichlorobenzene	HHHH. 1,4-Dioxane	H1. Freon 114
I. 1,1-Dichloroethane	II. 2-Chloroethylvinyl ether	III. n-Butylbenzene	IIII. Isobutyl alcohol	I1. 2-Nitropropane
J. 1,2-Dichloroethene, total	JJ. Dichlorodifluoromethane	JJJ. 1,2-Dichlorobenzene	JJJJ. Methacrylonitrile	J1. Dimethyl disulfide
K. Chloroform	KK. Trichlorofluoromethane	KKK. 1,2,4-Trichlorobenzene	KKKK. Propionitrile	K1. 2,3-Dimethyl pentane
L. 1,2-Dichloroethane	LL. Methyl-tert-butyl ether	LLL. Hexachlorobutadiene	LLLL. Ethyl ether	L1. 2,4-Dimethyl pentane
M. 2-Butanone	MM. 1,2-Dibromo-3-chloropropane	MMM. Naphthalene	MMMM. Benzyl chloride	M1. 3,3-Dimethyl pentane
N. 1,1,1-Trichloroethane	NN. Methyl ethyl ketone	NNN. 1,2,3-Trichlorobenzene	NNNN. Iodomethane	N1. 2-Methylpentane
O. Carbon tetrachloride	OO. 2,2-Dichloropropane	OOO. 1,3,5-Trichlorobenzene	OOOO.1,1-Difluoroethane	O1. 3-Methylpentane
P. Bromodichloromethane	PP. Bromochloromethane	PPP. trans-1,2-Dichloroethene	PPPP. Tetrahydrofuran	P1. 3-Ethylpentane
Q. 1,2-Dichloropropane	QQ. 1,1-Dichloropropene	QQQ. cis-1,2-Dichloroethene	QQQQ. Methyl acetate	Q1. 2,2-Dimethylpentane
R. cis-1,3-Dichloropropene	RR. Dibromomethane	RRR. m,p-Xylenes	RRRR. Ethyl acetate	R1. 2,2,3- Trimethylbutane
S. Trichloroethene	SS. 1,3-Dichloropropane	SSS. o-Xylene	SSSS. Cyclohexane	S1. 2,2,4-Trimethylpentane
T. Dibromochloromethane	TT. 1,2-Dibromoethane	TTT. 1,1,2-Trichloro-1,2,2-trifluoroethane	TTTT. Methyl cyclohexane	T1. 2-Methylhexane
U. 1,1,2-Trichloroethane	UU. 1,1,1,2-Tetrachloroethane	UUU. 1,2-Dichlorotetrafluoroethane	UUUU. Allyl chloride	U1. Nonanal
V. Benzene	VV. Isopropylbenzene	VVV. 4-Ethyltoluene	VVVV. Methyl methacrylate	V1. 2-Methylnaphthalene
W. trans-1,3-Dichloropropene	WW. Bromobenzene	WWW. Ethanol	WWWW. Ethyl methacrylate	W1. Methanol
X. Bromoform	XX. 1,2,3-Trichloropropane	XXX. Di-isopropyl ether	XXXX. cis-1,4-Dichloro-2-butene	X1. 1,2,3-Trimethylbenzene
Y. 4-Methyl-2-pentanone	YY. n-Propylbenzene	YYY. tert-Butanol	YYYY. trans-1,4-Dichloro-2-butene	Y1.
Z. 2-Hexanone	ZZ. 2-Chlorotoluene	ZZZ. tert-Butyl alcohol	ZZZZ. Pentachloroethane	Z1.

LDC #: 36282C1

VALIDATION FINDINGS WORKSHEET
Initial Calibration

Page: 1 of 1
Reviewer: FT
2nd Reviewer: AC

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A Did the laboratory perform a 5 point calibration prior to sample analysis?
Y N N/A Were percent relative standard deviations (%RSD) and relative response factors (RRF) within method criteria for all CCC's and SPCC's?
Y N N/A Was a curve fit used for evaluation? If yes, what was the acceptance criteria used for evaluation?_____
Y N N/A Did the initial calibration meet the acceptance criteria?
Y N N/A Were all %RSDs and RRFs within the validation criteria of ≤30/15 %RSD and ≥0.05 RRF ?

Code = 5

#	Date	Standard ID	Compound	Finding %RSD (Limit: ≤30/15%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	2/26/16	V067B26-ICAL	ZZZ		0.007 (≥0.01)	all	J+/UJ/A ND

INICAL.wpd

LDC #: 36202C1

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: FT
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

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

Y N N/A Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?
Y N N/A Were percent differences (%D) and relative response factors (RRF) within method criteria for all CCC's and SPCC's ?
Y N N/A Were all %D and RRFs within the validation criteria of ≤20 %D and ≥0.05 RRF ?

Code = J

#	Date	Standard ID	Compound	Finding %D (Limit: ≤20.0%)	Finding RRF (Limit: ≥0.05)	Associated Samples	Qualifications
	3/22/16	RCC434-CCV	ZZZ		0.007 (≥0.01)	all	J+ / UJ / A NB

LDC #: 36282 C1

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: FT
2nd Reviewer: R

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Y N N/A Was a method blank associated with every sample in this SDG?
Y N N/A Was a method blank analyzed at least once every 12 hours for each matrix and concentration?
Y N N/A Was there contamination in the method blanks? If yes, please see the qualifications below.

Blank analysis date: 3/22/16
Conc. units: ug/L Associated Samples: All (ND)

Compound	Blank ID	Sample Identification								
	MBLK1W									
F	0.91									

Blank analysis date:
Conc. units: Associated Samples:

Compound	Blank ID	Sample Identification								

All results were qualified using the criteria stated below except those circled.

Note: Common contaminants such as Methylene chloride, Acetone, 2-Butanone, Carbon disulfide and TICs that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 36282C1

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: FT
2nd Reviewer:

METHOD: GC/MS VOA (EPA SW 846 Method 8260B)

Y N N/A Were field blanks identified in this SDG?

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

Blank units: ug/L **Associated sample units:** NA

Sampling date: 3/15/16

Field blank type: (circle one) Field Blank / Rinsate / Trip Blank / Other: SB Associated Samples: none

Compound	Blank ID	Sample Identification								
	1									
F	4.1									

Blank units: _____ **Associated sample units:** _____

Sampling date: _____

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

Compound	Blank ID	Sample Identification								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as Methylene chloride, Acetone, 2-Butanone and Carbon disulfide that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 12, 2016

Parameters: Polynuclear Aromatic Hydrocarbons

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C129

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-032**	16C129-09**	Soil	03/15/16
KCH067-033	16C129-10	Soil	03/15/16
KCH067-041	16C129-18	Water	03/15/16
KCH067-042	16C129-19	Water	03/15/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polynuclear Aromatic Hydrocarbons (PAHs) by Environmental Protection Agency (EPA) SW 846 Method 8270C using Selected Ion Monitoring (SIM)

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. GC/MS Instrument Performance Check

A decafluorotriphenylphosphine (DFTPP) tune was performed at 12 hour intervals. All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

For compounds where average relative response factors (RRFs) were utilized, percent relative standard deviations (%RSD) were less than or equal to 15.0% for all compounds.

In the case where the laboratory used a calibration curve to evaluate the compounds, all coefficients of determination (r^2) were greater than or equal to 0.990.

Average relative response factors (RRF) for all compounds were within validation criteria.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the ending continuing calibration verifications (CCVs) were less than or equal to 50.0% for all compounds.

All of the continuing calibration relative response factors (RRF) were within validation criteria.

V. Laboratory Blanks

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

VI. Field Blanks

Sample KCH067-041 was identified as an equipment blank. No contaminants were found.

Sample KCH067-042 was identified as a source blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

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

IX. Laboratory Control Samples

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

Relative percent differences (RPD) were within QC limits with the following exceptions:

LCS ID (Associated Samples)	Compound	RPD (Limits)	Flag	A or P
SVC017WL/WC (All water samples in SDG 16C129)	Acenaphthene	26 (≤20)	UJ (all non-detects)	P
	Acenaphthylene	27 (≤20)	UJ (all non-detects)	
	Naphthalene	27 (≤20)	UJ (all non-detects)	
	2-Methylnaphthalene	29 (≤20)	UJ (all non-detects)	
	1-Methylnaphthalene	28 (≤20)	UJ (all non-detects)	

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

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

Due to LCS/LCSD RPD, data were qualified as estimated in two samples.

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

China Lake CTO 067
Polynuclear Aromatic Hydrocarbons - Data Qualification Summary - SDG 16C129

Sample	Compound	Flag	A or P	Reason (Code)
KCH067-041 KCH067-042	Acenaphthene Acenaphthylene Naphthalene 2-Methylnaphthalene 1-Methylnaphthalene	UJ (all non-detects) UJ (all non-detects) UJ (all non-detects) UJ (all non-detects) UJ (all non-detects)	P	Laboratory control samples (%R) (10)

China Lake CTO 067
Polynuclear Aromatic Hydrocarbons - Laboratory Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

China Lake CTO 067
Polynuclear Aromatic Hydrocarbons - Field Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

METHOD SW3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS SIM

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/21/16 13:45
Sample ID	: KCH067-041	Date Analyzed:	03/24/16 17:44
Lab Samp ID	: C129-18	Dilution Factor:	1
Lab File ID	: RCJ395	Matrix	: WATER
Ext Btch ID	: SVC017W	% Moisture	: NA
Calib. Ref.	: RBJ007	Instrument ID	: T-OE4

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
ACENAPHTHENE	ND UJ(10)	0.50	0.050	0.10
ACENAPHTHYLENE	ND ↓	0.50	0.050	0.10
ANTHRACENE	ND	0.50	0.050	0.10
BENZO(A)ANTHRACENE	ND	0.50	0.090	0.20
BENZO(A)PYRENE	ND	0.50	0.050	0.10
BENZO(B)FLUORANTHENE	ND	0.50	0.050	0.10
BENZO(K)FLUORANTHENE	ND	0.50	0.050	0.10
BENZO(G,H,I)PERYLENE	ND	0.50	0.050	0.10
CHRYSENE	ND	0.50	0.060	0.20
DIBENZO(A,H)ANTHRACENE	ND	0.50	0.050	0.10
FLUORANTHENE	ND	0.50	0.050	0.10
FLUORENE	ND	0.50	0.050	0.10
INDENO(1,2,3-CD)PYRENE	ND	0.50	0.050	0.10
NAPHTHALENE	ND UJ(10)	0.50	0.050	0.10
PHENANTHRENE	ND	0.50	0.050	0.10
PYRENE	ND	0.50	0.050	0.10
2-METHYLNAPHTHALENE	ND UJ(10)	0.50	0.050	0.10
1-METHYLNAPHTHALENE	ND ↓	0.50	0.050	0.10

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	15.3	20.00	76.5	53-106
NITROBENZENE-D5	16.6	20.00	82.8	55-111
TERPHENYL-D14	17.9	20.00	89.6	58-132

8C 3/31/16

METHOD SW3520C/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS SIM

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/21/16 13:45
Sample ID	: KCH067-042	Date Analyzed:	03/24/16 18:04
Lab Samp ID	: C129-19	Dilution Factor:	1.11
Lab File ID	: RCJ396	Matrix	: WATER
Ext Btch ID	: SVC017W	% Moisture	: NA
Calib. Ref.	: RBJ007	Instrument ID	: T-OE4

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
ACENAPHTHENE	ND UJ(10)	0.56	0.056	0.11
ACENAPHTHYLENE	ND	0.56	0.056	0.11
ANTHRACENE	ND	0.56	0.056	0.11
BENZO(A)ANTHRACENE	ND	0.56	0.10	0.22
BENZO(A)PYRENE	ND	0.56	0.056	0.11
BENZO(B)FLUORANTHENE	ND	0.56	0.056	0.11
BENZO(K)FLUORANTHENE	ND	0.56	0.056	0.11
BENZO(G,H,I)PERYLENE	ND	0.56	0.056	0.11
CHRYSENE	ND	0.56	0.067	0.22
DIBENZO(A,H)ANTHRACENE	ND	0.56	0.056	0.11
FLUORANTHENE	ND	0.56	0.056	0.11
FLUORENE	ND	0.56	0.056	0.11
INDENO(1,2,3-CD)PYRENE	ND	0.56	0.056	0.11
NAPHTHALENE	ND UJ(10)	0.56	0.056	0.11
PHENANTHRENE	ND	0.56	0.056	0.11
PYRENE	ND	0.56	0.056	0.11
2-METHYLNAPHTHALENE	ND UJ(10)	0.56	0.056	0.11
1-METHYLNAPHTHALENE	ND	0.56	0.056	0.11

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	18.4	22.20	82.7	53-106
NITROBENZENE-D5	19.9	22.20	89.8	55-111
TERPHENYL-D14	20.8	22.20	93.8	58-132

8-25-16

METHOD SW3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS SIM

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/22/16 10:39
Sample ID:	KCH067-032	Date Analyzed:	03/23/16 18:54
Lab Samp ID:	C129-09	Dilution Factor:	1
Lab File ID:	RCJ366	Matrix	: SOIL
Ext Btch ID:	SVC018S	% Moisture	: 1.7
Calib. Ref.:	RBJ007	Instrument ID	: T-OE4

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ACENAPHTHENE	ND	10	1.3	2.5
ACENAPHTHYLENE	ND	10	1.3	2.5
ANTHRACENE	3.5J	10	1.3	2.5
BENZO(A)ANTHRACENE	69	10	2.5	5.1
BENZO(A)PYRENE	73	10	1.3	2.5
BENZO(B)FLUORANTHENE	150	10	1.3	2.5
BENZO(K)FLUORANTHENE	43	10	1.3	2.5
BENZO(G,H,I)PERYLENE	55	10	1.3	2.5
CHRYSENE	130	10	2.2	5.1
DIBENZO(A,H)ANTHRACENE	13	10	1.3	2.5
FLUORANTHENE	160	10	1.3	2.5
FLUORENE	ND	10	1.3	2.5
INDENO(1,2,3-CD)PYRENE	51	10	1.3	2.5
NAPHTHALENE	ND	10	1.3	2.5
PHENANTHRENE	41	10	1.3	2.5
PYRENE	130	10	1.3	2.5
2-METHYLNAPHTHALENE	ND	10	1.3	2.5
1-METHYLNAPHTHALENE	ND	10	1.3	2.5

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	557	678.2	82.2	46-115
NITROBENZENE-D5	585	678.2	86.2	44-125
TERPHENYL-D14	720	678.2	106	58-133

4/5/16

METHOD SW3550B/8270C SIM
SEMI VOLATILE ORGANICS BY GC/MS SIM

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/22/16 10:39
Sample ID	: KCH067-033	Date Analyzed:	03/23/16 19:14
Lab Samp ID	: C129-10	Dilution Factor:	1
Lab File ID	: RCJ367	Matrix :	SOIL
Ext Btch ID	: SVC018S	% Moisture :	1.5
Calib. Ref.	: RBJ007	Instrument ID :	T-0E4

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ACENAPHTHENE	ND	10	1.3	2.5
ACENAPHTHYLENE	ND	10	1.3	2.5
ANTHRACENE	ND	10	1.3	2.5
BENZO(A)ANTHRACENE	ND	10	2.5	5.1
BENZO(A)PYRENE	ND	10	1.3	2.5
BENZO(B)FLUORANTHENE	ND	10	1.3	2.5
BENZO(K)FLUORANTHENE	ND	10	1.3	2.5
BENZO(G,H,I)PERYLENE	ND	10	1.3	2.5
CHRYSENE	ND	10	2.2	5.1
DIBENZO(A,H)ANTHRACENE	ND	10	1.3	2.5
FLUORANTHENE	ND	10	1.3	2.5
FLUORENE	ND	10	1.3	2.5
INDENO(1,2,3-CD)PYRENE	ND	10	1.3	2.5
NAPHTHALENE	ND	10	1.3	2.5
PHENANTHRENE	ND	10	1.3	2.5
PYRENE	ND	10	1.3	2.5
2-METHYLNAPHTHALENE	ND	10	1.3	2.5
1-METHYLNAPHTHALENE	ND	10	1.3	2.5

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
2-FLUOROBIPHENYL	554	676.9	81.9	46-115
NITROBENZENE-D5	584	676.9	86.3	44-125
TERPHENYL-D14	691	676.9	102	58-133

8/25/16

LDC #: 36282C2b **VALIDATION COMPLETENESS WORKSHEET** Date: 5/10/16
SDG #: 16C129 Standard/Full Page: 1 of 1
Laboratory: EMAX Laboratories Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC/MS Polynuclear Aromatic Hydrocarbons (EPA SW 846 Method 8270C-SIM)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	%D RSD ≤ 15, r² ICV ≤ 20
IV.	Continuing calibration / ending CCV	A	CCV ≤ 20
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB = 3 SB = 4
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	CS
IX.	Laboratory control samples	SW	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Standard validation.
XIII.	Target compound identification	A	Not reviewed for Standard validation.
XIV.	System performance	A	Not reviewed for Standard validation.
XV.	Overall assessment of data	A	

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

** Indicates sample underwent Full validation

	Client ID		Lab ID	Matrix	Date
1	KCH067-032**		16C129-09**	Soil	03/15/16
2	KCH067-033		16C129-10	Soil	03/15/16
3	KCH067-041	EB	16C129-18	Water	03/15/16
4	KCH067-042	SB	16C129-19	Water	03/15/16
5					
6					
7					
8					
9					

Notes:

	MBLK1W						
	MBLK1S						

LDC #: 36282C2b

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: EJ
2nd Reviewer: C

Method: Semivolatiles (EPA SW 846 Method 8270C-SIM)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. GC/MS Instrument performance check (Not required)				
Were the DFTPP performance results reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 15% and relative response factors (RRF) ≥ 0.05?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤20% or percent recoveries (%R) 80-120%?	✓			
IV. Continuing calibration				
Was a continuing calibration standard analyzed at least once every 12 hours for each instrument?	✓			
Were all percent differences (%D) ≤ 20% and relative response factors (RRF) ≥ 0.05?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VII. Surrogate spikes				
Were all surrogate percent differences (%R) within QC limits?	✓			
If 2 or more base neutral or acid surrogates were outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any percent recoveries (%R) was less than 10 percent, was a reanalysis performed to confirm %R?			✓	

LDC #: 36282C2b

VALIDATION FINDINGS CHECKLIST

Reviewer: FP
2nd Reviewer: C

Validation Area	Yes	No	NA	Findings/Comments
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		✓		
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per analytical batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?		✓		
X. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?			✓	
XI. Internal standards				
Were internal standard area counts within -50% or +100% of the associated calibration standard?	✓			
Were retention times within ± 30 seconds of the associated calibration standard?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

VALIDATION FINDINGS WORKSHEET

METHOD: GC/MS SVOA

A. Phenol	AA. 2-Chloronaphthalene	AAA. Butylbenzylphthalate	AAAA. Dibenzothiophene	A1.
B. Bis (2-chloroethyl) ether	BB. 2-Nitroaniline	BBB. 3,3'-Dichlorobenzidine	BBBB. Benzo(a)fluoranthene	B1.
C. 2-Chlorophenol	CC. Dimethylphthalate	CCC. Benzo(a)anthracene	CCCC. Benzo(b)fluorene	C1.
D. 1,3-Dichlorobenzene	DD. Acenaphthylene	DDD. Chrysene	DDDD. cis/trans-Decalin	D1.
E. 1,4-Dichlorobenzene	EE. 2,6-Dinitrotoluene	EEE. Bis(2-ethylhexyl)phthalate	EEEE. Biphenyl	E1.
F. 1,2-Dichlorobenzene	FF. 3-Nitroaniline	FFF. Di-n-octylphthalate	FFFF. Retene	F1.
G. 2-Methylphenol	GG. Acenaphthene	GGG. Benzo(b)fluoranthene	GGGG. C30-Hopane	G1.
H. 2,2'-Oxybis(1-chloropropane)	HH. 2,4-Dinitrophenol	HHH. Benzo(k)fluoranthene	HHHH. 1-Methylphenanthrene	H1.
I. 4-Methylphenol	II. 4-Nitrophenol	III. Benzo(a)pyrene	IIII. 1,4-Dioxane	I1.
J. N-Nitroso-di-n-propylamine	JJ. Dibenzofuran	JJJ. Indeno(1,2,3-cd)pyrene	JJJJ. Acetophenone	J1.
K. Hexachloroethane	KK. 2,4-Dinitrotoluene	KKK. Dibenz(a,h)anthracene	KKKK. Atrazine	K1.
L. Nitrobenzene	LL. Diethylphthalate	LLL. Benzo(g,h,i)perylene	LLLL. Benzaldehyde	L1.
M. Isophorone	MM. 4-Chlorophenyl-phenyl ether	MMM. Bis(2-Chloroisopropyl)ether	MMMM. Caprolactam	M1.
N. 2-Nitrophenol	NN. Fluorene	NNN. Aniline	NNNN. 2,6-Dichlorophenol	N1.
O. 2,4-Dimethylphenol	OO. 4-Nitroaniline	OOO. N-Nitrosodimethylamine	OOOO. 2,6-Dinitrotoluene	O1.
P. Bis(2-chloroethoxy)methane	PP. 4,6-Dinitro-2-methylphenol	PPP. Benzoic Acid	PPPP. 3-Methylphenol	P1.
Q. 2,4-Dichlorophenol	QQ. N-Nitrosodiphenylamine	QQQ. Benzyl alcohol	QQQQ. 3&4 Methylphenol	Q1.
R. 1,2,4-Trichlorobenzene	RR. 4-Bromophenyl-phenylether	RRR. Pyridine	RRRR. 4-Dimethyldibenzothiphene (4MDT)	R1.
S. Naphthalene	SS. Hexachlorobenzene	SSS. Benzidine	SSSS. 2/3-Dimethyldibenzothiophene (4MDT)	S1.
T. 4-Chloroaniline	TT. Pentachlorophenol	TTT. 1-Methylnaphthalene	TTTT. 1-Methyldibenzothiophene (1MDT)	T1.
U. Hexachlorobutadiene	UU. Phenanthrene	UUU.Benzo(b)thiophene	UUUU.	U1.
V. 4-Chloro-3-methylphenol	VV. Anthracene	VVV.Benzonaphthothiophene	VVVV.	V1.
W. 2-Methylnaphthalene	WW. Carbazole	WWW.Benzo(e)pyrene	WWWW.	W1.
X. Hexachlorocyclopentadiene	XX. Di-n-butylphthalate	XXX. 2,6-Dimethylnaphthalene	XXXX.	X1.
Y. 2,4,6-Trichlorophenol	YY. Fluoranthene	YYY. 2,3,5-Trimethylnaphthalene	YYYY.	Y1.
Z. 2,4,5-Trichlorophenol	ZZ. Pyrene	ZZZ. Perylene	ZZZZ.	Z1.

LDC #: 36282c2b

VALIDATION FINDINGS WORKSHEET
Laboratory Control Samples (LCS)

Page: 1 of 1
Reviewer: FT
2nd Reviewer:

METHOD: GC/MS BNA (EPA SW 846 Method 8270D)

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

Y N N/A Was a LCS required?

Y N N/A Were the LCS/LCSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits? code= 10

#	LCS/LCSD ID	Compound	LCS %R (Limits)	LCSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	SVC017WL/WC	GG	( )	( )	26 (20)	all water	J/UJ/P (ND)
		DD	( )	( )	27 ( )		
		S	( )	( )	27 ( )		
		W	( )	( )	29 ( )		
		TTT	( )	( )	20 ( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
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			( )	( )	( )		
			( )	( )	( )		

LDC #: 36282C2b

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)
The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

$RRF = (A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Internal Standard)	Reported RRF (10 std)	Recalculated RRF (10 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	2/2/16	S (1st IS)	3.981	3.981	4.006	4.006	3.76	3.76
			YY (2nd IS)	1.437	1.437	1.451	1.451	9.00	9.00
			III (3rd IS)	1.165	1.165	1.083	1.083	11.33	11.33
			(4th IS)						
			(5th IS)						
			(6th IS)						
2			(1st IS)						
			(2nd IS)						
			(3rd IS)						
			(4th IS)						
			(5th IS)						
			(6th IS)						
3			(1st IS)						
			(2nd IS)						
			(3rd IS)						
			(4th IS)						
			(5th IS)						
			(6th IS)						

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

LDC #: 36282c2b

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)
The percent difference (%D) of the initial calibration average Relative Response Factors (RRFs) and the continuing calibration RRFs were recalculated for the compounds identified below using the following calculation:

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

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

#	Standard ID	Calibration Date	Compound (Internal Standard)	Average RRF (Initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	CCV	3/23/16	S (1st IS)	4.006	3.851	3.851	3.9	3.9
			YY (2nd IS)	1.451	1.395	1.395	3.9	3.9
			III (3rd IS)	1.083	1.158	1.158	6.9	6.9
			(4th IS)					
			(5th IS)					
			(6th IS)					
2			(1st IS)					
			(2nd IS)					
			(3rd IS)					
			(4th IS)					
			(5th IS)					
			(6th IS)					
3			(1st IS)					
			(2nd IS)					
			(3rd IS)					
			(4th IS)					
			(5th IS)					
			(6th IS)					

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

LDC #: 36282 cab

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: FT
2nd reviewer: M

METHOD: GC/MS Semivolatiles (EPA SW 846 Method 8270C)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #1

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5	10.0	8.62	86.2	86.2	0
2-Fluorobiphenyl	↓	8.22	82.2	82.2	↓
Terphenyl-d14	↓	10.61	106	106	↓
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Nitrobenzene-d5					
2-Fluorobiphenyl					
Terphenyl-d14					
Phenol-d5					
2-Fluorophenol					
2,4,6-Tribromophenol					
2-Chlorophenol-d4					
1,2-Dichlorobenzene-d4					

LDC #: 36282C2b

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

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

% Recovery = 100 * (SC/SA Where: SSC = Spike concentration
SA = Spike added

RPD = I LCSC - LCSDC I * 2/(LCSC + LCSDC) LCSC = Laboratory control sample concentration LCSDC = Laboratory control sample duplicate concentration

LCS/LCSD samples: SV0018SL/SC

Compound	Spike Added (ug/kg)		Spike Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Phenol										
N-Nitroso-di-n-propylamine										
4-Chloro-3-methylphenol										
Acenaphthene	1330	1330	1010	943	76	76	71	71	7	7
Pentachlorophenol										
Pyrene	↓	↓	1320	1270	99	99	95	95	4	4

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

LDC #: 36282c2b

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: FT
2nd reviewer:

METHOD: GC/MS BNA (EPA SW 846 Method 8270C)

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

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

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

2/30

Example:

Sample I.D. #1, 44:

Conc. = $\frac{(37891)(40)(2)(1000)}{(1902181)(1.330)(30)(0.983)}$

=

41 ug/kg

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 12, 2016

Parameters: Chlorinated Pesticides

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C129

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-022	16C129-01	Soil	03/15/16
KCH067-022DL	16C129-01DL	Soil	03/15/16
KCH067-023	16C129-02	Soil	03/15/16
KCH067-023DL	16C129-02DL	Soil	03/15/16
KCH067-024	16C129-03	Soil	03/15/16
KCH067-024DL	16C129-03DL	Soil	03/15/16
KCH067-025	16C129-04	Soil	03/15/16
KCH067-025DL	16C129-04DL	Soil	03/15/16
KCH067-026**	16C129-05**	Soil	03/15/16
KCH067-026DL**	16C129-05DL**	Soil	03/15/16
KCH067-027	16C129-06	Soil	03/15/16
KCH067-027DL	16C129-06DL	Soil	03/15/16
KCH067-028	16C129-07	Soil	03/15/16
KCH067-028DL	16C129-07DL	Soil	03/15/16
KCH067-029	16C129-08	Soil	03/15/16
KCH067-029DL	16C129-08DL	Soil	03/15/16
KCH067-041	16C129-18	Water	03/15/16
KCH067-042	16C129-19	Water	03/15/16
KCH067-022MS	16C129-01MS	Soil	03/15/16
KCH067-022MSD	16C129-01MSD	Soil	03/15/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Chlorinated Pesticides by Environmental Protection Agency (EPA) SW 846 Method 8081A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. GC Instrument Performance Check

Instrument performance was checked at 12 hour intervals.

The individual 4,4'-DDT and Endrin breakdowns (%BD) were less than or equal to 15.0%.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

Retention time windows were established as required by the method for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds with the following exceptions:

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
03/22/16 (16:15)	CCV	RTX CLP2	alpha-BHC	22	All water samples in SDG 16C129	UJ (all non-detects)	A
03/22/16 (20:18)	CCV	RTX CLP2	alpha-BHC	23	KCH067-022 KCH067-023 KCH067-024 KCH067-025 KCH067-027 KCH067-029	UJ (all non-detects)	A

Date	Standard	Column	Compound	%D	Associated Samples	Flag	A or P
03/23/16 (20:25)	CCV	RTX CLP2	alpha-BHC gamma-BHC	31 25	KCH067-022DL KCH067-023DL KCH067-024DL KCH067-025DL KCH067-027DL KCH067-028 KCH067-029DL	UJ (all non-detects) UJ (all non-detects)	A
03/24/16 (20:03)	CCV	RTX CLP1	gamma-Chlordane alpha-Chlordane Endosulfan I	34 24 21	KCH067-026** KCH067-026DL** KCH067-028DL	J (all detects) UJ (all non-detects)	A
03/24/16 (20:03)	CCV	RTX CLP2	Aldrin	22	KCH067-026** KCH067-026DL** KCH067-028DL	J (all detects) UJ (all non-detects)	A

Retention times of all compounds in the calibration standards were within the established retention time windows for samples which underwent Level IV validation.

V. Laboratory Blanks

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

VI. Field Blanks

Sample KCH067-041 was identified as an equipment blank. No contaminants were found.

Sample KCH067-042 was identified as a source blank. No contaminants were found.

VII. Surrogates

Surrogates were added to all samples as required by the method. Surrogate recoveries (%R) were not within QC limits for several samples. No data were qualified for samples analyzed at greater than or equal to 5X dilution.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were not within the QC limits for KCH067-022MS/MSD. No data were qualified for Dieldrin since the parent sample results were greater than 4X the spiked concentration. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

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

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Compound Quantitation

All compound quantitations met validation criteria with the following exceptions:

Sample	Compound	Finding	Criteria	Flag	A or P
KCH067-022	Dieldrin Chlordane (Technical)	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects)	A
KCH067-023 KCH067-026** KCH067-028	alpha-Chlordane gamma-Chlordane Chlordane (Technical)	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects)	A
KCH067-024	alpha-Chlordane gamma-Chlordane	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects)	A
KCH067-025	alpha-Chlordane gamma-Chlordane 4,4'-DDE 4,4'-DDT Chlordane (Technical)	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	A
KCH067-027 KCH067-029	alpha-Chlordane gamma-Chlordane Dieldrin Chlordane (Technical)	Sample result exceeded calibration range.	Reported result should be within calibration range.	J (all detects) J (all detects) J (all detects) J (all detects)	A

The sample results for detected compounds from the two columns were within 40% relative percent difference (RPD) with the following exceptions:

Sample	Compound	RPD	Flag	A or P
KCH067-022	gamma-Chlordane Dieldrin 4,4'-DDT Chlordane (Technical)	52 78 45 45	J (all detects) J (all detects) J (all detects) J (all detects)	A
KCH067-022DL	gamma-Chlordane alpha-Chlordane	75 67	J (all detects) J (all detects)	A

Sample	Compound	RPD	Flag	A or P
KCH067-023	gamma-Chlordane Dieldrin 4,4'-DDT Chlordane (Technical)	84 50 89 63	J (all detects) J (all detects) J (all detects) J (all detects)	A
KCH067-023DL	alpha-Chlordane 4,4'-DDT	52 49	J (all detects) J (all detects)	A
KCH067-024	gamma-Chlordane alpha-Chlordane 4,4'-DDT	42 50 79	J (all detects) J (all detects) J (all detects)	A
KCH067-024DL	alpha-Chlordane	73	J (all detects)	A
KCH067-025	gamma-Chlordane 4,4'-DDE 4,4'-DDT Chlordane (Technical)	90 85 83 69	J (all detects) J (all detects) J (all detects) J (all detects)	A
KCH067-025DL	alpha-Chlordane Dieldrin	78 151	J (all detects) J (all detects)	A
KCH067-026**	gamma-Chlordane alpha-Chlordane Dieldrin Endrin Chlordane (Technical)	144 147 95 102 52	J (all detects) J (all detects) J (all detects) J (all detects) J (all detects)	A
KCH067-026DL**	alpha-Chlordane	51	J (all detects)	A
KCH067-027	gamma-Chlordane alpha-Chlordane 4,4'-DDT Chlordane (Technical)	82 81 81 56	J (all detects) J (all detects) J (all detects) J (all detects)	A
KCH067-027DL	alpha-Chlordane	70	J (all detects)	A
KCH067-028DL	alpha-Chlordane 4,4'-DDE	74 48	J (all detects) J (all detects)	A
KCH067-029	Aldrin gamma-Chlordane 4,4'-DDE Dieldrin	57 65 57 42	J (all detects) J (all detects) J (all detects) J (all detects)	A
KCH067-029DL	alpha-Chlordane 4,4'-DDE 4,4'-DDT	76 63 56	J (all detects) J (all detects) J (all detects)	A

Raw data were not reviewed for Level III validation.

XII. Target Compound Identification

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Overall Assessment of Data

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

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Compound	Flag	A or P
KCH067-022	Dieldrin Chlordane (Technical)	R R	A
KCH067-022DL	All compounds except Dieldrin Chlordane (Technical)	R	A
KCH067-023 KCH067-026** KCH067-028	alpha-Chlordane gamma-Chlordane Chlordane (Technical)	R R R	A
KCH067-023DL KCH067-026DL** KCH067-028DL	All compounds except alpha-Chlordane gamma-Chlordane Chlordane (Technical)	R	A
KCH067-024	alpha-Chlordane gamma-Chlordane	R R	A
KCH067-024DL	All compounds except alpha-Chlordane gamma-Chlordane	R	A
KCH067-025	alpha-Chlordane gamma-Chlordane 4,4'-DDE 4,4'-DDT Chlordane (Technical)	R R R R R	A

Sample	Compound	Flag	A or P
KCH067-025DL	All compounds except alpha-Chlordane gamma-Chlordane 4,4'-DDE 4,4'-DDT Chlordane (Technical)	R	A
KCH067-027 KCH067-029	alpha-Chlordane gamma-Chlordane Dieldrin Chlordane (Technical)	R R R R	A
KCH067-027DL KCH067-029DL	All compounds except alpha-Chlordane gamma-Chlordane Dieldrin Chlordane (Technical)	R	A

Due to continuing calibration %D and RPD between two columns, data were qualified as estimated in ten samples.

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

China Lake CTO 067
Chlorinated Pesticides - Data Qualification Summary - SDG 16C129

Sample	Compound	Flag	A or P	Reason (Code)
KCH067-041 KCH067-042 KCH067-022 KCH067-023 KCH067-024 KCH067-025 KCH067-027 KCH067-029	alpha-BHC	UJ (all non-detects)	A	Continuing calibration (%D) (5)
KCH067-028	alpha-BHC gamma-BHC	UJ (all non-detects) UJ (all non-detects)	A	Continuing calibration (%D) (5)
KCH067-026** KCH067-026DL** KCH067-028DL	gamma-Chlordane alpha-Chlordane Endosulfan I Aldrin	J (all detects) UJ (all non-detects)	A	Continuing calibration (%D) (5)
KCH067-022	gamma-Chlordane 4,4'-DDT	J (all detects) J (all detects)	A	Compound quantitation (RPD between two columns) (12)
KCH067-023	Dieldrin 4,4'-DDT	J (all detects) J (all detects)	A	Compound quantitation (RPD between two columns) (12)
KCH067-024 KCH067-027	4,4'-DDT	J (all detects)	A	Compound quantitation (RPD between two columns) (12)
KCH067-023DL KCH067-024DL KCH067-025DL KCH067-026DL** KCH067-027DL KCH067-028DL KCH067-029DL	alpha-Chlordane	J (all detects)	A	Compound quantitation (RPD between two columns) (12)
KCH067-026**	Dieldrin Endrin	J (all detects) J (all detects)	A	Compound quantitation (RPD between two columns) (12)
KCH067-029	Aldrin 4,4'-DDE	J (all detects) J (all detects)	A	Compound quantitation (RPD between two columns) (12)
KCH067-022	Dieldrin Chlordane (Technical)	R R	A	Overall assessment of data (22)
KCH067-022DL	All compounds except Dieldrin Chlordane (Technical)	R	A	Overall assessment of data (22)
KCH067-023 KCH067-026** KCH067-028	alpha-Chlordane gamma-Chlordane Chlordane (Technical)	R R R	A	Overall assessment of data (22)

Sample	Compound	Flag	A or P	Reason (Code)
KCH067-023DL KCH067-026DL** KCH067-028DL	All compounds except alpha-Chlordane gamma-Chlordane Chlordane (Technical)	R	A	Overall assessment of data (22)
KCH067-024	alpha-Chlordane gamma-Chlordane	R R	A	Overall assessment of data (22)
KCH067-024DL	All compounds except alpha-Chlordane gamma-Chlordane	R	A	Overall assessment of data (22)
KCH067-025	alpha-Chlordane gamma-Chlordane 4,4'-DDE 4,4'-DDT Chlordane (Technical)	R R R R R	A	Overall assessment of data (22)
KCH067-025DL	All compounds except alpha-Chlordane gamma-Chlordane 4,4'-DDE 4,4'-DDT Chlordane (Technical)	R	A	Overall assessment of data (22)
KCH067-027 KCH067-029	alpha-Chlordane gamma-Chlordane Dieldrin Chlordane (Technical)	R R R R	A	Overall assessment of data (22)
KCH067-027DL KCH067-029DL	All compounds except alpha-Chlordane gamma-Chlordane Dieldrin Chlordane (Technical)	R	A	Overall assessment of data (22)

China Lake CTO 067
Chlorinated Pesticides - Laboratory Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

China Lake CTO 067
Chlorinated Pesticides - Field Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/21/16 13:45
Sample ID: KCH067-022	Date Analyzed: 03/22/16 20:59
Lab Samp ID: C129-01	Dilution Factor: 1
Lab File ID: RC22025A	Matrix : SOIL
Ext Btch ID: CPC019S	% Moisture : 1.5
Calib. Ref.: RC22023A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND)	ND UJ(5)	2.0	0.20	0.41
GAMMA-BHC (LINDANE)	(ND)	ND	2.0	0.20	0.41
BETA-BHC	(ND)	ND	2.0	0.20	0.41
HEPTACHLOR	(ND)	ND	2.0	0.20	0.41
DELTA-BHC	(ND)	ND	2.0	0.27	0.41
ALDRIN	(ND)	ND	2.0	0.20	0.41
HEPTACHLOR EPOXIDE	(ND)	ND	2.0	0.20	0.41
GAMMA-CHLORDANE	9.4	(16) J(12)	2.0	0.20	0.41
ALPHA-CHLORDANE	(17)	13	2.0	0.20	0.41
ENDOSULFAN I	(ND)	ND	2.0	0.20	0.41
4,4'-DDE	7.9	(11)	2.0	0.20	0.41
DIELDRIN	140E	(320E) R(22)	2.0	0.20	0.41
ENDRIN	(ND)	0.56J	2.0	0.20	0.41
4,4'-DDD	(ND)	0.71J	2.0	0.20	0.41
ENDOSULFAN II	0.26J	(ND)	2.0	0.20	0.41
4,4'-DDT	6.1	(9.6) J(12)	2.0	0.20	0.41
ENDRIN ALDEHYDE	(ND)	ND	2.0	0.36	0.41
ENDOSULFAN SULFATE	(ND)	0.35J	2.0	0.20	0.41
ENDRIN KETONE	(ND)	ND	2.0	0.20	0.41
METHOXYCHLOR	(ND)	ND	10	2.0	4.1
TOXAPHENE	(ND)	ND	51	5.1	10
TECHNICAL CHLORDANE	380	(600E) R(22)	51	10	20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	13.12 (14.04)	13.53	96.9 (104)	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

SG 5/17/16

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/21/16 13:45
Sample ID: KCH067-022DL	Date Analyzed: 03/23/16 20:45
Lab Samp ID: C129-011	Dilution Factor: 10
Lab File ID: RC22058A	Matrix : SOIL
Ext Btch ID: CPC019S	% Moisture : 1.5
Calib. Ref.: RC22057A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND)	ND	20	2.0	4.1
GAMMA-BHC (LINDANE)	(ND)	ND	20	2.0	4.1
BETA-BHC	(ND)	ND	20	2.0	4.1
HEPTACHLOR	(ND)	ND	20	2.0	4.1
DELTA-BHC	(ND)	ND	20	2.7	4.1
ALDRIN	(ND)	ND	20	2.0	4.1
HEPTACHLOR EPOXIDE	(ND)	ND	20	2.0	4.1
GAMMA-CHLORDANE	9.6J	(21)	20	2.0	4.1
ALPHA-CHLORDANE	32	(16J)	20	2.0	4.1
ENDOSULFAN I	(ND)	ND	20	2.0	4.1
4,4'-DDE	(14J)	13J	20	2.0	4.1
DIELDRIN	340	(440)	20	2.0	4.1
ENDRIN	(ND)	ND	20	2.0	4.1
4,4'-DDD	(ND)	3.1J	20	2.0	4.1
ENDOSULFAN II	(ND)	ND	20	2.0	4.1
4,4'-DDT	(13J)	12J	20	2.0	4.1
ENDRIN ALDEHYDE	(ND)	ND	20	3.6	4.1
ENDOSULFAN SULFATE	(ND)	ND	20	2.0	4.1
ENDRIN KETONE	(ND)	ND	20	2.0	4.1
METHOXYCHLOR	(ND)	ND	100	20	41
TOXAPHENE	(ND)	ND	510	51	100
TECHNICAL CHLORDANE	(930)	930	510	100	200

R(22)

R(22)

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	14.05 (15.43)	13.53	104 (114)	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

4/25/16

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/21/16 13:45
Sample ID: KCH067-023	Date Analyzed: 03/22/16 22:01
Lab Samp ID: C129-02	Dilution Factor: 1
Lab File ID: RC22028A	Matrix : SOIL
Ext Btch ID: CPC019S	% Moisture : 4.3
Calib. Ref.: RC22023A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND)	ND UJ(5)	2.1	0.21	0.42
GAMMA-BHC (LINDANE)	(ND)	14	2.1	0.21	0.42
BETA-BHC	(ND)	ND	2.1	0.21	0.42
HEPTACHLOR	(ND)	ND	2.1	0.21	0.42
DELTA-BHC	(ND)	3.8	2.1	0.28	0.42
ALDRIN	2.0J	(2.2)	2.1	0.21	0.42
HEPTACHLOR EPOXIDE	(ND)	ND	2.1	0.21	0.42
GAMMA-CHLORDANE	130E	(320E) R(22)	2.1	0.21	0.42
ALPHA-CHLORDANE	190E	(270E) ↓	2.1	0.21	0.42
ENDOSULFAN I	3.2	(ND)	2.1	0.21	0.42
4,4'-DDE	(19)	18	2.1	0.21	0.42
DIELDRIN	(52)	87E J(12)	2.1	0.21	0.42
ENDRIN	(ND)	12	2.1	0.21	0.42
4,4'-DDD	(ND)	ND	2.1	0.21	0.42
ENDOSULFAN II	(ND)	ND	2.1	0.21	0.42
4,4'-DDT	8.5	(22) J(12)	2.1	0.21	0.42
ENDRIN ALDEHYDE	(ND)	ND	2.1	0.37	0.42
ENDOSULFAN SULFATE	(ND)	1.9J	2.1	0.21	0.42
ENDRIN KETONE	(ND)	ND	2.1	0.21	0.42
METHOXYCHLOR	(ND)	ND	10	2.1	4.2
TOXAPHENE	(ND)	ND	52	5.2	10
TECHNICAL CHLORDANE	1400E	(2700E) R(22)	52	10	21

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	12.11 (13.33)	13.93	87.0 (95.7)	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

SC 5/17/16

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/21/16 13:45
Sample ID: KCH067-023DL	Date Analyzed: 03/23/16 21:46
Lab Samp ID: C129-02I	Dilution Factor: 20
Lab File ID: RC22061A	Matrix : SOIL
Ext Btch ID: CPC019S	% Moisture : 4.3
Calib. Ref.: RC22057A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND)	ND R(22)	42	4.2	8.4
GAMMA-BHC (LINDANE)	(ND)	ND	42	4.2	8.4
BETA-BHC	(ND)	ND	42	4.2	8.4
HEPTACHLOR	(ND)	ND	42	4.2	8.4
DELTA-BHC	(ND)	5.9J	42	5.6	8.4
ALDRIN	(ND)	ND	42	4.2	8.4
HEPTACHLOR EPOXIDE	(ND)	ND	42	4.2	8.4
GAMMA-CHLORDANE	330	(460)	42	4.2	8.4
ALPHA-CHLORDANE	680E	(400) J(12)	42	4.2	8.4
ENDOSULFAN I	(ND)	ND R(22)	42	4.2	8.4
4,4'-DDE	(31J)	25J	42	4.2	8.4
DIELDRIN	100	(130)	42	4.2	8.4
ENDRIN	(ND)	ND	42	4.2	8.4
4,4'-DDD	(ND)	ND	42	4.2	8.4
ENDOSULFAN II	(ND)	ND	42	4.2	8.4
4,4'-DDT	20J	(33J)	42	4.2	8.4
ENDRIN ALDEHYDE	(ND)	ND	42	7.3	8.4
ENDOSULFAN SULFATE	(ND)	ND	42	4.2	8.4
ENDRIN KETONE	(ND)	ND	42	4.2	8.4
METHOXYCHLOR	(ND)	ND	210	42	84
TOXAPHENE	(ND)	ND	1000	100	210
TECHNICAL CHLORDANE	3400	(4100)	1000	210	420

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	16.35 (17.23)	13.93	117 (124)	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

8605171L

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/21/16 13:45
Sample ID: KCH067-024	Date Analyzed: 03/22/16 22:21
Lab Samp ID: C129-03	Dilution Factor: 1
Lab File ID: RC22029A	Matrix : SOIL
Ext Btch ID: CPC019S	% Moisture : 2.1
Calib. Ref.: RC22023A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND)	ND	2.0	0.20	0.41
GAMMA-BHC (LINDANE)	(ND)	ND	2.0	0.20	0.41
BETA-BHC	(ND)	ND	2.0	0.20	0.41
HEPTACHLOR	(ND)	ND	2.0	0.20	0.41
DELTA-BHC	(ND)	ND	2.0	0.28	0.41
ALDRIN	(0.26J)	0.24J	2.0	0.20	0.41
HEPTACHLOR EPOXIDE	(ND)	ND	2.0	0.20	0.41
GAMMA-CHLORDANE	27E	(45E)	2.0	0.20	0.41
ALPHA-CHLORDANE	(55E)	36E	2.0	0.20	0.41
ENDOSULFAN I	0.49J	(ND)	2.0	0.20	0.41
4,4'-DDE	9.0	(10)	2.0	0.20	0.41
DIELDRIN	1.4J	(ND)	2.0	0.20	0.41
ENDRIN	(ND)	0.84J	2.0	0.20	0.41
4,4'-DDD	(ND)	ND	2.0	0.20	0.41
ENDOSULFAN II	(ND)	ND	2.0	0.20	0.41
4,4'-DDT	1.0J	(2.3)	2.0	0.20	0.41
ENDRIN ALDEHYDE	(ND)	ND	2.0	0.36	0.41
ENDOSULFAN SULFATE	(ND)	ND	2.0	0.20	0.41
ENDRIN KETONE	(ND)	ND	2.0	0.20	0.41
METHOXYCHLOR	(ND)	ND	10	2.0	4.1
TOXAPHENE	(ND)	ND	51	5.1	10
TECHNICAL CHLORDANE	470	(500)	51	10	20

SURROGATE PARAMETERS	RESULTS		SPK_AMT	% RECOVERY		QC LIMIT
TETRACHLORO-M-XYLENE	12.70	(15.28)	13.62	93.2	(112)	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

4/25/16

METHOD SW3550B/8081A
PESTICIDES

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/21/16 13:45
Sample ID	: KCH067-024DL	Date Analyzed:	03/23/16 22:06
Lab Samp ID	: C129-03I	Dilution Factor:	5
Lab File ID	: RC22062A	Matrix	: SOIL
Ext Btch ID	: CPC019S	% Moisture	: 2.1
Calib. Ref.	: RC22057A	Instrument ID	: F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND)	ND R(22)	10	1.0	2.0
GAMMA-BHC (LINDANE)	(ND)	ND	10	1.0	2.0
BETA-BHC	(ND)	ND	10	1.0	2.0
HEPTACHLOR	(ND)	ND	10	1.0	2.0
DELTA-BHC	(ND)	ND	10	1.4	2.0
ALDRIN	(ND)	ND	10	1.0	2.0
HEPTACHLOR EPOXIDE	(ND)	ND	10	1.0	2.0
GAMMA-CHLORDANE	39	(53)	10	1.0	2.0
ALPHA-CHLORDANE	(86)	40 J R(32) (13)	10	1.0	2.0
ENDOSULFAN I	(ND)	ND	10	1.0	2.0
4,4'-DDE	(15)	12	10	1.0	2.0
DIELDRIN	(ND)	ND	10	1.0	2.0
ENDRIN	(ND)	ND	10	1.0	2.0
4,4'-DDD	(ND)	ND	10	1.0	2.0
ENDOSULFAN II	(ND)	ND	10	1.0	2.0
4,4'-DDT	(ND)	2.8J	10	1.0	2.0
ENDRIN ALDEHYDE	(ND)	ND	10	1.8	2.0
ENDOSULFAN SULFATE	(ND)	ND	10	1.0	2.0
ENDRIN KETONE	(ND)	ND	10	1.0	2.0
METHOXYCHLOR	(ND)	ND	51	10	20
TOXAPHENE	(ND)	ND	260	26	51
TECHNICAL CHLORDANE	550	(580)	260	51	100

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	16.11 | (16.26)	13.62	118 | (119)	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

8/25/16

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/21/16 13:45
Sample ID: KCH067-025	Date Analyzed: 03/22/16 22:42
Lab Samp ID: C129-04	Dilution Factor: 1
Lab File ID: RC22030A	Matrix : SOIL
Ext Btch ID: CPC019S	% Moisture : 4.3
Calib. Ref.: RC22023A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND)	ND UJ(S)	2.1	0.21	0.42
GAMMA-BHC (LINDANE)	(ND)	32E	2.1	0.21	0.42
BETA-BHC	24	(ND)	2.1	0.21	0.42
HEPTACHLOR	(ND)	1.6J	2.1	0.21	0.42
DELTA-BHC	(ND)	1.1J	2.1	0.28	0.42
ALDRIN	1.2J	(ND)	2.1	0.21	0.42
HEPTACHLOR EPOXIDE	17	(ND)	2.1	0.21	0.42
GAMMA-CHLORDANE	140E	(370E) R(22)	2.1	0.21	0.42
ALPHA-CHLORDANE	210E	(300E) ↓	2.1	0.21	0.42
ENDOSULFAN I	5.0	(ND)	2.1	0.21	0.42
4,4'-DDE	170E	(420E) R(22)	2.1	0.21	0.42
DIELDRIN	42	(46)	2.1	0.21	0.42
ENDRIN	(ND)	10	2.1	0.21	0.42
4,4'-DDD	(ND)	ND	2.1	0.21	0.42
ENDOSULFAN II	(ND)	ND	2.1	0.21	0.42
4,4'-DDT	220E	(530E) R(22)	2.1	0.21	0.42
ENDRIN ALDEHYDE	(ND)	ND	2.1	0.37	0.42
ENDOSULFAN SULFATE	(ND)	2.2	2.1	0.21	0.42
ENDRIN KETONE	(ND)	ND	2.1	0.21	0.42
METHOXYCHLOR	(ND)	ND	10	2.1	4.2
TOXAPHENE	(ND)	ND	52	5.2	10
TECHNICAL CHLORDANE	2100E	(4300E) R(22)	52	10	21

SURROGATE PARAMETERS	RESULTS		SPK_AMT	% RECOVERY		QC LIMIT
TETRACHLORO-M-XYLENE	(13.73)	13.19	13.93	(98.5)	94.7	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

SG 05/17/16

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/21/16 13:45
Sample ID: KCH067-025DL	Date Analyzed: 03/23/16 22:26
Lab Samp ID: C129-04I	Dilution Factor: 40
Lab File ID: RC22063A	Matrix : SOIL
Ext Btch ID: CPC019S	% Moisture : 4.3
Calib. Ref.: RC22057A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND) | ND	R(22)	84	8.4	17
GAMMA-BHC (LINDANE)	(ND) | ND		84	8.4	17
BETA-BHC	(ND) | ND		84	8.4	17
HEPTACHLOR	(ND) | ND		84	8.4	17
DELTA-BHC	(ND) | ND		84	11	17
ALDRIN	(ND) | ND		84	8.4	17
HEPTACHLOR EPOXIDE	(ND) | ND		84	8.4	17
GAMMA-CHLORDANE	360 | (460)		84	8.4	17
ALPHA-CHLORDANE	(840) | 370	J(12)	84	8.4	17
ENDOSULFAN I	(ND) | ND	R(22)	84	8.4	17
4,4'-DDE	520 | (540)		84	8.4	17
DIELDRIN	(11J) | 79J	R(22)	84	8.4	17
ENDRIN	(ND) | ND		84	8.4	17
4,4'-DDD	(ND) | ND		84	8.4	17
ENDOSULFAN II	(ND) | ND		84	8.4	17
4,4'-DDT	540 | (570)		84	8.4	17
ENDRIN ALDEHYDE	(ND) | ND	R(22)	84	15	17
ENDOSULFAN SULFATE	(ND) | ND		84	8.4	17
ENDRIN KETONE	(ND) | ND		84	8.4	17
METHOXYCHLOR	(ND) | ND		420	84	170
TOXAPHENE	(ND) | ND		2100	210	420
TECHNICAL CHLORDANE	(6000) | 5800		2100	420	840

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	14.47 | (17.42)	13.93	104 | (125)	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

8/25/16

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/21/16 13:45
Sample ID: KCH067-026	Date Analyzed: 03/24/16 20:44
Lab Samp ID: C129-05K	Dilution Factor: 20
Lab File ID: RC22087A	Matrix : SOIL
Ext Btch ID: CPC019S	% Moisture : 3.9
Calib. Ref.: RC22085A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND)	ND	42	4.2	8.3
GAMMA-BHC (LINDANE)	(ND)	ND	42	4.2	8.3
BETA-BHC	(ND)	ND	42	4.2	8.3
HEPTACHLOR	(ND)	270	42	4.2	8.3
DELTA-BHC	22J	(ND)	42	5.6	8.3
ALDRIN	270	(ND) UJ(5)	42	4.2	8.3
HEPTACHLOR EPOXIDE	2600E	(ND)	42	4.2	8.3
GAMMA-CHLORDANE	2300E	(14000E) R(22)	42	4.2	8.3
ALPHA-CHLORDANE	2000E	(13000E) ↓	42	4.2	8.3
ENDOSULFAN I	540	(ND) UJ(5)	42	4.2	8.3
4,4'-DDE	2400E	(ND)	42	4.2	8.3
DIELDRIN	1100	(390) J(12)	42	4.2	8.3
ENDRIN	(150)	460 ↓	42	4.2	8.3
4,4'-DDD	(ND)	ND	42	4.2	8.3
ENDOSULFAN II	390	(ND)	42	4.2	8.3
4,4'-DDT	(270)	240	42	4.2	8.3
ENDRIN ALDEHYDE	(ND)	ND	42	7.3	8.3
ENDOSULFAN SULFATE	(ND)	ND	42	4.2	8.3
ENDRIN KETONE	(ND)	ND	42	4.2	8.3
METHOXYCHLOR	(ND)	ND	210	42	83
TOXAPHENE	(ND)	ND	1000	100	210
TECHNICAL CHLORDANE	76000E	(130000E) R(22)	1000	210	420

SURROGATE PARAMETERS	RESULTS		SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	12.30	(13.52)	13.87	88.7 (97.5)	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

4/25/16

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/21/16 13:45
Sample ID: KCH067-026DL	Date Analyzed: 03/24/16 20:23
Lab Samp ID: C129-05J	Dilution Factor: 2000
Lab File ID: RC22086A	Matrix : SOIL
Ext Btch ID: CPC019S	% Moisture : 3.9
Calib. Ref.: RC22085A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND)	ND	4200	420	830
GAMMA-BHC (LINDANE)	(ND)	ND	4200	420	830
BETA-BHC	(ND)	ND	4200	420	830
HEPTACHLOR	(ND)	ND	4200	420	830
DELTA-BHC	(ND)	ND	4200	560	830
ALDRIN	(ND)	ND	4200	420	830
HEPTACHLOR EPOXIDE	(ND)	ND	4200	420	830
GAMMA-CHLORDANE	20000	(24000)	4200	420	830
ALPHA-CHLORDANE	(37000)	22000	4200	420	830
ENDOSULFAN I	(ND)	ND	4200	420	830
4,4'-DDE	960J	(ND)	4200	420	830
DIELDRIN	1000J	(ND)	4200	420	830
ENDRIN	(ND)	600J	4200	420	830
4,4'-DDD	(ND)	ND	4200	420	830
ENDOSULFAN II	(ND)	ND	4200	420	830
4,4'-DDT	(ND)	ND	4200	420	830
ENDRIN ALDEHYDE	(ND)	ND	4200	730	830
ENDOSULFAN SULFATE	(ND)	ND	4200	420	830
ENDRIN KETONE	(ND)	ND	4200	420	830
METHOXYCHLOR	(ND)	ND	21000	4200	8300
TOXAPHENE	(ND)	ND	100000	10000	21000
TECHNICAL CHLORDANE	(200000)	200000	100000	21000	42000

R(22)
J(5)
(12)
R(22)

SURROGATE PARAMETERS	RESULTS		SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	(ND)	ND	13.87 (0.000000*)	0.000000*	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

5/5/16

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/21/16 13:45
Sample ID: KCH067-027	Date Analyzed: 03/22/16 23:23
Lab Samp ID: C129-06	Dilution Factor: 1
Lab File ID: RC22032A	Matrix : SOIL
Ext Btch ID: CPC019S	% Moisture : 5.6
Calib. Ref.: RC22023A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND)	ND	2.1	0.21	0.42
GAMMA-BHC (LINDANE)	(ND)	ND	2.1	0.21	0.42
BETA-BHC	(ND)	ND	2.1	0.21	0.42
HEPTACHLOR	(ND)	ND	2.1	0.21	0.42
DELTA-BHC	(ND)	9.8	2.1	0.29	0.42
ALDRIN	(ND)	1.6J	2.1	0.21	0.42
HEPTACHLOR EPOXIDE	34E	(ND)	2.1	0.21	0.42
GAMMA-CHLORDANE	180E	(430E)	2.1	0.21	0.42
ALPHA-CHLORDANE	170E	(400E)	2.1	0.21	0.42
ENDOSULFAN I	(ND)	10	2.1	0.21	0.42
4,4'-DDE	(ND)	ND	2.1	0.21	0.42
DIELDRIN	110E	(160E)	2.1	0.21	0.42
ENDRIN	(ND)	ND	2.1	0.21	0.42
4,4'-DDD	(ND)	ND	2.1	0.21	0.42
ENDOSULFAN II	(ND)	ND	2.1	0.21	0.42
4,4'-DDT	5.1	(12)	2.1	0.21	0.42
ENDRIN ALDEHYDE	(ND)	3.1	2.1	0.37	0.42
ENDOSULFAN SULFATE	(ND)	1.8J	2.1	0.21	0.42
ENDRIN KETONE	1.2J	(ND)	2.1	0.21	0.42
METHOXYCHLOR	(ND)	ND	11	2.1	4.2
TOXAPHENE	(ND)	ND	53	5.3	11
TECHNICAL CHLORDANE	2300E	(4100E)	53	11	21

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	15.83 | (16.48)	14.12	112 | (117)	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/21/16 13:45
Sample ID: KCH067-027DL	Date Analyzed: 03/23/16 23:07
Lab Samp ID: C129-06I	Dilution Factor: 40
Lab File ID: RC22065A	Matrix : SOIL
Ext Btch ID: CPC019S	% Moisture : 5.6
Calib. Ref.: RC22057A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND)	ND	85	8.5	17
GAMMA-BHC (LINDANE)	(ND)	ND	85	8.5	17
BETA-BHC	(ND)	ND	85	8.5	17
HEPTACHLOR	(ND)	ND	85	8.5	17
DELTA-BHC	(ND)	14J	85	11	17
ALDRIN	(ND)	ND	85	8.5	17
HEPTACHLOR EPOXIDE	50J	(ND)	85	8.5	17
GAMMA-CHLORDANE	550	(680)	85	8.5	17
ALPHA-CHLORDANE	1200E	(580)	85	8.5	17
ENDOSULFAN I	(ND)	17J	85	8.5	17
4,4'-DDE	15J	(ND)	85	8.5	17
DIELDRIN	(200)	190	85	8.5	17
ENDRIN	(ND)	ND	85	8.5	17
4,4'-DDD	(ND)	ND	85	8.5	17
ENDOSULFAN II	(ND)	ND	85	8.5	17
4,4'-DDT	(ND)	13J	85	8.5	17
ENDRIN ALDEHYDE	(ND)	ND	85	15	17
ENDOSULFAN SULFATE	(ND)	ND	85	8.5	17
ENDRIN KETONE	(ND)	ND	85	8.5	17
METHOXYCHLOR	(ND)	ND	420	85	170
TOXAPHENE	(ND)	ND	2100	210	420
TECHNICAL CHLORDANE	6000	(6000)	2100	420	850

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	14.83 (16.04)	14.12	105 (114)	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/21/16 13:45
Sample ID: KCH067-028	Date Analyzed: 03/23/16 23:28
Lab Samp ID: C129-07I	Dilution Factor: 20
Lab File ID: RC22066A	Matrix : SOIL
Ext Btch ID: CPC019S	% Moisture : 2.3
Calib. Ref.: RC22057A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND)	ND UJ(S)	41	4.1	8.2
GAMMA-BHC (LINDANE)	(ND)	ND	41	4.1	8.2
BETA-BHC	(ND)	ND	41	4.1	8.2
HEPTACHLOR	(ND)	ND	41	4.1	8.2
DELTA-BHC	(ND)	ND	41	5.5	8.2
ALDRIN	(ND)	ND	41	4.1	8.2
HEPTACHLOR EPOXIDE	(ND)	ND	41	4.1	8.2
GAMMA-CHLORDANE	1700E	(2300E) R(>>)	41	4.1	8.2
ALPHA-CHLORDANE	(3000E)	2000E	41	4.1	8.2
ENDOSULFAN I	(ND)	70	41	4.1	8.2
4,4'-DDE	(300)	210	41	4.1	8.2
DIELDRIN	(290)	290	41	4.1	8.2
ENDRIN	(ND)	ND	41	4.1	8.2
4,4'-DDD	(ND)	ND	41	4.1	8.2
ENDOSULFAN II	(ND)	ND	41	4.1	8.2
4,4'-DDT	84	(120)	41	4.1	8.2
ENDRIN ALDEHYDE	(ND)	ND	41	7.2	8.2
ENDOSULFAN SULFATE	(ND)	ND	41	4.1	8.2
ENDRIN KETONE	(ND)	ND	41	4.1	8.2
METHOXYCHLOR	(ND)	ND	200	41	82
TOXAPHENE	(ND)	ND	1000	100	200
TECHNICAL CHLORDANE	19000E	(22000E) R(>>)	1000	200	410

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	14.75 | (15.21)	13.64	108 | (111)	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

Scott 7/16

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/21/16 13:45
Sample ID: KCH067-028DL	Date Analyzed: 03/24/16 21:24
Lab Samp ID: C129-07J	Dilution Factor: 200
Lab File ID: RC22089A	Matrix : SOIL
Ext Btch ID: CPC019S	% Moisture : 2.3
Calib. Ref.: RC22085A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND)	ND	410	41	82
GAMMA-BHC (LINDANE)	(ND)	ND	410	41	82
BETA-BHC	(ND)	ND	410	41	82
HEPTACHLOR	45J	(ND)	410	41	82
DELTA-BHC	(ND)	ND	410	55	82
ALDRIN	(ND)	ND	410	41	82
HEPTACHLOR EPOXIDE	(ND)	ND	410	41	82
GAMMA-CHLORDANE	1700	(2000)	410	41	82
ALPHA-CHLORDANE	(3900)	1800	410	41	82
ENDOSULFAN I	(ND)	ND	410	41	82
4,4'-DDE	(260J)	160J	410	41	82
DIELDRIN	(290J)	260J	410	41	82
ENDRIN	(ND)	ND	410	41	82
4,4'-DDD	(ND)	ND	410	41	82
ENDOSULFAN II	(ND)	ND	410	41	82
4,4'-DDT	71J	(90J)	410	41	82
ENDRIN ALDEHYDE	(ND)	ND	410	72	82
ENDOSULFAN SULFATE	(ND)	ND	410	41	82
ENDRIN KETONE	(ND)	ND	410	41	82
METHOXYCHLOR	(ND)	ND	2000	410	820
TOXAPHENE	(ND)	ND	10000	1000	2000
TECHNICAL CHLORDANE	(23000)	20000	10000	2000	4100

SURROGATE PARAMETERS	RESULTS		SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	(ND)	ND	13.64	(0.000000*) | 0.000000*	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

3/17/16

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/21/16 13:45
Sample ID: KCH067-029	Date Analyzed: 03/23/16 00:03
Lab Samp ID: C129-08	Dilution Factor: 1
Lab File ID: RC22034A	Matrix : SOIL
Ext Btch ID: CPC019S	% Moisture : 1.4
Calib. Ref.: RC22023A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND)	ND UJ(5)	2.0	0.20	0.41
GAMMA-BHC (LINDANE)	(ND)	3.9	2.0	0.20	0.41
BETA-BHC	2.9	(ND)	2.0	0.20	0.41
HEPTACHLOR	(ND)	0.88J	2.0	0.20	0.41
DELTA-BHC	(ND)	0.33J	2.0	0.27	0.41
ALDRIN	(0.63J)	0.35J J(12)	2.0	0.20	0.41
HEPTACHLOR EPOXIDE	(ND)	ND	2.0	0.20	0.41
GAMMA-CHLORDANE	97E	(190E) R(22)	2.0	0.20	0.41
ALPHA-CHLORDANE	(200E)	170E ↓	2.0	0.20	0.41
ENDOSULFAN I	(ND)	ND	2.0	0.20	0.41
4,4'-DDE	10	(18) J(12)	2.0	0.20	0.41
DIELDRIN	98E	(150E) R(22)	2.0	0.20	0.41
ENDRIN	(ND)	5.3	2.0	0.20	0.41
4,4'-DDD	(ND)	ND	2.0	0.20	0.41
ENDOSULFAN II	(ND)	ND	2.0	0.20	0.41
4,4'-DDT	6.4	(9.5)	2.0	0.20	0.41
ENDRIN ALDEHYDE	(ND)	ND	2.0	0.35	0.41
ENDOSULFAN SULFATE	(ND)	ND	2.0	0.20	0.41
ENDRIN KETONE	(ND)	ND	2.0	0.20	0.41
METHOXYCHLOR	(ND)	ND	10	2.0	4.1
TOXAPHENE	(ND)	ND	51	5.1	10
TECHNICAL CHLORDANE	1500E	(1900E) R(22)	51	10	20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	13.60 (13.63)	13.52	101 (101)	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

4/5/16

METHOD SW3550B/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/21/16 13:45
Sample ID: KCH067-029DL	Date Analyzed: 03/23/16 23:48
Lab Samp ID: C129-08I	Dilution Factor: 20
Lab File ID: RC22067A	Matrix : SOIL
Ext Btch ID: CPC019S	% Moisture : 1.4
Calib. Ref.: RC22057A	Instrument ID : F9

PARAMETERS	RESULTS (ug/kg)		LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
ALPHA-BHC	(ND)	ND	41	4.1	8.1
GAMMA-BHC (LINDANE)	(ND)	ND	41	4.1	8.1
BETA-BHC	(ND)	ND	41	4.1	8.1
HEPTACHLOR	(ND)	ND	41	4.1	8.1
DELTA-BHC	(ND)	ND	41	5.5	8.1
ALDRIN	(ND)	ND	41	4.1	8.1
HEPTACHLOR EPOXIDE	(ND)	ND	41	4.1	8.1
GAMMA-CHLORDANE	200	(230)	41	4.1	8.1
ALPHA-CHLORDANE	(470)	210	41	4.1	8.1
ENDOSULFAN I	(ND)	8.2J	41	4.1	8.1
4,4'-DDE	(25J)	13J	41	4.1	8.1
DIELDRIN	(170)	170	41	4.1	8.1
ENDRIN	(ND)	ND	41	4.1	8.1
4,4'-DDD	(ND)	ND	41	4.1	8.1
ENDOSULFAN II	(ND)	ND	41	4.1	8.1
4,4'-DDT	6.2J	(11J)	41	4.1	8.1
ENDRIN ALDEHYDE	(ND)	ND	41	7.1	8.1
ENDOSULFAN SULFATE	(ND)	ND	41	4.1	8.1
ENDRIN KETONE	(ND)	ND	41	4.1	8.1
METHOXYCHLOR	(ND)	ND	200	41	81
TOXAPHENE	(ND)	ND	1000	100	200
TECHNICAL CHLORDANE	(2400)	2400	1000	200	410

SURROGATE PARAMETERS	RESULTS		SPK_AMT	% RECOVERY		QC LIMIT
TETRACHLORO-M-XYLENE	(14.85)	18.19	13.52	(110)	135*	42-129

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

METHOD SW3520C/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/17/16 16:30
Sample ID: KCH067-041	Date Analyzed: 03/22/16 17:36
Lab Samp ID: C129-18	Dilution Factor: 1.1
Lab File ID: RC22015A	Matrix : WATER
Ext Btch ID: CPC014W	% Moisture : NA
Calib. Ref.: RC22011A	Instrument ID : F9

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
ALPHA-BHC	(ND) | ND UJ(S)	0.11	0.0055	0.011
GAMMA-BHC (LINDANE)	(ND) | ND	0.11	0.0055	0.011
BETA-BHC	(ND) | 0.22	0.11	0.0077	0.011
HEPTACHLOR	(ND) | ND	0.11	0.0077	0.011
DELTA-BHC	(ND) | ND	0.11	0.0077	0.011
ALDRIN	(ND) | 0.044J	0.11	0.0055	0.011
HEPTACHLOR EPOXIDE	(ND) | ND	0.11	0.0055	0.011
GAMMA-CHLORDANE	(ND) | ND	0.11	0.0055	0.011
ALPHA-CHLORDANE	(ND) | ND	0.11	0.0055	0.011
ENDOSULFAN I	(ND) | ND	0.11	0.0088	0.011
4,4'-DDE	(ND) | ND	0.11	0.0055	0.011
DIELDRIN	(ND) | ND	0.11	0.0055	0.011
ENDRIN	(ND) | ND	0.11	0.0088	0.011
4,4'-DDD	(ND) | ND	0.11	0.0055	0.011
ENDOSULFAN II	(ND) | ND	0.11	0.0055	0.011
4,4'-DDT	(ND) | ND	0.11	0.0055	0.011
ENDRIN ALDEHYDE	(ND) | ND	0.11	0.0055	0.011
ENDOSULFAN SULFATE	(ND) | ND	0.11	0.0055	0.011
ENDRIN KETONE	(ND) | ND	0.11	0.0055	0.011
METHOXYCHLOR	(ND) | ND	1.1	0.055	0.11
TOXAPHENE	(ND) | ND	2.2	0.28	0.55
TECHNICAL CHLORDANE	(ND) | ND	1.1	0.28	0.55

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.4331 | (0.4827)	0.4400	98.4 | (110)	44-124

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

SDG 17/16

METHOD SW3520C/8081A
PESTICIDES

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/17/16 16:30
Sample ID: KCH067-042	Date Analyzed: 03/22/16 17:56
Lab Samp ID: C129-19	Dilution Factor: 1.14
Lab File ID: RC22016A	Matrix : WATER
Ext Btch ID: CPC014W	% Moisture : NA
Calib. Ref.: RC22011A	Instrument ID : F9

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
ALPHA-BHC	(ND) | ND UJ(5)	0.11	0.0057	0.011
GAMMA-BHC (LINDANE)	(ND) | ND	0.11	0.0057	0.011
BETA-BHC	(ND) | ND	0.11	0.0080	0.011
HEPTACHLOR	(ND) | ND	0.11	0.0080	0.011
DELTA-BHC	(ND) | ND	0.11	0.0080	0.011
ALDRIN	(ND) | 0.028J	0.11	0.0057	0.011
HEPTACHLOR EPOXIDE	(ND) | ND	0.11	0.0057	0.011
GAMMA-CHLORDANE	(ND) | ND	0.11	0.0057	0.011
ALPHA-CHLORDANE	(ND) | ND	0.11	0.0057	0.011
ENDOSULFAN I	(ND) | ND	0.11	0.0091	0.011
4,4'-DDE	(ND) | ND	0.11	0.0057	0.011
DIELDRIN	(ND) | ND	0.11	0.0057	0.011
ENDRIN	(ND) | ND	0.11	0.0091	0.011
4,4'-DDD	(ND) | ND	0.11	0.0057	0.011
ENDOSULFAN II	(ND) | ND	0.11	0.0057	0.011
4,4'-DDT	(ND) | ND	0.11	0.0057	0.011
ENDRIN ALDEHYDE	(ND) | ND	0.11	0.0057	0.011
ENDOSULFAN SULFATE	(ND) | ND	0.11	0.0057	0.011
ENDRIN KETONE	(ND) | ND	0.11	0.0057	0.011
METHOXYCHLOR	(ND) | ND	1.1	0.057	0.11
TOXAPHENE	(ND) | ND	2.3	0.28	0.57
TECHNICAL CHLORDANE	(ND) | ND	1.1	0.28	0.57

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.4365 | (0.4695)	0.4560	95.7 | (103)	44-124

RL : Reporting limit
Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )

3/25/16

LDC #: 36282C3a
SDG #: 16C129
Laboratory: EMAX Laboratories Inc.

VALIDATION COMPLETENESS WORKSHEET
Standard/Full

Date: 5/10/16
Page: 1 of 2
Reviewer: F
2nd Reviewer: R

METHOD: GC Chlorinated Pesticides (EPA SW846 Method 8081A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC Instrument Performance Check	A	
III.	Initial calibration/ICV	A / A	%RSD/ICV ≤20
IV.	Continuing calibration	SW	CCV ≤ 20
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB= 17 SB=18'
VII.	Surrogate spikes	SW	
VIII.	Matrix spike/Matrix spike duplicates	SW	
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Compound quantitation/RL/LOQ/LODs	SW	Not reviewed for Standard validation.
XII.	Target compound identification	A	Not reviewed for Standard validation.
XIII.	System Performance	A	Not reviewed for Standard validation.
XIV.	Overall assessment of data	SW	

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

** Indicates sample underwent Full validation

	Client ID	Lab ID	Matrix	Date
1	KCH067-022	16C129-01	Soil	03/15/16
2	KCH067-022DL	16C129-01DL	Soil	03/15/16
3	KCH067-023	16C129-02	Soil	03/15/16
4	KCH067-023DL	16C129-02DL	Soil	03/15/16
5	KCH067-024	16C129-03	Soil	03/15/16
6	KCH067-024DL	16C129-03DL	Soil	03/15/16
7	KCH067-025	16C129-04	Soil	03/15/16
8	KCH067-025DL	16C129-04DL	Soil	03/15/16
9	KCH067-026**	16C129-05**	Soil	03/15/16
10	KCH067-026DL**	16C129-05DL**	Soil	03/15/16
11	KCH067-027	16C129-06	Soil	03/15/16
12	KCH067-027DL	16C129-06DL	Soil	03/15/16
13	KCH067-028	16C129-07	Soil	03/15/16
14	KCH067-028DL	16C129-07DL	Soil	03/15/16
15	KCH067-029	16C129-08	Soil	03/15/16

LDC #: 36282C3a

SDG #: 16C129

Laboratory: EMAX Laboratories Inc.

VALIDATION COMPLETENESS WORKSHEET

Standard/Full

Date: 5/10/16

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC Chlorinated Pesticides (EPA SW846 Method 8081A)

	Client ID	Lab ID	Matrix	Date
16	KCH067-029DL	16C129-08DL	Soil	03/15/16
17	KCH067-041	16C129-18	Water	03/15/16
18	KCH067-042	16C129-19	Water	03/15/16
19	KCH067-022MS	16C129-01MS	Soil	03/15/16
20	KCH067-022MSD	16C129-01MSD	Soil	03/15/16
21				
22				
23				
24				
25				

Notes:

-	MBLKIW						
-	MB LK1S						

LDC #: 36282C30a

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: EJ
2nd Reviewer: [illegible]

Method: Pesticides (EPA SW 846 Method 8081)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. GC/ECD Instrument performance check				
Was the instrument performance found to be acceptable?	✓			
Were Evaluation mix standards analyzed prior to the initial calibration and at beginning of each 12-hour shift?	✓			
Were endrin and 4,4'-DDT breakdowns ≤ 15% for individual breakdown in the Evaluation mix standards?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were the RT windows properly established?	✓			
IIIb. Initial calibration verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?		✓		
Were all the retention times within the acceptance windows?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VII. Surrogate spikes/Internal Standards				
Were all surrogate percent recovery (%R) within the QC limits?		✓		

LDC #: 36282C3a

VALIDATION FINDINGS CHECKLIST

Reviewer: FT
2nd Reviewer: A

Validation Area	Yes	No	NA	Findings/Comments
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any percent recovery (%R) was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
Were internal standard area counts within ± 50% of the average area calculated during calibration?		FT A	✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?		✓		
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?			✓	
XI. Compound quantitation				
Were compound quantitation and RLs adjusted to reflect all sample dilutions, dry weight factors, and clean-up activities applicable to level IV validation?	✓			
Were relative percent difference (RPD) of the results between two columns ≤ 40%?	✓	✓		
XII. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

VALIDATION FINDINGS WORKSHEET

METHOD: Pesticide/PCBs (EPA SW 846 Method 8081/8082)

A. alpha-BHC	I. Dieldrin	Q. Endrin ketone	Y. Aroclor-1242	GG. Chlordane
B. beta-BHC	J. 4,4'-DDE	R. Endrin aldehyde	Z. Aroclor-1248	HH. Chlordane (Technical)
C. delta-BHC	K. Endrin	S. alpha-Chlordane	AA. Aroclor-1254	II. Arochlor 1262
D. gamma-BHC	L. Endosulfan II	T. gamma-Chlordane	BB. Aroclor-1260	JJ. Aroclor 1268
E. Heptachlor	M. 4,4'-DDD	U. Toxaphene	CC. 2,4'-DDD	KK. Oxychlordane
F. Aldrin	N. Endosulfan sulfate	V. Aroclor-1016	DD. 2,4'-DDE	LL. trans-Nonachlor
G. Heptachlor epoxide	O. 4,4'-DDT	W. Aroclor-1221	EE. 2,4'-DDT	MM. cis-Nonachlor
H. Endosulfan I	P. Methoxychlor	X. Aroclor-1232	FF. Hexachlorobenzene	NN.

Notes:_____

LDC #: 36282C3a

VALIDATION FINDINGS WORKSHEET
Continuing Calibration

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: ✓ GC __ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
What type of continuing calibration calculation was performed? ___%D or ___%R
Y N N/A Were continuing calibration standards analyzed at the required frequencies?
Y N N/A Did the continuing calibration standards meet the %D / %R validation criteria of ≤20.0% / 80-120%?
Level IV Only
Y N N/A Were the retention times for all calibrated compounds within their respective acceptance windows?

code = 5

#	Date	Standard ID	Detector/ Column	Compound	%D (Limit ≤ 20.0)	RT (limit)	Associated Samples	Qualifications
	3/22/16 16:15	CCV	RTX CLP2	A	22		All Water + MBLKS	J dil/UJ/A (ND)
	3/22/16 20:18	CCV	RTX CLP2	A	23		1, 3, 5, 7, 11, 15 19/20	J/UJ/A (ND)
	3/23/16 20:25	CCV	RTX CLP2	A	31		2, 4, 6, 8, 12, 13, 16	J/UJ/A (ND)
				D	25			
	3/24/16 20:03	CCV	RTX CLP1	T	34		9, 10, 14	J/UJ/A (ND+RJT)
				S	24			
				H	21			
			RTX CLP2	F	22			

LDC #: 36282 c3a

VALIDATION FINDINDS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: ✓ **GC** __ **HPLC**

Are surrogates required by the method? Yes____ or No____.

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

Y N N/A Were surrogates spiked into all samples and blanks?

Y N N/A Did all surrogate recoveries (%R) meet the QC limits?

#	Sample ID	Detector/ Column	Surrogate Compound	%R (Limits)	Qualifications
	10, 14	surrogate	was diluted out	( )	no qual 75x DL
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
	16	✓ RTX CLP2	Y	135 (42-129)	no qual 20x DL
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	
				( )	

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound		
A	Chlorobenzene (CBZ)	G	Octacosane	M	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	Y	Tetrachloro-m- xylene
B	4-Bromofluorobenzene (BFB)	H	Ortho-Terphenyl	N	Terphenyl-D14	T	3,4-Dinitrotoluene	Z	2-Bromonaphthalene
C	a,a,a-Trifluorotoluene	I	Fluorobenzene (FBZ)	O	Decachlorobiphenyl (DCB)	U	Tripentyltin	AA	Chloro-octadecane
D	Bromochlorobenene	J	n-Triacontane	P	1-methylnaphthalene	V	Tri-n-propyltin	BB	2,4-Dichlorophenylacetic acid
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate	CC	2,5-Dibromotoluene
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate		

LDC #: 36282c3a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: V **GC** __ **HPLC**

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

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

#	MS/MSD ID	Compound	MS %R (Limits)	MSD %R (Limits)	RPD (Limits)	Associated Samples	Qualifications
	19 & 20	I	-120 (56-136)	-130 (56-136)	( )	1, 2	no qual parent 7 x spikr Amt
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		
			( )	( )	( )		

LDC #: 36289c3a

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: FT
2nd Reviewer: AC

METHOD: ✓ GC __ HPLC

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

Level IV/D Only

Y N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Y N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

code = 20

#	Associated Samples	Compound Name	Findings	Qualifications
	1	I, HH	x'd cal Range	J all / Δ
	3, 9, 13	S, T, HH		
	5	S, T		
	7	S, T, J, θ, HH		
	FT 9, 11, 15	S, T, I, HH	↓	↓
	FT 15	FT I		

Comments: See sample calculation verification worksheet for recalculations

LDC #: 36282 C3a

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: FT
2nd Reviewer: AC

METHOD: V **GC** __ **HPLC**

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

Level IV/D Only

Y N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Y N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

code = 12

#	Associated Samples	Compound Name	Findings (%RPD Bet 2 col ≤ 40)	Qualifications
	1	T	52	J det / Δ
		I	78	
		θ	45	
		HH	45	
	2	T	75	
		S	67	
	3	T	84	
		I	50	
		θ	89	
		HH	63	
	4	S	52	
		θ	49	✓

Comments: See sample calculation verification worksheet for recalculations

LDC #: 36282C3a

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: FT
2nd Reviewer: M

METHOD: ✓ **GC** __ **HPLC**

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

Level IV/D Only

Y N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Y N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

code = 12

#	Associated Samples	Compound Name	% RPD Bet 2 col ≤ 40 Findings	Qualifications
	5	T	42	J det /A
		S	50	
		O	79	
	6	S	73	
	7	T	90	
		J	85	
		O	83	
		HH	69	
	8	S	78	
		I	151	

Comments: See sample calculation verification worksheet for recalculations

LDC #: 36282C3a

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: FT
2nd Reviewer: DC

METHOD: ✓ GC ___ HPLC

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

Level IV/D Only

Y N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Y N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

wells = 12

#	Associated Samples	Compound Name	% RPD Bet 2 col ≤40 Findings	Qualifications
	9	T	144	J all / A
		S	147	
		I	95	
		K	102	
		HH	52	
	10	S	51	
	11	T	82	
		S	81	
			81	
		HH	56	
	~~12~~	~~S~~	~~70~~ FT	↓

Comments: See sample calculation verification worksheet for recalculations

LDC #: 36282 C3a

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Page: 1 of 1
Reviewer: FT
2nd Reviewer: MC

METHOD: ✓ GC __ HPLC

Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".
Level IV/D Only
Y N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?
Y N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

code - 12

#	Associated Samples	Compound Name	% RPD Bet 2 col Findings ≤40	Qualifications
	12	S	70	J dit /A
	14	S	74	
		J	48	
	15	F	57	
		T	65	
		J	57	
		I	42	
	16	S	76	
		J	63	
		O	56	

Comments: See sample calculation verification worksheet for recalculations

COMQUA_r1.wpd

LDC #: 36282C3a

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: FT
2nd Reviewer: 9

METHOD: ✓ **GC** __ **HPLC**

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

code = 22

#	Associated samples	Compounds	Findings	Qualifications
	1	I, HH	x'd cal Range	R/Δ
	2	all except I, HH	diluted	
	3, 9, 13	S, T, HH	x'd cal Range	
	4, 10, 14	all except S, T, HH	diluted	
	5	S, T	x'd cal Range	
	6	all except S, T	diluted	
	7	S, T, J, O, HH	x'd cal Range	
	8	all except S, T, J, O, HH	diluted	↓

Comments: _____

LDC #: 36282c3a

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Page: 1 of 1
Reviewer: FT
2nd Reviewer: MC

METHOD: ✓ **GC** __ **HPLC**

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable?

wbl = 22

#	Associated samples	Compounds	Findings	Qualifications
	11, 15	S, T, I, HH	x'd cal Range	R/Δ
	12, 16	all except S, T, I, HH	diluted	J

Comments: _____

LDC #: 36282C3a

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC Pesticides (EPA SW 846 Method 8081)

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C
Average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where: A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (20 std)/200	Recalculated CF (20 std)/200	Reported CF (initial)	Recalculated CF (intial)	Reported %RSD	Recalculated %RSD
1	ICA L	1/21/16	endosulfan I	431064	431064	419333.4	419333.4	12.1	12.1
	RTX cup1		Methoxychlor	146220	146220	164669.2	164669.2	15.4	15.4
2	RTX cup2		↓	107259	107259	105819.2	105819.2	5.8	5.8
				44563	44563	45652.3	45652.3	5.4	5.4
3									
4									

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

LDC #: 36282C 3a

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC Pesticides (EPA SW 846 Method 8081)

Percent difference (%D) = 100 * (N - C)/N

Where: N = Initial Calibration Factor or Nominal Amount (ng)
C = Calibration Factor from Continuing Calibration Standard or Calculated Amount (ng)

Standard ID	Calibration Date/Time	Compound	Average CF/ CCV Conc	Reported CF/Conc CCV	Recalculated CF/Conc CCV	Reported %D	Recalculated %D
CCV 16:15	3/22/16	endosulfan I RTx CVP1	20.0	19.17	19.17	4	4
		methoxychlor RTx CVP2	200.0	203.87	203.87	2	2
			20.0	21.25	21.25	6	6
			200.0	207.31	207.31	4	4
CCV 20:18	3/22/16	↓	↓	20.24	20.24	1	1
				226.17	226.17	13	13
				21.74	21.74	9	9
				226.34	226.34	13	13
CCV 20:03	3/24/16	↓	↓	15.80	15.80	21	21
				199.76	199.76	0	0
				17.07	17.07	15	15
				207.96	207.96	4	4

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

LDC #: 36282c3a

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: FT
2nd reviewer: [illegible]

METHOD: GC Pesticides (EPA SW 846 Method 8081)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 9

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Tetrachloro-m-xylene	RTX opl	40	35.467	88.7	88.7	0
Tetrachloro-m-xylene	↓	↓	38.981	97.5	97.5	0
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Sample ID:

Surrogate	Column	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Tetrachloro-m-xylene						
Tetrachloro-m-xylene						
Decachlorobiphenyl						
Decachlorobiphenyl						

Notes:

LDC #: 36282C3a

VALIDATION FINDINGS WORKSHEET

Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: FT
2nd Reviewer: A

METHOD: GC Pesticides (EPA SW 846 Method 8081)

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

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

Where: SSC = Spiked sample concentration
SA = Spike added
SC = Concentration

RPD = I MS - MSD I * 2/(MS + MSD)

MS = Matrix spike percent recovery

MSD = Matrix spike duplicate percent recovery

MS/MSD samples: 19 + 20

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD		MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	6.77	6.77	ND	5.02	5.04	74	74	74	74	0	0
4,4'-DDT	↓	↓	9.6	17.9	16.7	123	123	105	105	7	7

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

LDC #: 36282c3a

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicate Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: GC Pesticides (EPA SW 846 Method 8081A)

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

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

Where: SSC = Spiked sample concentration
SA = Spike added
SC = Concentration

RPD = I LCS - LCSD I * 2/(LCS + LCSD)

LCS = Laboratory control sample percent recovery

LCSD = Laboratory control sample duplicate percent recovery

LCS/LCSD samples: CP a0195L / sa

Compound	Spike Added (ug/kg)		Spiked Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
gamma-BHC	6.67	6.67	8.32	8.33	125	125	125	125	0	0
4,4'-DDT	↓	↓	8.33	8.17	125	125	122	122	2	2

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

LDC #: 36282c3a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: EJ
2nd reviewer: [illegible]

METHOD: GC Pesticides (EPA SW 846 Method 8081A)

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

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

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

V_i = Volume of extract injected in microliters (ul)

V_t = Volume of the concentrated extract in microliters (ul)

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

2.0 = Factor of 2 to account for GPC cleanup

Example:

Sample I.D. #9 , 4,4' DDT

Conc. = $\frac{(12119673)\ (10)\ (20)}{(312997.5)\ (30)\ (0.961)}$

= 270 ug/kg

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 11, 2016

Parameters: Polychlorinated Biphenyls

Validation Level: Level III

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C129

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-042	16C129-19	Water	03/15/16

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Biphenyls (PCBs) by Environmental Protection Agency (EPA) SW 846 Method 8082

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

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

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

V. Field Blanks

Sample KCH067-042 was identified as a source blank. No contaminants were found.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identification

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

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

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

China Lake CTO 067
Polychlorinated Biphenyls - Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

China Lake CTO 067
Polychlorinated Biphenyls - Laboratory Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

China Lake CTO 067
Polychlorinated Biphenyls - Field Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

METHOD SW3520C/8082
PCBs

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
Batch No. : 16C129	Date Extracted: 03/17/16 16:30
Sample ID: KCH067-042	Date Analyzed: 03/18/16 17:58
Lab Samp ID: C129-19	Dilution Factor: 1.14
Lab File ID: KC18014A	Matrix : WATER
Ext Btch ID: CPC014W	% Moisture : NA
Calib. Ref.: KC18004A	Instrument ID : GCT071

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
AROCLOR 1016	(ND)|ND	1.1	0.51	0.57
AROCLOR 1221	(ND)|ND	1.1	0.33	0.57
AROCLOR 1232	(ND)|ND	1.1	0.28	0.57
AROCLOR 1242	(ND)|ND	1.1	0.28	0.57
AROCLOR 1248	(ND)|ND	1.1	0.28	0.57
AROCLOR 1254	(ND)|ND	1.1	0.28	0.57
AROCLOR 1260	(ND)|ND	1.1	0.35	0.57

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
TETRACHLORO-M-XYLENE	0.4467|(0.4704)	0.4560	98.0|(103)	60-130

Left of | is related to first column ; Right of | related to second column
Final result indicated by ( )
* Out side of QC Limit

SL 3/17/16

LDC #: 36282C3b

SDG #: 16C129

Laboratory: EMAX Laboratories Inc.

VALIDATION COMPLETENESS WORKSHEET

Standard

Date: 5/10/16

Page: 1 of 1

Reviewer: EF

2nd Reviewer: [illegible]

METHOD: GC Polychlorinated Biphenyls (EPA SW846 Method 8082)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / Δ	
II.	Initial calibration/ICV	A / Δ	
III.	Continuing calibration	Δ	
IV.	Laboratory Blanks	Δ	
V.	Field blanks	ND	SB = 1
VI.	Surrogate spikes	Δ	
VII.	Matrix spike/Matrix spike duplicates	N	QC Sample
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	
X.	Compound quantitation/RL/LOQ/LODs	N	
XI.	Target compound identification	N	
XII	Overall assessment of data	Δ	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-042	16C129-19	Water	03/15/16
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

Notes:

	MBLK1W						

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 24, 2016

Parameters: Metals

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C129

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-032**	16C129-09**	Soil	03/15/16
KCH067-033	16C129-10	Soil	03/15/16
KCH067-034	16C129-11	Soil	03/15/16
KCH067-035	16C129-12	Soil	03/15/16
KCH067-036	16C129-13	Soil	03/15/16
KCH067-037	16C129-14	Soil	03/15/16
KCH067-038	16C129-15	Soil	03/15/16
KCH067-039	16C129-16	Soil	03/15/16
KCH067-040	16C129-17	Soil	03/15/16
KCH067-041	16C129-18	Water	03/15/16
KCH067-042	16C129-19	Water	03/15/16
KCH067-035MS	16C129-12MS	Soil	03/15/16
KCH067-035MSD	16C129-12MSD	Soil	03/15/16
KCH067-041MS	16C129-18MS	Water	03/15/16
KCH067-041MSD	16C129-18MSD	Water	03/15/16
KCH067-032DL**	16C129-09DL**	Soil	03/15/16
KCH067-037DL	16C129-14DL	Soil	03/15/16

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following methods:

Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Vanadium, and Zinc by Environmental Protection Agency (EPA) SW 846 Method 6020A
Mercury by EPA SW 846 Method 7470A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

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U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. ICPMS Tune

The mass calibration was within 0.1 AMU and the percent relative standard deviation (%RSD) was less than or equal to 5%.

III. Instrument Calibration

Initial and continuing calibrations were performed as required by the methods.

The initial calibration verification (ICV) and continuing calibration verification (CCV) standards were within QC limits.

IV. ICP Interference Check Sample Analysis

The frequency of interference check sample (ICS) analysis was met. All criteria were within QC limits.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the methods. No contaminants were found in the laboratory blanks with the following exceptions:

Laboratory Blank ID	Analyte	Maximum Concentration	Associated Samples
PB (prep blank)	Copper	0.308 ug/L	All water samples in SDG 16C129
ICB/CCB	Molybdenum	0.203 ug/L	KCH067-032** KCH067-033 KCH067-034 KCH067-035

Data qualification by the laboratory blanks was based on the maximum contaminant concentration in the laboratory blanks in the analysis of each analyte. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
KCH067-042	Copper	0.811 ug/L	0.811U ug/L

Sample	Analyte	Reported Concentration	Modified Final Concentration
KCH067-033	Molybdenum	0.324 mg/Kg	0.324U mg/Kg
KCH067-034	Molybdenum	0.195 mg/Kg	0.195U mg/Kg
KCH067-035	Molybdenum	0.310 mg/Kg	0.310U mg/Kg

VI. Field Blanks

Sample KCH067-041 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
KCH067-041	03/15/16	Aluminum Barium Boron Calcium Chromium Copper Iron Lead Magnesium Manganese Nickel Potassium Sodium Zinc	21.6 ug/L 1.09 ug/L 4.36 ug/L 122 ug/L 0.284 ug/L 1.34 ug/L 27.5 ug/L 0.570 ug/L 17.7 ug/L 0.800 ug/L 0.156 ug/L 156 ug/L 152 ug/L 8.14 ug/L	All soil samples in SDG 16C129

Sample KCH067-042 was identified as a source blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Analyte	Concentration	Associated Samples
KCH067-042	03/15/16	Barium Boron Calcium Chromium Copper Lead Magnesium Sodium	0.277 ug/L 4.00 ug/L 34.7 ug/L 0.101 ug/L 0.811 ug/L 0.0528 ug/L 7.51 ug/L 35.3 ug/L	KCH067-041

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated field blanks with the following exceptions:

Sample	Analyte	Reported Concentration	Modified Final Concentration
KCH067-033	Boron	8.19 mg/Kg	8.19U mg/Kg
KCH067-034	Boron Sodium	5.65 mg/Kg 94.9 mg/Kg	5.65U mg/Kg 94.9U mg/Kg
KCH067-035	Boron Sodium	5.36 mg/Kg 71.3 mg/Kg	5.36U mg/Kg 71.3U mg/Kg
KCH067-036	Boron Sodium	6.06 mg/Kg 77.3 mg/Kg	6.06U mg/Kg 77.3U mg/Kg
KCH067-037	Boron Sodium	6.18 mg/Kg 81.9 mg/Kg	6.18U mg/Kg 81.9U mg/Kg
KCH067-038	Boron Sodium	5.40 mg/Kg 77.5 mg/Kg	5.40U mg/Kg 77.5U mg/Kg
KCH067-039	Boron Sodium	5.75 mg/Kg 85.8 mg/Kg	5.75U mg/Kg 85.8U mg/Kg
KCH067-040	Boron Sodium	5.70 mg/Kg 85.7 mg/Kg	5.70U mg/Kg 85.7U mg/Kg
KCH067-041	Boron Chromium Lead Magnesium	4.36 ug/L 0.284 ug/L 0.570 ug/L 17.7 ug/L	5.00U ug/L 0.284U ug/L 0.570U ug/L 17.7U ug/L
KCH067-037DL	Sodium	70.6 mg/Kg	97.4U mg/Kg

VII. Matrix Spike/Matrix Spike Duplicates

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

Spike ID (Associated Samples)	Analyte	MS (%R) (Limits)	MSD (%R) (Limits)	Flag	A or P
KCH067-035MS/MSD (KCH067-035)	Aluminum Calcium Manganese	135 (78-124) 132 (86-118) 120 (85-116)	132 (78-124) 132 (86-118) -	J+ (all detects) J+ (all detects) J+ (all detects)	A
KCH067-035MS/MSD (KCH067-035)	Vanadium	-	73 (82-116)	J- (all detects)	A

For KCH067-035MS/MSD, no data were qualified for Barium and Iron percent recoveries (%R) outside the QC limits since the parent sample results were greater than 4X the spike concentration.

Relative percent differences (RPD) were within QC limits.

VIII. Duplicate Sample Analysis

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

IX. Serial Dilution

Serial dilution analysis was performed on an associated project sample. The analysis criteria were met.

X. Laboratory Control Samples

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

XI. Field Duplicates

No field duplicates were identified in this SDG.

XII. Internal Standards (ICP-MS)

All internal standard percent recoveries (%R) were within QC limits for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Level IV validation with the following exceptions:

Sample	Analyte	Finding	Criteria	Flag	A or P
KCH067-032**	Boron	Sample result exceeded linear range.	Reported result should be within linear range.	J (all detects)	A
KCH067-037	Iron	Sample result exceeded linear range.	Reported result should be within linear range.	J (all detects)	A

Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

The analysis was conducted within all specifications of the methods.

In the case where more than one result was reported for an individual sample, the least technically acceptable results were deemed unusable as follows:

Sample	Analyte	Flag	A or P
KCH067-032**	Boron	R	A
KCH067-037	Iron	R	A
KCH067-032DL**	All analytes except Boron	R	A
KCH067-037DL	All analytes except Iron	R	A

Due to MS/MSD %R, data were qualified as estimated in one sample.

Due to laboratory blank contamination, data were qualified as not detected in four samples.

Due to equipment blank and source blank contamination, data were qualified as not detected in ten samples.

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

China Lake CTO 067
Metals - Data Qualification Summary - SDG 16C129

Sample	Analyte	Flag	A or P	Reason (Code)
KCH067-035	Aluminum Calcium Manganese	J+ (all detects) J+ (all detects) J+ (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (8)
KCH067-035	Vanadium	J- (all detects)	A	Matrix spike/Matrix spike duplicate (%R) (8)
KCH067-032**	Boron	R	A	Overall assessment of data (22)
KCH067-037	Iron	R	A	Overall assessment of data (22)
KCH067-032DL**	All analytes except Boron	R	A	Overall assessment of data (22)
KCH067-037DL	All analytes except Iron	R	A	Overall assessment of data (22)

China Lake CTO 067
Metals - Laboratory Blank Data Qualification Summary - SDG 16C129

Sample	Analyte	Modified Final Concentration	A or P	Code
KCH067-042	Copper	0.811U ug/L	A	7
KCH067-033	Molybdenum	0.324U mg/Kg	A	7
KCH067-034	Molybdenum	0.195U mg/Kg	A	7
KCH067-035	Molybdenum	0.310U mg/Kg	A	7

China Lake CTO 067
Metals - Field Blank Data Qualification Summary - SDG 16C129

Sample	Analyte	Modified Final Concentration	A or P	Code
KCH067-033	Boron	8.19U mg/Kg	A	6
KCH067-034	Boron Sodium	5.65U mg/Kg 94.9U mg/Kg	A	6

Sample	Analyte	Modified Final Concentration	A or P	Code
KCH067-035	Boron Sodium	5.36U mg/Kg 71.3U mg/Kg	A	6
KCH067-036	Boron Sodium	6.06U mg/Kg 77.3U mg/Kg	A	6
KCH067-037	Boron Sodium	6.18U mg/Kg 81.9U mg/Kg	A	6
KCH067-038	Boron Sodium	5.40U mg/Kg 77.5U mg/Kg	A	6
KCH067-039	Boron Sodium	5.75U mg/Kg 85.8U mg/Kg	A	6
KCH067-040	Boron Sodium	5.70U mg/Kg 85.7U mg/Kg	A	6
KCH067-041	Boron Chromium Lead Magnesium	5.00U ug/L 0.284U ug/L 0.570U ug/L 17.7U ug/L	A	6

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
SDG NO.	: 16C129	Date Extracted:	03/23/16 15:08
Sample ID	: KCH067-032	Date Analyzed:	03/28/16 13:36
Lab Samp ID	: C129-09	Dilution Factor:	0.971
Lab File ID	: 98C11021	Matrix :	SOIL
Ext Btch ID	: IMC040S	% Moisture :	1.7
Calib. Ref.	: 98C11016	Instrument ID :	T-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	5650	98.8	9.88	19.8
Antimony	0.890	0.494	0.0988	0.198
Arsenic	6.11	0.494	0.0494	0.0988
Barium	35.2	0.494	0.0711	0.0988
Beryllium	0.203J	0.494	0.0494	0.0988
Boron	25.1E R(22)	9.88	2.47	4.94
Cadmium	0.779	0.494	0.0563	0.0988
Calcium	18200	98.8	16.8	19.8
Chromium	8.04	0.494	0.0494	0.0988
Cobalt	3.16	0.494	0.0494	0.0988
Copper	8.87	0.494	0.0988	0.198
Iron	10200	98.8	4.94	9.88
Lead	23.9	0.494	0.0494	0.0988
Magnesium	4140	98.8	9.88	19.8
Manganese	157	0.494	0.151	0.198
Molybdenum	0.802	0.494	0.0988	0.198
Nickel	4.17	0.494	0.0622	0.0988
Potassium	2490	98.8	9.88	19.8
Selenium	0.0630J	0.494	0.0494	0.0988
Silver	0.181J	0.494	0.0494	0.0988
Sodium	454	98.8	9.88	19.8
Thallium	0.0666J	0.494	0.0494	0.0988
Vanadium	20.7	0.494	0.188	0.247
Zinc	385	1.98	0.675	0.988

5/17/16

METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
SDG NO.	: 16C129	Date Extracted:	03/23/16 15:08
Sample ID:	KCH067-032DL	Date Analyzed:	03/28/16 17:49
Lab Samp ID:	C129-09I	Dilution Factor:	1.94
Lab File ID:	98C11078	Matrix :	SOIL
Ext Btch ID:	IMC040S	% Moisture :	1.7
Calib. Ref.:	98C11074	Instrument ID :	T-I98

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	5640 R22	197	19.7	39.5
Antimony	0.869J	0.987	0.197	0.395
Arsenic	6.23	0.987	0.0987	0.197
Barium	34.5	0.987	0.142	0.197
Beryllium	0.205J	0.987	0.0987	0.197
Boron	25.4	19.7	4.93	9.87
Cadmium	0.726J R22	0.987	0.112	0.197
Calcium	19100	197	33.6	39.5
Chromium	8.08	0.987	0.0987	0.197
Cobalt	3.24	0.987	0.0987	0.197
Copper	9.05	0.987	0.197	0.395
Iron	10300	197	9.87	19.7
Lead	23.9	0.987	0.0987	0.197
Magnesium	4110	197	19.7	39.5
Manganese	162	0.987	0.302	0.395
Molybdenum	0.775J	0.987	0.197	0.395
Nickel	4.22	0.987	0.124	0.197
Potassium	2570	197	19.7	39.5
Selenium	ND	0.987	0.0987	0.197
Silver	0.174J	0.987	0.0987	0.197
Sodium	454	197	19.7	39.5
Thallium	ND	0.987	0.0987	0.197
Vanadium	20.8	0.987	0.375	0.493
Zinc	387	3.95	1.35	1.97

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
SDG NO.	: 16C129	Date Extracted:	03/23/16 15:08
Sample ID:	KCH067-033	Date Analyzed:	03/28/16 13:40
Lab Samp ID:	C129-10	Dilution Factor:	0.966
Lab File ID:	98C11022	Matrix :	SOIL
Ext Btch ID:	IMC040S	% Moisture :	1.5
Calib. Ref.:	98C11016	Instrument ID :	T-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	4010	98.1	9.81	19.6
Antimony	0.437J	0.490	0.0981	0.196
Arsenic	2.68	0.490	0.0490	0.0981
Barium	33.5	0.490	0.0706	0.0981
Beryllium	0.151J	0.490	0.0490	0.0981
Boron	8.19J U(6)	9.81	2.45	4.90
Cadmium	0.163J	0.490	0.0559	0.0981
Calcium	7780	98.1	16.7	19.6
Chromium	4.33	0.490	0.0490	0.0981
Cobalt	2.07	0.490	0.0490	0.0981
Copper	5.55	0.490	0.0981	0.196
Iron	6710	98.1	4.90	9.81
Lead	2.74	0.490	0.0490	0.0981
Magnesium	2420	98.1	9.81	19.6
Manganese	111	0.490	0.150	0.196
Molybdenum	0.324J U(T)	0.490	0.0981	0.196
Nickel	2.52	0.490	0.0618	0.0981
Potassium	1400	98.1	9.81	19.6
Selenium	ND	0.490	0.0490	0.0981
Silver	ND	0.490	0.0490	0.0981
Sodium	112	98.1	9.81	19.6
Thallium	ND	0.490	0.0490	0.0981
Vanadium	14.1	0.490	0.186	0.245
Zinc	24.8	1.96	0.670	0.981

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
SDG NO.	: 16C129	Date Extracted:	03/23/16 15:08
Sample ID:	KCH067-034	Date Analyzed:	03/28/16 13:45
Lab Samp ID:	C129-11	Dilution Factor:	0.966
Lab File ID:	98C11023	Matrix :	SOIL
Ext Btch ID:	IMC040S	% Moisture :	0.4
Calib. Ref.:	98C11016	Instrument ID :	T-I98

PARAMETERS	RESULTS (mg/kg)		LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	2050		97.0	9.70	19.4
Antimony	0.179J		0.485	0.0970	0.194
Arsenic	2.79		0.485	0.0485	0.0970
Barium	111		0.485	0.0698	0.0970
Beryllium	0.0961J		0.485	0.0485	0.0970
Boron	5.65J	U(6)	9.70	2.42	4.85
Cadmium	0.0643J		0.485	0.0553	0.0970
Calcium	3850		97.0	16.5	19.4
Chromium	9.76		0.485	0.0485	0.0970
Cobalt	3.06		0.485	0.0485	0.0970
Copper	3.35		0.485	0.0970	0.194
Iron	13400		97.0	4.85	9.70
Lead	2.47		0.485	0.0485	0.0970
Magnesium	866		97.0	9.70	19.4
Manganese	54.7		0.485	0.148	0.194
Molybdenum	0.195J	U(7)	0.485	0.0970	0.194
Nickel	1.71		0.485	0.0611	0.0970
Potassium	729		97.0	9.70	19.4
Selenium	ND		0.485	0.0485	0.0970
Silver	0.0879J		0.485	0.0485	0.0970
Sodium	94.9J	U(6)	97.0	9.70	19.4
Thallium	ND		0.485	0.0485	0.0970
Vanadium	37.8		0.485	0.184	0.242
Zinc	9.51		1.94	0.662	0.970

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
SDG NO.	: 16C129	Date Extracted:	03/23/16 15:08
Sample ID:	KCH067-035	Date Analyzed:	03/28/16 14:15
Lab Samp ID:	C129-12	Dilution Factor:	0.976
Lab File ID:	98C11030	Matrix :	SOIL
Ext Btch ID:	IMC040S	% Moisture :	0.5
Calib. Ref.:	98C11028	Instrument ID :	T-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	1970 J+(8)	98.1	9.81	19.6
Antimony	0.203J	0.490	0.0981	0.196
Arsenic	3.43	0.490	0.0490	0.0981
Barium	199	0.490	0.0706	0.0981
Beryllium	0.0978J	0.490	0.0490	0.0981
Boron	5.36J U(6)	9.81	2.45	4.90
Cadmium	0.0697J	0.490	0.0559	0.0981
Calcium	5040 J+(8)	98.1	16.7	19.6
Chromium	9.98	0.490	0.0490	0.0981
Cobalt	2.17	0.490	0.0490	0.0981
Copper	3.82	0.490	0.0981	0.196
Iron	15700	98.1	4.90	9.81
Lead	3.05	0.490	0.0490	0.0981
Magnesium	948	98.1	9.81	19.6
Manganese	57.2 J+(8)	0.490	0.150	0.196
Molybdenum	0.310J U(7)	0.490	0.0981	0.196
Nickel	1.88	0.490	0.0618	0.0981
Potassium	763	98.1	9.81	19.6
Selenium	ND	0.490	0.0490	0.0981
Silver	ND	0.490	0.0490	0.0981
Sodium	71.3J U(6)	98.1	9.81	19.6
Thallium	ND	0.490	0.0490	0.0981
Vanadium	42.1 J-(8)	0.490	0.186	0.245
Zinc	8.51	1.96	0.670	0.981

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
SDG NO.	: 16C129	Date Extracted:	03/23/16 15:08
Sample ID	: KCH067-036	Date Analyzed:	03/28/16 14:24
Lab Samp ID	: C129-13	Dilution Factor:	0.98
Lab File ID	: 98C11032	Matrix	: SOIL
Ext Btch ID	: IMC040S	% Moisture	: 2.3
Calib. Ref.	: 98C11028	Instrument ID	: T-I98

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	2530	100	10.0	20.1
Antimony	0.197J	0.502	0.100	0.201
Arsenic	3.20	0.502	0.0502	0.100
Barium	230	0.502	0.0722	0.100
Beryllium	0.107J	0.502	0.0502	0.100
Boron	6.06J U16)	10.0	2.51	5.02
Cadmium	0.0824J	0.502	0.0572	0.100
Calcium	7270	100	17.1	20.1
Chromium	11.5	0.502	0.0502	0.100
Cobalt	2.13	0.502	0.0502	0.100
Copper	3.82	0.502	0.100	0.201
Iron	17600	100	5.02	10.0
Lead	2.73	0.502	0.0502	0.100
Magnesium	1280	100	10.0	20.1
Manganese	72.2	0.502	0.153	0.201
Molybdenum	0.228J	0.502	0.100	0.201
Nickel	2.01	0.502	0.0632	0.100
Potassium	838	100	10.0	20.1
Selenium	ND	0.502	0.0502	0.100
Silver	0.0585J	0.502	0.0502	0.100
Sodium	77.3J U16)	100	10.0	20.1
Thallium	ND	0.502	0.0502	0.100
Vanadium	46.8	0.502	0.191	0.251
Zinc	10.1	2.01	0.685	1.00

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
SDG NO.	: 16C129	Date Extracted:	03/23/16 15:08
Sample ID:	KCH067-037	Date Analyzed:	03/28/16 14:29
Lab Samp ID:	C129-14	Dilution Factor:	0.957
Lab File ID:	98C11033	Matrix :	SOIL
Ext Btch ID:	IMC040S	% Moisture :	1.6
Calib. Ref.:	98C11028	Instrument ID :	T-I98

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	2630	97.3	9.73	19.5
Antimony	0.307J	0.486	0.0973	0.195
Arsenic	4.79	0.486	0.0486	0.0973
Barium	253	0.486	0.0700	0.0973
Beryllium	0.112J	0.486	0.0486	0.0973
Boron	6.18J U(6)	9.73	2.43	4.86
Cadmium	0.105J	0.486	0.0554	0.0973
Calcium	6850	97.3	16.5	19.5
Chromium	27.0	0.486	0.0486	0.0973
Cobalt	3.74	0.486	0.0486	0.0973
Copper	4.62	0.486	0.0973	0.195
Iron	38000E R22	97.3	4.86	9.73
Lead	4.61	0.486	0.0486	0.0973
Magnesium	1430	97.3	9.73	19.5
Manganese	105	0.486	0.149	0.195
Molybdenum	0.383J	0.486	0.0973	0.195
Nickel	3.44	0.486	0.0613	0.0973
Potassium	909	97.3	9.73	19.5
Selenium	0.0573J	0.486	0.0486	0.0973
Silver	ND	0.486	0.0486	0.0973
Sodium	81.9J U(6)	97.3	9.73	19.5
Thallium	ND	0.486	0.0486	0.0973
Vanadium	111	0.486	0.185	0.243
Zinc	13.7	1.95	0.664	0.973

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
SDG NO.	: 16C129	Date Extracted:	03/23/16 15:08
Sample ID:	KCH067-037DL	Date Analyzed:	03/28/16 17:54
Lab Samp ID:	C129-14I	Dilution Factor:	4.79
Lab File ID:	98C11079	Matrix :	SOIL
Ext Btch ID:	IMC040S	% Moisture :	1.6
Calib. Ref.:	98C11074	Instrument ID :	T-I98

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	2690 R22	487	48.7	97.4
Antimony	ND	2.43	0.487	0.974
Arsenic	5.04	2.43	0.243	0.487
Barium	249	2.43	0.350	0.487
Beryllium	ND	2.43	0.243	0.487
Boron	ND	48.7	12.2	24.3
Cadmium	ND	2.43	0.277	0.487
Calcium	7220	487	82.8	97.4
Chromium	27.0	2.43	0.243	0.487
Cobalt	3.88	2.43	0.243	0.487
Copper	4.77	2.43	0.487	0.974
Iron	39700	487	24.3	48.7
Lead	4.76 R22	2.43	0.243	0.487
Magnesium	1450	487	48.7	97.4
Manganese	110	2.43	0.745	0.974
Molybdenum	ND	2.43	0.487	0.974
Nickel	3.54	2.43	0.307	0.487
Potassium	913	487	48.7	97.4
Selenium	ND	2.43	0.243	0.487
Silver	ND	2.43	0.243	0.487
Sodium	70.6J	487	48.7	97.4
Thallium	ND	2.43	0.243	0.487
Vanadium	108	2.43	0.925	1.22
Zinc	14.7	9.74	3.32	4.87

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
SDG NO.	: 16C129	Date Extracted:	03/23/16 15:08
Sample ID	: KCH067-038	Date Analyzed:	03/28/16 14:33
Lab Samp ID	: C129-15	Dilution Factor:	0.985
Lab File ID	: 98C11034	Matrix	: SOIL
Ext Btch ID	: IMC040S	% Moisture	: 1.3
Calib. Ref.	: 98C11028	Instrument ID	: T-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	2120	99.8	9.98	20.0
Antimony	0.156J	0.499	0.0998	0.200
Arsenic	3.31	0.499	0.0499	0.0998
Barium	17.2	0.499	0.0719	0.0998
Beryllium	0.0788J	0.499	0.0499	0.0998
Boron	5.40J U(6)	9.98	2.49	4.99
Cadmium	0.0580J	0.499	0.0569	0.0998
Calcium	6350	99.8	17.0	20.0
Chromium	6.16	0.499	0.0499	0.0998
Cobalt	1.56	0.499	0.0499	0.0998
Copper	3.49	0.499	0.0998	0.200
Iron	8850	99.8	4.99	9.98
Lead	2.68	0.499	0.0499	0.0998
Magnesium	1330	99.8	9.98	20.0
Manganese	51.8	0.499	0.153	0.200
Molybdenum	0.200J	0.499	0.0998	0.200
Nickel	1.45	0.499	0.0629	0.0998
Potassium	688	99.8	9.98	20.0
Selenium	ND	0.499	0.0499	0.0998
Silver	0.0867J	0.499	0.0499	0.0998
Sodium	77.5J U(6)	99.8	9.98	20.0
Thallium	ND	0.499	0.0499	0.0998
Vanadium	22.9	0.499	0.190	0.249
Zinc	10.5	2.00	0.682	0.998

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
SDG NO.	: 16C129	Date Extracted:	03/23/16 15:08
Sample ID:	KCH067-039	Date Analyzed:	03/28/16 14:37
Lab Samp ID:	C129-16	Dilution Factor:	0.971
Lab File ID:	98C11035	Matrix :	SOIL
Ext Btch ID:	IMC040S	% Moisture :	1.1
Calib. Ref.:	98C11028	Instrument ID :	T-I98

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	2180	98.2	9.82	19.6
Antimony	0.143J	0.491	0.0982	0.196
Arsenic	3.02	0.491	0.0491	0.0982
Barium	19.0	0.491	0.0707	0.0982
Beryllium	0.0893J	0.491	0.0491	0.0982
Boron	5.75J U(6)	9.82	2.45	4.91
Cadmium	0.0645J	0.491	0.0560	0.0982
Calcium	7370	98.2	16.7	19.6
Chromium	3.91	0.491	0.0491	0.0982
Cobalt	1.35	0.491	0.0491	0.0982
Copper	2.94	0.491	0.0982	0.196
Iron	5740	98.2	4.91	9.82
Lead	2.10	0.491	0.0491	0.0982
Magnesium	1370	98.2	9.82	19.6
Manganese	51.1	0.491	0.150	0.196
Molybdenum	0.216J	0.491	0.0982	0.196
Nickel	1.26	0.491	0.0619	0.0982
Potassium	708	98.2	9.82	19.6
Selenium	ND	0.491	0.0491	0.0982
Silver	0.128J	0.491	0.0491	0.0982
Sodium	85.8J U(6)	98.2	9.82	19.6
Thallium	ND	0.491	0.0491	0.0982
Vanadium	14.1	0.491	0.187	0.245
Zinc	8.24	1.96	0.671	0.982

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
SDG NO.	: 16C129	Date Extracted:	03/23/16 15:08
Sample ID	: KCH067-040	Date Analyzed:	03/28/16 14:42
Lab Samp ID	: C129-17	Dilution Factor:	0.971
Lab File ID	: 98C11036	Matrix	: SOIL
Ext Btch ID	: IMC040S	% Moisture	: 1.0
Calib. Ref.	: 98C11028	Instrument ID	: T-198

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
Aluminum	2260	98.1	9.81	19.6
Antimony	0.143J	0.490	0.0981	0.196
Arsenic	3.09	0.490	0.0490	0.0981
Barium	21.5	0.490	0.0706	0.0981
Beryllium	0.0920J	0.490	0.0490	0.0981
Boron	5.70J U(6)	9.81	2.45	4.90
Cadmium	0.0621J	0.490	0.0559	0.0981
Calcium	6600	98.1	16.7	19.6
Chromium	9.16	0.490	0.0490	0.0981
Cobalt	1.67	0.490	0.0490	0.0981
Copper	4.02	0.490	0.0981	0.196
Iron	11700	98.1	4.90	9.81
Lead	2.44	0.490	0.0490	0.0981
Magnesium	1390	98.1	9.81	19.6
Manganese	70.5	0.490	0.150	0.196
Molybdenum	0.192J	0.490	0.0981	0.196
Nickel	1.61	0.490	0.0618	0.0981
Potassium	747	98.1	9.81	19.6
Selenium	ND	0.490	0.0490	0.0981
Silver	0.312J	0.490	0.0490	0.0981
Sodium	85.7J U(6)	98.1	9.81	19.6
Thallium	ND	0.490	0.0490	0.0981
Vanadium	31.4	0.490	0.186	0.245
Zinc	9.11	1.96	0.670	0.981

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METHOD SW6020A
METALS BY ICP-MS

Client : KLEINFELDER	Date Collected: 03/15/16
Project : NAWS CHINA LAKE, CTO 067	Date Received: 03/17/16
SDG NO. : 16C129	Date Extracted: 03/23/16 11:55
Sample ID: KCH067-041	Date Analyzed: 03/28/16 18:56
Lab Samp ID: C129-18	Dilution Factor: 1
Lab File ID: 98C11093	Matrix : WATER
Ext Btch ID: IMC039W	% Moisture : NA
Calib. Ref.: 98C11085	Instrument ID : T-I98

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Aluminum	21.6J	100	10.0	20.0
Antimony	ND	1.00	0.250	0.500
Arsenic	ND	1.00	0.100	0.200
Barium	1.09	1.00	0.250	0.500
Beryllium	ND	1.00	0.0500	0.100
Boron	4.36J ≤ 5.00 U	10.0 (6)	2.50	5.00
Cadmium	ND	1.00	0.100	0.200
Calcium	122	100	13.0	25.0
Chromium	0.284J U (6)	1.00	0.100	0.200
Cobalt	ND	1.00	0.100	0.200
Copper	1.34	1.00	0.250	0.500
Iron	27.5J	100	5.00	10.0
Lead	0.570J U (6)	1.00	0.0500	0.100
Magnesium	17.7J U (6)	100	5.00	10.0
Manganese	0.800J	1.00	0.100	0.200
Molybdenum	ND	2.00	0.250	0.500
Nickel	0.156J	1.00	0.100	0.200
Potassium	156	100	10.0	20.0
Selenium	ND	1.00	0.150	0.300
Silver	ND	1.00	0.100	0.200
Sodium	152	100	25.0	50.0
Thallium	ND	1.00	0.100	0.200
Vanadium	ND	1.00	0.250	0.500
Zinc	8.14J	20.0	5.00	10.0

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METHOD SW6020A
METALS BY ICP-MS

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
SDG NO.	: 16C129	Date Extracted:	03/23/16 11:55
Sample ID:	KCH067-042	Date Analyzed:	03/28/16 19:05
Lab Samp ID:	C129-19	Dilution Factor:	1
Lab File ID:	98C11095	Matrix	: WATER
Ext Btch ID:	IMC039W	% Moisture	: NA
Calib. Ref.:	98C11085	Instrument ID	: T-I98

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
Aluminum	ND	100	10.0	20.0
Antimony	ND	1.00	0.250	0.500
Arsenic	ND	1.00	0.100	0.200
Barium	0.277J	1.00	0.250	0.500
Beryllium	ND	1.00	0.0500	0.100
Boron	4.00J	10.0	2.50	5.00
Cadmium	ND	1.00	0.100	0.200
Calcium	34.7J	100	13.0	25.0
Chromium	0.101J	1.00	0.100	0.200
Cobalt	ND	1.00	0.100	0.200
Copper	0.811J U(7)	1.00	0.250	0.500
Iron	ND	100	5.00	10.0
Lead	0.0528J	1.00	0.0500	0.100
Magnesium	7.51J	100	5.00	10.0
Manganese	ND	1.00	0.100	0.200
Molybdenum	ND	2.00	0.250	0.500
Nickel	ND	1.00	0.100	0.200
Potassium	ND	100	10.0	20.0
Selenium	ND	1.00	0.150	0.300
Silver	ND	1.00	0.100	0.200
Sodium	35.3J	100	25.0	50.0
Thallium	ND	1.00	0.100	0.200
Vanadium	ND	1.00	0.250	0.500
Zinc	ND	20.0	5.00	10.0

8/25/16

METHOD SW7470A
MERCURY BY COLD VAPOR

Client : KLEINFELDER
Project : NAWS CHINA LAKE, CTO 067
Batch No. : 16C129

Matrix : WATER
InstrumentID : 47

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (ug/L)	DIL'N FACTOR	MOIST (%)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1W	HGC014WB	ND	1	NA	0.50	0.050	0.10	03/23/1610:11	03/22/1616:30	M47C011011	M47C011	HGC014W	NA	NA
LCS1W	HGC014WL	2.38	1	NA	0.50	0.050	0.10	03/23/1610:13	03/22/1616:30	M47C011012	M47C011	HGC014W	NA	NA
LCD1W	HGC014WC	2.40	1	NA	0.50	0.050	0.10	03/23/1610:15	03/22/1616:30	M47C011013	M47C011	HGC014W	NA	NA
KCH067-041	C129-18	ND	1	NA	0.50	0.050	0.10	03/23/1610:46	03/22/1616:30	M47C011027	M47C011	HGC014W	03/15/1614:00	03/17/16
KCH067-042	C129-19	ND	1	NA	0.50	0.050	0.10	03/23/1610:48	03/22/1616:30	M47C011028	M47C011	HGC014W	03/15/1614:40	03/17/16

8/25/16

7113

METHOD SW7471A
MERCURY BY COLD VAPOR

Client : KLEINFELDER
Project : NAWS CHINA LAKE, CTO 067
Batch No. : 16C129

Matrix : SOIL
InstrumentID : 47

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (mg/kg)	DIL'N FACTOR	MOIST (%)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1S	HGC012SB	ND	1	NA	0.10	0.010	0.020	03/21/1614:21	03/21/1611:40	M47C009011	M47C009	HGC012S	NA	NA
LCS1S	HGC012SL	0.445	1	NA	0.10	0.010	0.020	03/21/1614:24	03/21/1611:40	M47C009012	M47C009	HGC012S	NA	NA
LCD1S	HGC012SC	0.434	1	NA	0.10	0.010	0.020	03/21/1614:26	03/21/1611:40	M47C009013	M47C009	HGC012S	NA	NA
KCH067-035	C129-12	ND	1	0.5	0.10	0.010	0.020	03/21/1614:30	03/21/1611:40	M47C009015	M47C009	HGC012S	03/15/1612:15	03/17/16
KCH067-035MS	C129-12M	0.444	1	0.5	0.099	0.0099	0.020	03/21/1614:35	03/21/1611:40	M47C009017	M47C009	HGC012S	03/15/1612:15	03/17/16
KCH067-035MSD	C129-12S	0.439	1	0.5	0.098	0.0098	0.020	03/21/1614:37	03/21/1611:40	M47C009018	M47C009	HGC012S	03/15/1612:15	03/17/16
KCH067-032	C129-09	ND	1	1.7	0.10	0.010	0.020	03/21/1614:40	03/21/1611:40	M47C009019	M47C009	HGC012S	03/15/1611:20	03/17/16
KCH067-033	C129-10	ND	1	1.5	0.10	0.010	0.020	03/21/1614:42	03/21/1611:40	M47C009020	M47C009	HGC012S	03/15/1611:35	03/17/16
KCH067-034	C129-11	ND	1	0.4	0.10	0.010	0.020	03/21/1614:48	03/21/1611:40	M47C009023	M47C009	HGC012S	03/15/1612:10	03/17/16
KCH067-036	C129-13	ND	1	2.3	0.10	0.010	0.020	03/21/1614:50	03/21/1611:40	M47C009024	M47C009	HGC012S	03/15/1612:30	03/17/16
KCH067-037	C129-14	ND	1	1.6	0.10	0.010	0.020	03/21/1614:52	03/21/1611:40	M47C009025	M47C009	HGC012S	03/15/1612:40	03/17/16
KCH067-038	C129-15	0.0256J	1	1.3	0.10	0.010	0.020	03/21/1614:55	03/21/1611:40	M47C009026	M47C009	HGC012S	03/15/1612:50	03/17/16
KCH067-039	C129-16	ND	1	1.1	0.10	0.010	0.020	03/21/1614:58	03/21/1611:40	M47C009027	M47C009	HGC012S	03/15/1613:00	03/17/16
KCH067-040	C129-17	ND	1	1.0	0.10	0.010	0.020	03/21/1615:00	03/21/1611:40	M47C009028	M47C009	HGC012S	03/15/1613:05	03/17/16

K051716

7116

LDC #: 36282C4a

SDG #: 16C129

Laboratory: EMAX Laboratories Inc.

VALIDATION COMPLETENESS WORKSHEET

Standard/Full

Date: 5/10/16

Page: 1 of 1

Reviewer: JD

2nd Reviewer: JL

METHOD: Metals (EPA SW 846 Method 6020A/7470A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	3/15/16
II.	ICP/MS Tune	A	
III.	Instrument Calibration	A	
IV.	ICP Interference Check Sample (ICS) Analysis	A	
V.	Laboratory Blanks	SW	
VI.	Field Blanks	SW	EB= (10) SB=(11)
VII.	Matrix Spike/Matrix Spike Duplicates	SW	MSD = (12,13)(14,15)
VIII.	Duplicate sample analysis	N	
IX.	Serial Dilution	A	
X.	Laboratory control samples	A	LCSD
XI.	Field Duplicates	N	
XII.	Internal Standard (ICP-MS)	A	Not reviewed for Standard validation
XIII.	Sample Result Verification 30	SW/A	Not reviewed for Standard validation.
XIV.	Overall Assessment of Data ↓	SW/A	

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

** Indicates sample underwent Full validation

	Client ID		Lab ID	Matrix	Date
1	KCH067-032**		16C129-09**	Soil	03/15/16
2	KCH067-033		16C129-10	Soil	03/15/16
3	KCH067-034		16C129-11	Soil	03/15/16
4	KCH067-035		16C129-12	Soil	03/15/16
5	KCH067-036		16C129-13	Soil	03/15/16
6	KCH067-037		16C129-14	Soil	03/15/16
7	KCH067-038		16C129-15	Soil	03/15/16
8	KCH067-039		16C129-16	Soil	03/15/16
9	KCH067-040		16C129-17	Soil	03/15/16
10	KCH067-041		16C129-18	Water	03/15/16
11	KCH067-042		16C129-19	Water	03/15/16
12	KCH067-035MS	All	16C129-12MS	Soil	03/15/16
13	KCH067-035MSD	↓	16C129-12MSD	Soil	03/15/16
14	KCH067-041MS	All but Hg	16C129-18MS	Water	03/15/16
15	KCH067-041MSD	↓	16C129-18MSD	Water	03/15/16

LDC #: 36282C4a

VALIDATION COMPLETENESS WORKSHEET

Standard/Full

Date: 5/10/16

SDG #: 16C129

Page: 2 of 2

Laboratory: EMAX Laboratories Inc.

Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: Metals (EPA SW 846 Method 6020A/7470A)

	Client ID	Lab ID	Matrix	Date
16	#1DL			
17	#6DL			
18				
19				
20				

Notes:

LDC #: 36282C4a

VALIDATION FINDINGS CHECKLIST

Reviewer: 3D
2nd Reviewer: AC

Method: Metals (EPA SW 846 Method 6010B/7000/6020)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. ICP/MS Tune				
Were all isotopes in the tuning solution mass resolution within 0.1 amu?	✓			
Were %RSD of isotopes in the tuning solution ≤5%?	✓			
III. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% (80-120% for mercury) QC limits?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
IV. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
V. ICP Interference Check Sample				
Were ICP interference check samples performed daily?	✓			
Were the AB solution percent recoveries (%R) with the 80-120% QC limits?	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.		✓		
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of +/- RL(+/-2X RL for soil) was used for samples that were ≤ 5X the RL, including when only one of the duplicate sample values were ≤ 5X the RL.	✓			
VII. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% QC limits for water samples and laboratory established QC limits for soils?	✓			

Validation Area	Yes	No	NA	Findings/Comments
VIII. Internal Standards (EPA SW 846 Method 6020/EPA 200.8)				
Were all the percent recoveries (%R) within the 30-120% (6020)/60-125% (200.8) of the intensity of the internal standard in the associated initial calibration?	✓			
If the %Rs were outside the criteria, was a reanalysis performed?	✓			
IX. ICP Serial Dilution				
Was an ICP serial dilution analyzed if analyte concentrations were > 50X the MDL (ICP)/>100X the MDL(ICP/MS)?	✓			
Were all percent differences (%Ds) < 10%?	✓			
Was there evidence of negative interference? If yes, professional judgement will be used to qualify the data.		✓		
X. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XII. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
XIII. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.	✓			

LDC #: 36282C4a

VALIDATION FINDINGS WORKSHEET
Sample Specific Element Reference

Reviewer: JS
2nd reviewer: M

All circled elements are applicable to each sample.

Sample ID	Matrix	Target Analyte List (TAL)
1-9	S	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
10-11	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
12-13	S	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
14-15	W	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
16-17	S	Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
Analysis Method		
ICP		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
ICP-MS		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___
GFAA		Al, Sb, As, Ba, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Hg, Ni, K, Se, Ag, Na, Tl, V, Zn, Mo, B, Sn, Ti, ___ ___

Comments: Mercury by CVAA if performed

LDC #: 36282C4a

VALIDATION FINDINGS WORKSHEET
PB/ICB/CCB QUALIFIED SAMPLES

Reviewer: JD
2nd Reviewer:

METHOD: Metals (EPA SW 864 Method 6010/6020/7000) Soil preparation factor applied:

Sample Concentration units, unless otherwise noted: ug/L Associated Samples: All Waters (07)

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Blank Action Limit	11									
Cu		0.308			0.811/~~1.00~~									

Sample Concentration units, unless otherwise noted: mg/kg Associated Samples: 1-4 (07)

					Sample Identification									
Analyte	Maximum PB[a] (mg/Kg)	Maximum PB[a] (ug/L)	Maximum ICB/CCB[a] (ug/L)	Blank Action Limit	2	3	4							
Mo			0.203		0.324/~~0.490~~	0.195/~~0.485~~	0.310/~~0.490~~							

Samples with analyte concentrations within five times the associated ICB, CCB or PB concentration are listed above with the identifications from the Validation Completeness Worksheet. These sample results were qualified as not detected, "U".

Note : a - The listed analyte concentration is the highest ICB, CCB, or PB detected in the analysis of each element.

LDC #: 36282C4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JD
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA Method 200.7/200.8)
Blank units: ug/L **Associated sample units:** mg/kg
Sampling date: 03/15/16 Soil factor applied 50X
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All Soils (06)

Analyte	Blank ID	Sample Identification										
	10	Action Limit	2	3	4	5	6	7	8	9	17	
Al	21.6											
Ba	1.09	0.545										
B	4.36		8.19/~~9.81~~	5.65/~~9.70~~	5.36/~~9.81~~	6.06/~~10.0~~	6.18/~~9.73~~	5.40/~~9.98~~	5.75/~~9.82~~	5.70/~~9.81~~		
Ca	122	61										
Cr	0.284											
Cu	1.34	0.67										
Fe	27.5											
Pb	0.570											
Mg	17.7											
Mn	0.800											
Ni	0.156											
K	156	78										
Na	152	76		94.9/~~97.0~~	71.3/~~98.1~~	77.3/~~100~~	81.9/~~97.3~~	77.5/~~99.8~~	85.8/~~96.2~~	85.7/~~98.1~~	70.6/~~467~~	
Zn	8.14										97.4U	

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with analyte concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 36282C4a

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: JD
2nd Reviewer: AC

METHOD: Trace Metals (EPA Method 200.7/200.8)
Blank units: ug/L **Associated sample units:** ug/L
Sampling date: 03/15/16 Soil factor applied _____
Field blank type: (circle one) Field Blank / Rinsate / Other: (SB) Associated Samples: 10 (06)

Analyte	Blank ID	Sample Identification											
[redacted]	11	Action Limit	10										
Ba	0.277												
B	4.00		4.36/~~10.0~~ 5.00										
Ca	34.7												
Cr	0.101		0.284/~~1.00~~										
Cu	0.811												
Pb	0.0528		0.570/~~1.00~~										
Mg	7.51		17.7/~~100~~										
Na	35.3												

LDC #: 36282C4a

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates

Page: 1 of 1
Reviewer: JD
2nd Reviewer: AC

METHOD: Trace metals (EPA SW 846 Method 6010/7000)

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

Y N N/A Was a matrix spike analyzed for each matrix in this SDG?

Y N N/A Were matrix spike percent recoveries (%R) within the control limits of 75-125? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.

Y N N/A Were all duplicate sample relative percent differences (RPD) ≤ 20% for samples?

LEVEL IV ONLY:

Y N N/A Were recalculated results acceptable? See Level IV Recalculation Worksheet for recalculations.

#	MS/MSD ID	Matrix	Analyte	MS %Recovery	MSD %Recovery	RPD (Limits)	Associated Samples	Qualifications
	12/13	S	Al	135 (78-124)	132 (78-124)		4	J+det/A (det) (08)
			Ca	132 (86-118)	132 (86-118)			J+det/A (det) (08)
			Mn	120 (85-116)				J+det/A (det) (08)
			V		73 (82-116)			J-/UJ/A (det) (08)

Comments: 12/13: Ba, Fe > 4X

LDC #: 36282C4a

VALIDATION FINDINGS WORKSHEET
Sample Result Verification

Reviewer: JD
2nd Reviewer: Q

METHOD: Metals (EPA SW 846 Method 6010/6020/7000)

#	Sample ID	Analyte	Result (units)	RL (units)	Finding	Qualifications
	1	B			> Linear range	J/A (20)
	106	Fe			> Liner range	J/A (20)

Comments:

LDC #: 36282C4a

VALIDATION FINDINGS WORKSHEET
Overall Assessment of Data

Reviewer: SD
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA CLP SOW ILM02.1)

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

All available information pertaining to the data were reviewed using professional judgement to compliment the determination of the overall quality of the data.

Y N N/A Was the overall quality and usability of the data acceptable? All except = 6020 only -- Do not include Hg

#	Date	Sample ID	Finding	Associated Samples	Qualifications
		1	B (exceeds calibration range)	1	R/A (22)
		~~10~~ 6	Fe (exceeds calibration range)	10	R/A (22)
		16	All Except B (dilution not necessary)	16	R/A (22)
		17	All Except Fe (dilution not necessary)	17	R/A (22)

Comments:

LDC #: 36852C4a

VALIDATION FINDINGS WORKSHEET
Initial and Continuing Calibration Calculation Verification

Reviewer: JO
2nd Reviewer: [illegible]

METHOD: Trace Metals (See cover)

An initial and continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

%R = Found x 100 / True

Where, Found = concentration (in ug/L) of each analyte measured in the analysis of the ICV or CCV solution
True = concentration (in ug/L) of each analyte in the ICV or CCV source

Standard ID	Type of Analysis	Element	Found (ug/L)	True (ug/L)	Recalculated %R	Reported %R	Acceptable (Y/N)
	ICP (Initial calibration)						
ICV 12:43	ICP/MS (Initial calibration)	Ca	29890 ug/L	30000 ug/L	100%R	100%R	Y
ICV 14:13	CVAA (Initial calibration)	Hg	1.95 ug/L	2 ug/L	98%R	98%R	Y
	ICP (Continuing calibration)						
CCV (2) 14:07	ICP/MS (Continuing calibration)	Cr	245.3 ug/L	250 ug/L	98%R	98%R	Y
CCV 14:44	CVAA (Contining calibration)	Hg	2.11 ug/L	2 ug/L	106%R	106%R	Y
	GFAA (Initial calibration)						
	GFAA (Continuing calibation)						

Comments: _____

LDC #: 36202C4a

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: JD
2nd Reviewer: [illegible]

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

Percent recoveries (%R) for an ICP interference check sample, a laboratory control sample and a matrix spike sample were recalculated using the following formula:

$\%R = \frac{Found}{True} \times 100$ Where, Found = Concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = Concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

$RPD = \frac{|S-D|}{(S+D)/2} \times 100$ Where, S = Original sample concentration
D = Duplicate sample concentration

An ICP serial dilution percent difference (%D) was recalculated using the following formula:

$\%D = \frac{|I-SDR|}{I} \times 100$ Where, I = Initial Sample Result (mg/L)
SDR = Serial Dilution Result (mg/L) (Instrument Reading x 5)

Sample ID	Type of Analysis	Element	Found / S / I (units)	True / D / SDR (units)	Recalculated %R / RPD / %D	Reported %R / RPD / %D	Acceptable (Y/N)
ICS AB 13:05	ICP interference check	Cd	21.81 ug/L	20 ug/L	109%R	109%R	Y
LCS 14:24	Laboratory control sample	Hg	445.2 mg/kg	0.416 mg/kg	107%R	107%R	↓
N	Matrix spike		(SSR-SR)				
N	Duplicate						
N	ICP serial dilution						

Comments: _____

LDC #: 36828C4a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 2
Reviewer: JO
2nd reviewer: AC

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for (1) Ag were recalculated and verified using the following equation:

Concentration = (RD)(FV)(Dil) / (In. Vol.)

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

Prep Factor: 10
%Solids = 0.983
RD = 0.3658 ug/L
FV = 100 ml
In. W = 2.06g

Recalculation: $\frac{(0.3658 ug/L)(100ml)(10)}{(2.06g)(0.983)} \times \frac{1mg}{1000ug} = 0.181 mg/kg$

#	Sample ID	Analyte	Reported Concentration (mg/kg)	Calculated Concentration (mg/kg)	Acceptable (Y/N)
	1	Al	5650	5640	y*
	|	Sb	0.890	0.889	y*
	|	As	6.11	6.11	y
	|	Ba	35.2	35.2	|
	↓	Be	0.203	0.203	↓
	16	B	25.4	25.5	y*
	1	Cd	0.779	0.779	y
	|	Ca	18200	18200	↓
	|	Cr	8.04	8.03	y*
	|	Co	3.16	3.16	y
	|	Cu	8.87	8.87	|
	|	Fe	10200	10200	|
	|	Pb	23.9	23.9	|
	|	Mg	4140	4140	|
	|	Mn	157	157	|
	|	Mo	0.802	0.802	|
	|	Ni	4.17	4.17	|
	|	K	2490	2490	|
	|	Se	0.0630	0.0630	|
	↓	Ag	0.181	0.181	↓

Note: _____

LDC #: 30282C4a

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 2 of 2
Reviewer: JSD
2nd reviewer: AC

METHOD: Trace Metals (EPA SW 846 Method 6010/6020/7000)

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments and within the linear range of the ICP?
Y N N/A Are all detection limits below the CRDL?

Detected analyte results for See Pg 1 were recalculated and verified using the following equation:

Concentration = $\frac{(RD)(FV)(Dil)}{(In.\ Vol.)}$ Recalculation:

RD = Raw data concentration
FV = Final volume (ml)
In. Vol. = Initial volume (ml) or weight (G)
Dil = Dilution factor

#	Sample ID	Analyte	Reported Concentration (mg/Kg)	Calculated Concentration (mg/Kg)	Acceptable (Y/N)
	1	Na	454	454	Y
	↓	Tl	0.0666	0.0666	↓
		V	20.7	20.7	
	↓	Zn	385	385	↓
	~~4b~~ 3D				

Note: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 12, 2016

Parameters: Hexavalent Chromium

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C129

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-032**	16C129-09**	Soil	03/15/16
KCH067-033	16C129-10	Soil	03/15/16
KCH067-041	16C129-18	Water	03/15/16
KCH067-042	16C129-19	Water	03/15/16
KCH067-032MS	16C129-09MS	Soil	03/15/16
KCH067-032MSD	16C129-09MSD	Soil	03/15/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Inorganic Superfund Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Hexavalent Chromium by Environmental Protection Agency (EPA) SW 846 Method 7199

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

All samples were received in good condition.

All technical holding time requirements were met.

II. Initial Calibration

All criteria for the initial calibration were met.

III. Continuing Calibration

Continuing calibration frequency and analysis criteria were met.

IV. Laboratory Blanks

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

V. Field Blanks

Sample KCH067-041 was identified as an equipment blank. No contaminants were found.

Sample KCH067-042 was identified as a source blank. No contaminants were found.

VI. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VII. Duplicate Sample Analysis

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

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Sample Result Verification

All sample result verifications were acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XI. Overall Assessment of Data

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

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

China Lake CTO 067
Hexavalent Chromium - Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

China Lake CTO 067
Hexavalent Chromium - Laboratory Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

China Lake CTO 067
Hexavalent Chromium - Field Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

METHOD SW7199
HEXAVALENT CHROMIUM

Client : KLEINFELDER
Project : NAWS CHINA LAKE, CTO 067
Batch No. : 16C129

Matrix : SOIL
InstrumentID : 59

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (ug/kg)	DIL'N. FACTOR	MOIST (%)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1S	HCC003SB	ND	1	NA	100	13	40	03/28/1613:24	03/24/1615:20	IC26003	IC26001	HCC003S	NA	NA
LCS1S	CSC003SL	1080	1	NA	100	13	40	03/28/1613:45	03/24/1615:20	IC26005	IC26001	HCC003S	NA	NA
KCH067-032	C129-09	632	1	1.7	102	13.2	40.7	03/28/1614:26	03/24/1615:20	IC26009	IC26001	HCC003S	03/15/1611:20	03/17/16
KCH067-032MS	C129-09M	2490	1	1.7	102	13.2	40.7	03/28/1615:08	03/24/1615:20	IC26013	IC26011	HCC003S	03/15/1611:20	03/17/16
KCH067-032MSD	C129-09S	2350	1	1.7	102	13.2	40.7	03/28/1615:29	03/24/1615:20	IC26015	IC26011	HCC003S	03/15/1611:20	03/17/16
KCH067-033	C129-10	70.1J	1	1.5	102	13.2	40.6	03/28/1616:31	03/24/1615:20	IC26021	IC26011	HCC003S	03/15/1611:35	03/17/16

R05/7/16

METHOD SW7199
HEXAVALENT CHROMIUM

Client : KLEINFELDER
Project : NAWS CHINA LAKE, CTO 067
Batch No. : 16C129

Matrix : WATER
InstrumentID : 59

CLIENT SAMPLE ID	EMAX SAMPLE ID	RESULTS (ug/L)	DIL'N. FACTOR	MOIST (%)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1W	HCC007WB	ND	1	NA	0.2	0.05	0.1	03/17/1612:23	03/17/1612:45	IC17003	IC17001	HCC007W	NA	NA
LCS1W	HCC007WL	1.86	1	NA	0.2	0.05	0.1	03/17/1612:44	03/17/1612:45	IC17005	IC17001	HCC007W	NA	NA
LCD1W	HCC007WC	1.86	1	NA	0.2	0.05	0.1	03/17/1613:05	03/17/1612:45	IC17007	IC17001	HCC007W	NA	NA
KCH067-042	C129-19	ND	1	NA	0.2	0.05	0.1	03/17/1614:49	03/17/1612:45	IC17017	IC17011	HCC007W	03/15/1614:40	03/17/16
KCH067-041	C129-18I	ND	10	NA	2	0.5	1	03/17/1615:49	03/17/1612:45	IC17021	IC17019	HCC007W	03/15/1614:00	03/17/16

8051716

8082

LDC #: 36282C6 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/10/16
SDG #: 16C129 Standard/Full Page: 1 of 1
Laboratory: EMAX Laboratories Inc. Reviewer: SD
2nd Reviewer: N

METHOD: (Analyte) Hexavalent Chromium (EPA SW846 Method 7199)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A	3/15/16
II	Initial calibration	A	
III.	Calibration verification	A	
IV	Laboratory Blanks	A	
V	Field blanks	ND	EB=(3) SB=(4)
VI.	Matrix Spike/Matrix Spike Duplicates	A	MS/D=(5,6)
VII.	Duplicate sample analysis	N	
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	
X.	Sample result verification	A	Not reviewed for Standard validation.
XI	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-032**	16C129-09**	Soil	03/15/16
2	KCH067-033	16C129-10	Soil	03/15/16
3	KCH067-041	16C129-18	Water	03/15/16
4	KCH067-042	16C129-19	Water	03/15/16
5	KCH067-032MS	16C129-09MS	Soil	03/15/16
6	KCH067-032MSD	16C129-09MSD	Soil	03/15/16
7				
8				
9				
10				
11				
12				
13				
14				
15				

Notes:

LDC #: 36282C60

VALIDATION FINDINGS CHECKLIST

Reviewer: SD
2nd Reviewer: M

Method: Inorganics (EPA Method See Cover)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. Calibration				
Were all instruments calibrated daily, each set-up time?	✓			
Were the proper number of standards used?	✓			
Were all initial calibration correlation coefficients ≥ 0.995?	✓			
Were all initial and continuing calibration verification %Rs within the 90-110% QC limits?	✓			
Were titrant checks performed as required? (Level IV only)			✓	
Were balance checks performed as required? (Level IV only)			✓	
III. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
IV. Matrix spike/Matrix spike duplicates and Duplicates				
Were a matrix spike (MS) and duplicate (DUP) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD or MS/DUP. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the 75-125 QC limits? If the sample concentration exceeded the spike concentration by a factor of 4 or more, no action was taken.	✓			
Were the MS/MSD or duplicate relative percent differences (RPD) ≤ 20% for waters and ≤ 35% for soil samples? A control limit of ≤ CRDL(≤ 2X CRDL for soil) was used for samples that were ≤ 5X the CRDL, including when only one of the duplicate sample values were ≤ 5X the CRDL.	✓			
V. Laboratory control samples				
Was an LCS anaylzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the 80-120% (85-115% for Method 300.0) QC limits?	✓			
VI. Regional Quality Assurance and Quality Control				
Were performance evaluation (PE) samples performed?			✓	
Were the performance evaluation (PE) samples within the acceptance limits?			✓	

LDC #: 36282C9

VALIDATION FINDINGS CHECKLIST

Reviewer: 3D
2nd Reviewer: MC

Validation Area	Yes	No	NA	Findings/Comments
VII. Sample Result Verification				
Were RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
Were detection limits < RL?	✓			
VIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target analytes were detected in the field duplicates.			✓	
X. Field blanks				
Field blanks were identified in this SDG.	✓			
Target analytes were detected in the field blanks.		✓		

LDC #: 36282C50

Validation Findings Worksheet
Initial and Continuing Calibration Calculation Verification

Reviewer: JD
2nd Reviewer: AK

Method: Inorganics, Method See Cover

The correlation coefficient (r) for the calibration of Cr^{+6} was recalculated. Calibration date: 1/20/16

An initial or continuing calibration verification percent recovery (%R) was recalculated for each type of analysis using the following formula:

$$\%R = \frac{\text{Found} \times 100}{\text{True}}$$

Where, Found = concentration of each analyte measured in the analysis of the ICV or CCV solution
True = concentration of each analyte in the ICV or CCV source

Type of analysis	Analyte	Standard	Conc. (ug/l)	Area	Recalculated r or r^2	Reported r or r^2	Acceptable (Y/N)
Initial calibration	Cr^{+6}	s1	0	0	*0.9998*	0.9998	Y
		s2	0.2	0.0000157			
		s3	0.5	0.0000504			
		s4	1	0.0001022			
		s5	2	0.000194			
		s6	5	0.0005014			
		s7	7.5	0.0007527			
		s8	10	0.0010231			
ICV 13:57 Calibration verification		Found 3.925ug/L	True 4ug/L		93%R	93%R	
CCV 14:47 Calibration verification		1.949ug/L	2ug/L		97%R	97%R	
Calibration verification							

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

LDC #: 36282C6

VALIDATION FINDINGS WORKSHEET
Level IV Recalculation Worksheet

Page: 1 of 1
Reviewer: SD
2nd Reviewer: JL

METHOD: Inorganics, Method See Cover

Percent recoveries (%R) for a laboratory control sample and a matrix spike sample were recalculated using the following formula:

%R = Found / True x 100 Where, Found = concentration of each analyte measured in the analysis of the sample. For the matrix spike calculation, Found = SSR (spiked sample result) - SR (sample result).
True = concentration of each analyte in the source.

A sample and duplicate relative percent difference (RPD) was recalculated using the following formula:

RPD = |S-D| / (S+D)/2 x 100 Where, S = Original sample concentration
D = Duplicate sample concentration

Sample ID	Type of Analysis	Element	Found / S (units)	True / D (units)	Recalculated %R / RPD	Reported %R / RPD	Acceptable (Y/N)
LCS 13:45	Laboratory control sample	Cr^{+6}	1077 ug/kg	1000 ug/kg	108%R	108%R	Y
MS 15:08	Matrix spike sample		(SSR-SR) 1861 ug/kg	2000 ug/kg	93%R	93%R	
MSD 15:29	Duplicate sample		2346 ug/kg	2493 ug/kg	6%RPD	6%RPD	

Comments: _____

LDC #: 36282C6

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: SD
2nd reviewer: KC

METHOD: Inorganics, Method See Cover

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

Y N N/A Have results been reported and calculated correctly?
Y N N/A Are results within the calibrated range of the instruments?
Y N N/A Are all detection limits below the CRQL?

Compound (analyte) results for (1) Cr^{+6} reported with a positive detect were recalculated and verified using the following equation:

Concentration = $\frac{A-(-0.0000035)}{0.0001018}$

Recalculation: $\frac{0.0001229-(-0.0000035)}{0.0001018} \times \frac{(100ml)(62.5)}{(12.503g)(0.983)} = 63$ ug

A = 0.0001229
FV = 100ml
%solids = 0.983
Sm. W = 12.503g
Prep F = 62.5

#	Sample ID	Analyte	Reported Concentration (ug/kg)	Calculated Concentration (ug/kg)	Acceptable (Y/N)
	1	Cr^{+6}	632	632	Y

Note: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 11, 2016

Parameters: Total Petroleum Hydrocarbons as Gasoline

Validation Level: Level III

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C129

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-042	16C129-19	Water	03/15/16
KCH067-043	16C129-20	Water	03/15/16

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Total Petroleum Hydrocarbons (TPH) as Gasoline by Environmental Protection Agency (EPA) SW 846 Method 8015B

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

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

Percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

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

V. Field Blanks

Sample KCH067-043 was identified as a trip blank. No contaminants were found.

Sample KCH067-042 was identified as a source blank. No contaminants were found.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

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

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

China Lake CTO 067
Total Petroleum Hydrocarbons as Gasoline - Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

China Lake CTO 067
Total Petroleum Hydrocarbons as Gasoline - Laboratory Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

China Lake CTO 067
Total Petroleum Hydrocarbons as Gasoline - Field Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

METHOD SW5030B/8015B
TOTAL PETROLEUM HYDROCARBONS BY PURGE AND TRAP

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/21/16 14:45
Sample ID:	KCH067-042	Date Analyzed:	03/21/16 14:45
Lab Samp ID:	C129-19	Dilution Factor:	1
Lab File ID:	EC21008A	Matrix :	WATER
Ext Btch ID:	VG39C10	% Moisture :	NA
Calib. Ref.:	EC21003A	Instrument ID :	GCT039

PARAMETERS	RESULTS (mg/L)	LOQ (mg/L)	DL (mg/L)	LOD (mg/L)
GASOLINE	ND	0.10	0.010	0.020

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
4-BROMOFLUOROBENZENE	0.0338	0.04000	84.5	69-133

Parameter	H-C Range
Gasoline	C6-C10

SGJ 7/16

METHOD SW5030B/8015B
TOTAL PETROLEUM HYDROCARBONS BY PURGE AND TRAP

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/21/16 15:24
Sample ID:	KCH067-043	Date Analyzed:	03/21/16 15:24
Lab Samp ID:	C129-20	Dilution Factor:	1
Lab File ID:	EC21009A	Matrix :	WATER
Ext Btch ID:	VG39C10	% Moisture :	NA
Calib. Ref.:	EC21003A	Instrument ID :	GCT039

PARAMETERS	RESULTS (mg/L)	LOQ (mg/L)	DL (mg/L)	LOD (mg/L)
GASOLINE	ND	0.10	0.010	0.020

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
4-BROMOFLUOROBENZENE	0.0308	0.04000	77.0	69-133

Parameter	H-C Range
Gasoline	C6-C10

SL 3/31/16

LDC #: 36282C7 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/10/16

SDG #: 16C129 Standard Page: 1 of 1

Laboratory: EMAX Laboratories Inc. Reviewer: [illegible]

2nd Reviewer: [illegible]

METHOD: GC TPH as Gasoline (EPA SW 846 Method 8015B)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	Initial calibration/ICV	A / A	
III.	Continuing calibration	A	
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	SB = 1 TB = 2
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	QC samples
VIII.	Laboratory control samples	A	LCS/LD
IX.	Field duplicates	N	
X.	Compound quantitation RL/LOQ/LODs	N	
XI.	Target compound identification	N	
XII	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-042	16C129-19	Water	03/15/16
2	KCH067-043	16C129-20	Water	03/15/16
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				

Notes:

	MBLK1W						

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 13, 2016

Parameters: Total Petroleum Hydrocarbons as Extractables

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C129

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-032**	16C129-09**	Soil	03/15/16
KCH067-033	16C129-10	Soil	03/15/16
KCH067-041	16C129-18	Water	03/15/16
KCH067-042	16C129-19	Water	03/15/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Total Petroleum Hydrocarbons (TPH) as Extractables by Environmental Protection Agency (EPA) SW 846 Method 8015B

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for all compounds.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 20.0% for all compounds.

IV. Laboratory Blanks

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

V. Field Blanks

Sample KCH067-041 was identified as an equipment blank. No contaminants were found.

Sample KCH067-042 was identified as a source blank. No contaminants were found.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

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

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

China Lake CTO 067
Total Petroleum Hydrocarbons as Extractables - Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

China Lake CTO 067
Total Petroleum Hydrocarbons as Extractables - Laboratory Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

China Lake CTO 067
Total Petroleum Hydrocarbons as Extractables - Field Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/21/16 11:25
Sample ID	: KCH067-032	Date Analyzed:	03/21/16 15:36
Lab Samp ID	: C129-09	Dilution Factor:	1
Lab File ID	: LC21014A	Matrix	: SOIL
Ext Btch ID	: DSC017S	% Moisture	: 1.7
Calib. Ref.	: LC21009A	Instrument ID	: D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	ND	10	2.5	5.1
JP-5	ND	20	2.5	5.1
MOTOR OIL	6.5J	20	2.5	5.1

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	99.8	101.7	98.1	60-130
HEXACOSANE	30.4	25.43	119	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

3/25/16

METHOD SW3550B/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/21/16 11:25
Sample ID:	KCH067-033	Date Analyzed:	03/21/16 15:52
Lab Samp ID:	C129-10	Dilution Factor:	1
Lab File ID:	LC21015A	Matrix :	SOIL
Ext Btch ID:	DSC017S	% Moisture :	1.5
Calib. Ref.:	LC21009A	Instrument ID :	D5

PARAMETERS	RESULTS (mg/kg)	LOQ (mg/kg)	DL (mg/kg)	LOD (mg/kg)
DIESEL	ND	10	2.5	5.1
JP-5	ND	20	2.5	5.1
MOTOR OIL	ND	20	2.5	5.1

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	100	101.5	98.8	60-130
HEXACOSANE	29.7	25.38	117	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

3/25/16

METHOD SW3520C/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/17/16 13:45
Sample ID:	KCH067-041	Date Analyzed:	03/18/16 16:16
Lab Samp ID:	C129-18	Dilution Factor:	1
Lab File ID:	LC18020A	Matrix :	WATER
Ext Btch ID:	DSC015W	% Moisture :	NA
Calib. Ref.:	LC18016A	Instrument ID :	D5

PARAMETERS	RESULTS (mg/L)	LOQ (mg/L)	DL (mg/L)	LOD (mg/L)
DIESEL	ND	0.50	0.050	0.10
JP-5	ND	0.50	0.050	0.10
MOTOR OIL	ND	0.50	0.050	0.10

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	0.965	1.000	96.5	60-130
HEXACOSANE	0.249	0.2500	99.4	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

3/25/16

METHOD SW3520C/8015B
TOTAL PETROLEUM HYDROCARBONS BY EXTRACTION

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/17/16 13:45
Sample ID:	KCH067-042	Date Analyzed:	03/18/16 16:33
Lab Samp ID:	C129-19	Dilution Factor:	1
Lab File ID:	LC18021A	Matrix :	WATER
Ext Btch ID:	DSC015W	% Moisture :	NA
Calib. Ref.:	LC18016A	Instrument ID :	D5

PARAMETERS	RESULTS (mg/L)	LOQ (mg/L)	DL (mg/L)	LOD (mg/L)
DIESEL	ND	0.50	0.050	0.10
JP-5	ND	0.50	0.050	0.10
MOTOR OIL	ND	0.50	0.050	0.10

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
BROMOBENZENE	0.972	1.000	97.2	60-130
HEXACOSANE	0.247	0.2500	98.7	60-130

Parameter	H-C Range
Diesel	C10-C24
JP-5	C8-C18

3/25/16

LDC #: 36282C8 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/10/16
SDG #: 16C129 Standard/Full Page: 1 of 1
Laboratory: EMAX Laboratories Inc. Reviewer: EJ
2nd Reviewer: A

METHOD: GC TPH as Extractables (EPA SW 846 Method 8015B)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	Initial calibration/ICV	A / A	%RSD / ICV ≤20
III.	Continuing calibration	A	CCV ≤20
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	EB = 3 SB = 4
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	N	CS
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	
X.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Standard validation.
XI.	Target compound identification	A	Not reviewed for Standard validation.
XII.	Overall assessment of data	A	

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

	Client ID		Lab ID	Matrix	Date
1	KCH067-032**		16C129-09**	Soil	03/15/16
2	KCH067-033		16C129-10	Soil	03/15/16
3	KCH067-041	EB	16C129-18	Water	03/15/16
4	KCH067-042	SB	16C129-19	Water	03/15/16
5					
6					
7					
8					
9					
10					
11					
12					
13					

Notes:

1	MBLK1S						
	MBLK1W						

LDC #: 36282 CS

VALIDATION FINDINGS CHECKLIST

Reviewer: FZ
2nd Reviewer: AC

Method: ✓ GC _____ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
IIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥0.990?			✓	
Were the RT windows properly established?	✓			
IIb. Initial calibration verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) < 20% or percent recoveries (%R) 80-120%?	✓			
III. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) ≤ 20% or percent recoveries (%R) 80-120%?	✓			
Were all the retention times within the acceptance windows?	✓			
IV. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. Field Blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VI. Surrogate spikes				
Were all surrogate percent recovery (%R) within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.			✓	
Was a MS/MSD analyzed every 20 samples of each matrix?			✓	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	

LDC #: 36282C8

VALIDATION FINDINGS CHECKLIST

Page: 2 of 2
Reviewer: EJ
2nd Reviewer: AV

Validation Area	Yes	No	NA	Findings/Comments
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?		✓		
X. Compound quantitation				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC #: 36282 c8

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: FT
2nd Reviewer: A

METHOD: GC ✓ HPLC ____

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C
Average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where: A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (500std)	Recalculated CF (500std)	Reported CF (initial)	Recalculated CF (intial)	Reported %RSD	Recalculated %RSD
1	ICAL	3/9/16	Diesel C10-C24	33825	33825	31896.9	31896.9	12.9	12.9
2									
3									
4									

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

LDC #: 36282c5

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: FT
2nd Reviewer: AR

METHOD: GC ✓ HPLC _____

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

% Difference = 100 * (ave. CF -CF)/ave.CF

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(ICAL)/ CCV Conc.	Reported CF/ Conc. CCV	Recalculated CF/ Conc. CCV	Reported %D	Recalculated %D
1	CCV 1250	3/21/16	Diesel C10 - C24	500.0	442.28	442.28	12	12
2								
3								
4								

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

LDC #: 36282cg

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: FT
2nd reviewer: AK

METHOD: ✓ GC ___ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #1

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
Bromobenzene	/	100	98.07	98.1	98.1	0
Hexacosane	/	25	29.873	~~119~~ 119	119	U

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound
A	Chlorobenzene (CBZ)	G	Octacosane	M	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	Y	Tetrachloro-m- xylene
B	4-Bromofluorobenzene (BFB)	H	Ortho-Terphenyl	N	Terphenyl-D14	T	3,4-Dinitrotoluene	Z	2-Bromonaphthalene
C	a,a,a-Trifluorotoluene	I	Fluorobenzene (FBZ)	O	Decachlorobiphenyl (DCB)	U	Tripentyltin	AA	Chloro-octadecane
D	Bromochlorobenene	J	n-Triacontane	P	1-methylnaphthalene	V	Tri-n-propyltin	BB	2,4-Dichlorophenylacetic acid
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate	CC	2,5-Dibromotoluene
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate		

LDC #: 36282C8

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: FT
2nd Reviewer: AC

METHOD: ✓ GC ___HPLC

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

%Recovery = 100 * (SSC/SA)
RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

Where SSC = Spiked sample concentration
LCS = Laboratory Control Sample
SA = Spike added
LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: DSC0175L/SC

Compound	Spike Added (mg/kg)		Spike Sample Concentration (mg/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)	500	500	495	511	99	99	102	102	3	3
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)										
2,4,6-Trinitrotoluene (8330)										
Phorate (8141A)										
Malathion (8141A)										
Formaldehyde (8315A)										

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

LDC #: 36282cf

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: ___ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= $\frac{(A)(Fv)(Df)}{(RF)(Vs \text{ or } Ws)(\%S/100)}$

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. #1 Compound Name Malor 6:1

Concentration = $\frac{126429 \quad (10)}{19873.41117 \quad (10.03)(0.983)}$ =

= 6.5 mg/kg

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 11, 2016

Parameters: Explosives

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C129

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-032**	16C129-09**	Soil	03/15/16
KCH067-033	16C129-10	Soil	03/15/16
KCH067-034	16C129-11	Soil	03/15/16
KCH067-035	16C129-12	Soil	03/15/16
KCH067-036	16C129-13	Soil	03/15/16
KCH067-037	16C129-14	Soil	03/15/16
KCH067-038	16C129-15	Soil	03/15/16
KCH067-039	16C129-16	Soil	03/15/16
KCH067-040	16C129-17	Soil	03/15/16
KCH067-041	16C129-18	Water	03/15/16
KCH067-042	16C129-19	Water	03/15/16
KCH067-035MS	16C129-12MS	Soil	03/15/16
KCH067-035MSD	16C129-12MSD	Soil	03/15/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Explosives by Environmental Protection Agency (EPA) SW 846 Method 8330A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all compounds.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 15.0% for all compounds.

Retention time windows were established as required by the method for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

III. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 15.0% for all compounds.

Retention times of all compounds in the calibration standards were within the established retention time windows for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

IV. Laboratory Blanks

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

V. Field Blanks

Sample KCH067-041 was identified as an equipment blank. No contaminants were found.

Sample KCH067-042 was identified as a source blank. No contaminants were found.

VI. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation.

The sample results for detected compounds from the two columns were within 40% relative percent difference (RPD) with the following exceptions:

Sample	Compound	RPD	Flag	A or P
KCH067-034	HMX	46	J (all detects)	A

Raw data were not reviewed for Level III validation.

XI. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XII. Overall Assessment of Data

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

Due to RPD between two columns, data were qualified as estimated in one sample.

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

China Lake CTO 067
Explosives - Data Qualification Summary - SDG 16C129

Sample	Compound	Flag	A or P	Reason (Code)
KCH067-034	HMX	J (all detects)	A	Compound quantitation (RPD between two columns) (12)

China Lake CTO 067
Explosives - Laboratory Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

China Lake CTO 067
Explosives - Field Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/22/16 15:17
Sample ID	: KCH067-032	Date Analyzed:	03/23/16 18:50
Lab Samp ID	: C129-09	Dilution Factor:	1
Lab File ID	: XC23012A	Matrix :	SOIL
Ext Btch ID	: EXC008S	% Moisture :	NA
Calib. Ref.	: XC23002A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2110	2000	106	60-140

Note: All positive results are confirmed by Biphenyl column

3/25/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/22/16 15:17
Sample ID:	KCH067-033	Date Analyzed:	03/23/16 19:34
Lab Samp ID:	C129-10	Dilution Factor:	1
Lab File ID:	XC23013A	Matrix :	SOIL
Ext Btch ID:	EXC008S	% Moisture :	NA
Calib. Ref.:	XC23002A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2040	2000	102	60-140

Note: All positive results are confirmed by Biphenyl column

3/25/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/22/16 15:17
Sample ID:	KCH067-034	Date Analyzed:	03/23/16 22:14
Lab Samp ID:	C129-11	Dilution Factor:	1
Lab File ID:	XC23017A	Matrix :	SOIL
Ext Btch ID:	EXC008S	% Moisture :	NA
Calib. Ref.:	XC23015A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	54J J(12)	400	50	100
RDX	120J	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2090	2000	104	60-140

Note: All positive results are confirmed by Biphenyl column

Dos1716

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/22/16 15:17
Sample ID	: KCH067-035	Date Analyzed:	03/23/16 22:50
Lab Samp ID	: C129-12	Dilution Factor:	1
Lab File ID	: XC23018A	Matrix :	SOIL
Ext Btch ID	: EXC008S	% Moisture :	NA
Calib. Ref.	: XC23015A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	140J	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2060	2000	103	60-140

Note: All positive results are confirmed by Biphenyl column

3/25/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/22/16 15:17
Sample ID	: KCH067-036	Date Analyzed:	03/24/16 00:54
Lab Samp ID	: C129-13	Dilution Factor:	1
Lab File ID	: XC23021A	Matrix :	SOIL
Ext Btch ID	: EXC008S	% Moisture :	NA
Calib. Ref.	: XC23015A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2080	2000	104	60-140

Note: All positive results are confirmed by Biphenyl column

3/25/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/22/16 15:17
Sample ID:	KCH067-037	Date Analyzed:	03/24/16 01:30
Lab Samp ID:	C129-14	Dilution Factor:	1
Lab File ID:	XC23022A	Matrix :	SOIL
Ext Btch ID:	EXC008S	% Moisture :	NA
Calib. Ref.:	XC23015A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2110	2000	106	60-140

Note: All positive results are confirmed by Biphenyl column

3/25/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/22/16 15:17
Sample ID:	KCH067-038	Date Analyzed:	03/24/16 02:14
Lab Samp ID:	C129-15	Dilution Factor:	1
Lab File ID:	XC23023A	Matrix :	SOIL
Ext Btch ID:	EXC008S	% Moisture :	NA
Calib. Ref.:	XC23015A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2080	2000	104	60-140

Note: All positive results are confirmed by Biphenyl column

SL 05/17/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/22/16 15:17
Sample ID:	KCH067-039	Date Analyzed:	03/24/16 02:50
Lab Samp ID:	C129-16	Dilution Factor:	1
Lab File ID:	XC23024A	Matrix :	SOIL
Ext Btch ID:	EXC008S	% Moisture :	NA
Calib. Ref.:	XC23015A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2010	2000	100	60-140

Note: All positive results are confirmed by Biphenyl column

4/25/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/22/16 15:17
Sample ID:	KCH067-040	Date Analyzed:	03/24/16 03:33
Lab Samp ID:	C129-17	Dilution Factor:	1
Lab File ID:	XC23025A	Matrix :	SOIL
Ext Btch ID:	EXC008S	% Moisture :	NA
Calib. Ref.:	XC23015A	Instrument ID :	T-081

PARAMETERS	RESULTS (ug/kg)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)
HMX	ND	400	50	100
RDX	ND	400	50	100
1,3,5-TNB	ND	400	50	100
1,3-DNB	ND	400	50	100
TETRYL	ND	400	57	100
NITROBENZENE	ND	400	50	100
2,4,6-TNT	ND	400	50	100
4-AM-2,6-DNT	ND	400	50	100
2-AM-4,6-DNT	ND	400	50	100
2,6-DNT	ND	400	56	100
2,4-DNT	ND	400	55	100
2-NITROTOLUENE	ND	400	76	200
3-NITROTOLUENE	ND	400	95	200
4-NITROTOLUENE	ND	400	99	200

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	2070	2000	103	60-140

Note: All positive results are confirmed by Biphenyl column

8/25/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/21/16 16:05
Sample ID:	KCH067-041	Date Analyzed:	03/23/16 15:35
Lab Samp ID:	C129-18	Dilution Factor:	1
Lab File ID:	XC23007A	Matrix	: WATER
Ext Btch ID:	EXC009W	% Moisture	: NA
Calib. Ref.:	XC23002A	Instrument ID	: T-081

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
HMX	ND	1.0	0.10	0.20
RDX	ND	1.0	0.16	0.40
1,3,5-TNB	ND	1.0	0.10	0.20
1,3-DNB	ND	1.0	0.10	0.20
TETRYL	ND	1.0	0.10	0.20
NITROBENZENE	ND	1.0	0.10	0.20
2,4,6-TNT	ND	1.0	0.16	0.40
4-AM-2,6-DNT	ND	1.0	0.20	0.20
2-AM-4,6-DNT	ND	1.0	0.10	0.20
2,6-DNT	ND	1.0	0.10	0.20
2,4-DNT	ND	1.0	0.12	0.20
2-NITROTOLUENE	ND	1.0	0.11	0.20
3-NITROTOLUENE	ND	1.0	0.16	0.40
4-NITROTOLUENE	ND	1.0	0.10	0.20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	4.15	4.000	104	60-140

Note: All positive results are confirmed by Biphenyl column

3/25/16

METHOD SW8330A
EXPLOSIVES

Client	: KLEINFELDER	Date Collected:	03/15/16
Project	: NAWS CHINA LAKE, CTO 067	Date Received:	03/17/16
Batch No.	: 16C129	Date Extracted:	03/21/16 16:05
Sample ID	: KCH067-042	Date Analyzed:	03/23/16 16:11
Lab Samp ID	: C129-19	Dilution Factor:	1
Lab File ID	: XC23008A	Matrix	: WATER
Ext Btch ID	: EXC009W	% Moisture	: NA
Calib. Ref.	: XC23002A	Instrument ID	: T-081

PARAMETERS	RESULTS (ug/L)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)
HMX	ND	1.0	0.10	0.20
RDX	ND	1.0	0.16	0.40
1,3,5-TNB	ND	1.0	0.10	0.20
1,3-DNB	ND	1.0	0.10	0.20
TETRYL	ND	1.0	0.10	0.20
NITROBENZENE	ND	1.0	0.10	0.20
2,4,6-TNT	ND	1.0	0.16	0.40
4-AM-2,6-DNT	ND	1.0	0.20	0.20
2-AM-4,6-DNT	ND	1.0	0.10	0.20
2,6-DNT	ND	1.0	0.10	0.20
2,4-DNT	ND	1.0	0.12	0.20
2-NITROTOLUENE	ND	1.0	0.11	0.20
3-NITROTOLUENE	ND	1.0	0.16	0.40
4-NITROTOLUENE	ND	1.0	0.10	0.20

SURROGATE PARAMETERS	RESULTS	SPK_AMT	% RECOVERY	QC LIMIT
3,4-DINITROTOLUENE	3.96	4.000	99.1	60-140

Note: All positive results are confirmed by Biphenyl column

3/31/16

LDC #: 36282C40 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/10/16
SDG #: 16C129 Standard/Full Page: 1 of 1
Laboratory: EMAX Laboratories Inc. Reviewer: EJ
2nd Reviewer: [illegible]

METHOD: HPLC Explosives (EPA SW 846 Method 8330A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A/A	
II.	Initial calibration/ICV	A/A	%D RSD ≤20 ICV ≤15
III.	Continuing calibration	A	CCV ≤15
IV.	Laboratory Blanks	A	
V.	Field blanks	ND	EB=10 SB=11
VI.	Surrogate spikes	A	
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS/D
IX.	Field duplicates	N	
X.	Compound quantitation RL/LOQ/LODs	SW	Not reviewed for Standard validation.
XI.	Target compound identification	A	Not reviewed for Standard validation.
XII.	System performance	A	Not reviewed for Standard validation.
XIII.	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-032**	16C129-09**	Soil	03/15/16
2	KCH067-033	16C129-10	Soil	03/15/16
3	KCH067-034	16C129-11	Soil	03/15/16
4	KCH067-035	16C129-12	Soil	03/15/16
5	KCH067-036	16C129-13	Soil	03/15/16
6	KCH067-037	16C129-14	Soil	03/15/16
7	KCH067-038	16C129-15	Soil	03/15/16
8	KCH067-039	16C129-16	Soil	03/15/16
9	KCH067-040	16C129-17	Soil	03/15/16
10	KCH067-041	16C129-18	Water	03/15/16
11	KCH067-042	16C129-19	Water	03/15/16
12	KCH067-035MS	16C129-12MS	Soil	03/15/16
13	KCH067-035MSD	16C129-12MSD	Soil	03/15/16
14				
15	MBLK1S			
16	MBLK1W			

LDC #: 36282c40

VALIDATION FINDINGS CHECKLIST

Reviewer: R
2nd Reviewer: M

Method: ____ GC ✓ HPLC

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
IIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?	✓			
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit acceptance criteria of ≥0.990?		✓		
Were the RT windows properly established?	✓			
IIb. Initial calibration verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) < 15%?	✓			
III. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) < 15%?	✓			
Were all the retention times within the acceptance windows?	✓			
IV. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
V. Field Blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VI. Surrogate spikes				
Were all surrogate percent recovery (%R) within the QC limits?	✓			
If the percent recovery (%R) of one or more surrogates was outside QC limits, was a reanalysis performed to confirm %R?			✓	
If any %R was less than 10 percent, was a reanalysis performed to confirm %R?			✓	
VII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			

LDC #: 36282C40

VALIDATION FINDINGS CHECKLIST

Reviewer: FD
2nd Reviewer: MC

Validation Area	Yes	No	NA	Findings/Comments
VIII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Field duplicates				
Were field duplicate pairs identified in this SDG?		✓		
Were target compounds detected in the field duplicates?			✓	
X. Compound quantitation				
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. Target compound identification				
Were the retention times of reported detects within the RT windows?	✓			
XII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

VALIDATION FINDINGS WORKSHEET

METHOD: ____GC ____HPLC

8310	8330	8151	8141	8141 (Con't)	8021B
A. Acenaphthene	A. HMX	A. 2,4-D	A. Dichlorvos	V. Fensulfothion	V. Benzene
B. Acenaphthylene	B. RDX	B. 2,4-DB	B. Mevinphos	W. Bolstar	CC. Toluene
C. Anthracene	C. 1,3,5-Trinitrobenzene	C. 2,4,5-T	C. Demeton-O	X. EPN	EE. Ethyl Benzene
D. Benzo(a)anthracene	D. 1,3-Dinitrobenzene	D. 2,4,5-TP	D. Demeton-S	Y. Azinphos-methyl	SSS. O-Xylene
E. Benzo(a)pyrene	E. Tetryl	E. Dinoseb	E. Ethoprop	Z. Coumaphos	RRR. MP-Xylene
F. Benzo(b)fluoranthene	F. Nitrobenzene	F. Dichlorprop	F. Naled	AA. Parathion	GG. Total Xylene
G. Benzo(g,h,i)perylene	G. 2.4.6-Trinitrotoluene	G. Dicamba	G. Sulfotep	BB. Trichloronate	
H. Benzo(k)fluoranthene	H. 4-Amino-2,6-dinitrotoluene	H. Dalapon	H. Phorate	CC. Trichlorinate	
I. Chrysene	I. 2-Amino-4,6-dinitrotoluene	I. MCPP	I. Dimethoate	DD. Trifluralin	
J. Dibenz(a,h)anthracene	J. 2,4-Dinitrotolune	J. MCPA	J. Diazinon	EE. Def	
K. Fluoranthene	K. 2,6-Dinitrotoluene	K. Pentachlorophenol	K. Disulfoton	FF. Prowl	
L. Fluorene	L. 2-Nitrotoluene	L.. 2,4,5-TP (silvex)	L. Parathion-methyl	GG. Ethion	
M. Indeno(1,2,3-cd)pyrene	M. 3-Nitrotoluene	M. Silvex	M. Ronnel		
N. Naphthalene	N. 4-Nitrotoluene		N. Malathion		
O. Phenanthrene	O.		O. Chlorpyrifos		
P. Pyrene	P.		P. Fenthion		
Q.	Q		Q. Parathion-ethyl		
R.			R. Trichlornate		
S.			S. Merphos		
			T. Stirofos		
			U. Tokuthion		

Notes:_____

LDC #: 36282C40

VALIDATION FINDINGS WORKSHEET
Compound Quantitation and Reported CRQLs

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: ~~GC~~ HPLC

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

Level IV/D Only

Y N N/A Were CRQLs adjusted for sample dilutions, dry weight factors, etc.?

Y N N/A Did the reported results for detected target compounds agree within 10.0% of the recalculated results?

Code = 12

#	Associated Samples	Compound Name	%RPD Bet 2 columns ≤ 40 Findings	Qualifications
	3	A	46	J det / A

Comments: See sample calculation verification worksheet for recalculations

LDC #: 36282C40

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC ~~(HPLC)~~ HPLC

The calibration factors (CF) and relative standard deviation (%RSD) were recalculated using the following calculations:

CF = A/C
Average CF = sum of the CF/number of standards
%RSD = 100 * (S/X)

Where: A = Area of compound
C = Concentration of compound
S = Standard deviation of calibration factors
X = Mean of calibration factors

#	Standard ID	Calibration Date	Compound	Reported CF (100 std)	Recalculated CF (100 std)	Reported CF (initial)	Recalculated CF (intial)	Reported %RSD	Recalculated %RSD
1	ICAL	1/27/16	HMX (C18)	145	145.15	151.7	151.7	6.9	6.9
			2,4,6 TNT	430	429.84	410.8	410.8	6.3	6.3
2	ICAL	1/20/16	HMX (Biphenyl)	124	123.6	122.9	122.9	9.8	9.8
			2,4,6 TNT	321	320.7	322.0	322.0	6.1	6.1
3									
4									

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

LDC #: 36282C40

VALIDATION FINDINGS WORKSHEET
Continuing Calibration Results Verification

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: GC ~~X~~ (HPLC)

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

% Difference = 100 * (ave. CF -CF)/ave.CF

Where: ave. CF = initial calibration average CF
CF = continuing calibration CF
A = Area of compound
C = Concentration of compound

#	Standard ID	Calibration Date	Compound	Average CF(ICAL)/ CCV Conc.	Reported CF/ Conc. CCV	Recalculated CF/ Conc. CCV	Reported %D	Recalculated %D
1	CCV 12:55	3/23/16	HMX (C18)	400.0	~~425.88~~ ~~151.7~~ F7	425.38	6	6
			2,4,6-TNT	400.0	428.11	428.11	7	7
2	CCV 13:15	3/28/16	(Biphenyl)	200.0	219.63	219.63	10	10
			↓	200.0	191.47	191.47	4	4
3								
4								

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

LDC #: 36282C40

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Page: 1 of 1
Reviewer: FT
2nd reviewer: [illegible]

METHOD: ___ GC ___ HPLC

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: #1

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	
3,4- DinitroToluene	C-18 (Ch A)	200	211.2	106	106	0

Sample ID: _____

Surrogate	Column/Detector	Surrogate Spiked	Surrogate Found	Percent Recovery	Percent Recovery	Percent Difference
				Reported	Recalculated	

	Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound		Surrogate Compound
A	Chlorobenzene (CBZ)	G	Octacosane	M	Benzo(e)Pyrene	S	1-Chloro-3-Nitrobenzene	Y	Tetrachloro-m- xylene
B	4-Bromofluorobenzene (BFB)	H	Ortho-Terphenyl	N	Terphenyl-D14	T	3,4-Dinitrotoluene	Z	2-Bromonaphthalene
C	a,a,a-Trifluorotoluene	I	Fluorobenzene (FBZ)	O	Decachlorobiphenyl (DCB)	U	Tripentyltin	AA	Chloro-octadecane
D	Bromochlorobenene	J	n-Triacontane	P	1-methylnaphthalene	V	Tri-n-propyltin	BB	2,4-Dichlorophenylacetic acid
E	1,4-Dichlorobutane	K	Hexacosane	Q	Dichlorophenyl Acetic Acid (DCAA)	W	Tributyl Phosphate	CC	2,5-Dibromotoluene
F	1,4-Difluorobenzene (DFB)	L	Bromobenzene	R	4-Nitrophenol	X	Triphenyl Phosphate		

LDC #: 36282C40

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: ___ GC ___ HPLC

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

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

RPD =(({SSCMS - SSCMSD} * 2) / (SSCMS + SSCMSD))*100

Where
SSC = Spiked sample concentration
SC = Sample concentration
SA = Spike added
MS = Matrix spike
MSD = Matrix spike duplicate

MS/MSD samples: 12 + 13

Compound		Spike Added (ug/kg)		Sample Conc. (ug/kg)	Spike Sample Concentration (ug/kg)		Matrix spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
		MS	MSD	---	MS	MSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline	(8015)											
Diesel	(8015)											
Benzene	(8021B)											
Methane	(RSK-175)											
2,4-D	(8151)											
Dinoseb	(8151)											
Naphthalene	(8310)											
Anthracene	(8310)											
HMX	(8330)	2000	2000	ND	2070	2090	103	103	104	104	1	1
2,4,6-Trinitrotoluene	(8330)	↓	↓	↓	1920	1970	96	96	99	99	3	3
Phorate	(8141A)											
Malathion	(8141A)											
Formaldehyde	(8315A)											

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

LDC #: 36282c40

VALIDATION FINDINGS WORKSHEET

Laboratory Control Sample/Laboratory Control Sample Duplicates Results Verification

Reviewer: FT

2nd Reviewer: AC

METHOD: ~~GC~~ HPLC

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

%Recovery = 100 * (SSC/SA)
RPD =(({SSCLCS - SSCLCSD} * 2) / (SSCLCS + SSCLCSD))*100

Where SSC = Spiked sample concentration
LCS = Laboratory Control Sample
SA = Spike added
LCSD = Laboratory Control Sample duplicate

LCS/LCSD samples: EXC0085L/SC

Compound	Spike Added (ug/kg)		Spike Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc.	Reported	Recalc.	Reported	Recalc.
Gasoline (8015)										
Diesel (8015)										
Benzene (8021B)										
Methane (RSK-175)										
2,4-D (8151)										
Dinoseb (8151)										
Naphthalene (8310)										
Anthracene (8310)										
HMX (8330)	2000	2000	2250	2210	112	112	111	111	2	2
2,4,6-Trinitrotoluene (8330)	2000	2000	2020	1930	101	101	96	96	5	5
Phorate (8141A)										
Malathion (8141A)										
Formaldehyde (8315A)										

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

LDC #: 36282CY0

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: __ GC __ HPLC

Y N N/A Were all reported results recalculated and verified for all level IV samples?
Y N N/A Were all recalculated results for detected target compounds within 10% of the reported results?

Concentration= (A)(Fv)(Df) / (RF)(Vs or Ws)(%S/100)

A= Area or height of the compound to be measured
Fv= Final Volume of extract
Df= Dilution Factor
RF= Average response factor of the compound In the initial calibration
Vs= Initial volume of the sample
Ws= Initial weight of the sample
%S= Percent Solid

Example:

Sample ID. EXC009SL (LCS) Compound Name HMX

Concentration = (34100)(20) / (151.7)(2) =

= 2248 ug/kg

#	Sample ID	Compound	Reported Concentrations ( )	Recalculated Results Concentrations ( )	Qualifications

Comments: _____

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 12, 2016

Parameters: Perchlorate

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): 16C129

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-032**	16C129-09**	Soil	03/15/16
KCH067-033	16C129-10	Soil	03/15/16
KCH067-034	16C129-11	Soil	03/15/16
KCH067-035	16C129-12	Soil	03/15/16
KCH067-036	16C129-13	Soil	03/15/16
KCH067-037	16C129-14	Soil	03/15/16
KCH067-038	16C129-15	Soil	03/15/16
KCH067-039	16C129-16	Soil	03/15/16
KCH067-040	16C129-17	Soil	03/15/16
KCH067-041	16C129-18	Water	03/15/16
KCH067-042	16C129-19	Water	03/15/16
KCH067-035MS	16C129-12MS	Soil	03/15/16
KCH067-035MSD	16C129-12MSD	Soil	03/15/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perchlorate by Environmental Protection Agency (EPA) SW 846 Method 6850

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance check was performed prior to initial calibration.

All perchlorate ion signal to noise ratio requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

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

The isotope ratios were within QC limits.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 15.0% for all compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 15.0% for all compounds.

The percent differences (%D) of the limit of detection verification (LODV) standard were less than or equal to 30.0%.

The isotope ratios were within QC limits.

V. Laboratory Blanks

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

VI. Field Blanks

Sample KCH067-041 was identified as an equipment blank. No contaminants were found.

Sample KCH067-042 was identified as a source blank. No contaminants were found.

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Internal Standards

All internal standard areas and retention times were within QC limits.

XI. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

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

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

China Lake CTO 067
Perchlorate - Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

China Lake CTO 067
Perchlorate - Laboratory Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

China Lake CTO 067
Perchlorate - Field Blank Data Qualification Summary - SDG 16C129

No Sample Data Qualified in this SDG

METHOD SW6850
PERCHLORATE

Client : KLEINFELDER
Project : NAWS CHINA LAKE, CTO 067
Batch No. : 16C129

Matrix : SOIL
InstrumentID : G0

Client SAMPLE ID	EMAX SAMPLE ID	RESULT (ug/kg)	DIL'N. FACTOR	MOIST (%)	LOQ (ug/kg)	DL (ug/kg)	LOD (ug/kg)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1S	PLC003SB	ND	1	NA	4	0.5	1	03/21/1616:10	03/21/1610:30	16MC21008	MC21004	16PLC003S	NA	NA
LCS1S	PLC003SL	4.36	1	NA	4	0.5	1	03/21/1616:25	03/21/1610:30	16MC21009	MC21004	16PLC003S	NA	NA
KCH067-032	C129-09	2.32J	1	1.7	4.07	0.509	1.02	03/21/1616:54	03/21/1610:30	16MC21011	MC21004	16PLC003S	03/15/1611:20	03/17/16
LCD1S	PLC003SC	4.52	1	NA	4	0.5	1	03/21/1617:11	03/21/1610:30	16MC21012	MC21004	16PLC003S	NA	NA
KCH067-033	C129-10	ND	1	1.5	4.06	0.508	1.02	03/21/1617:26	03/21/1610:30	16MC21013	MC21004	16PLC003S	03/15/1611:35	03/17/16
KCH067-034	C129-11	1.99J	1	0.4	4.02	0.502	1	03/21/1617:41	03/21/1610:30	16MC21014	MC21004	16PLC003S	03/15/1612:10	03/17/16
KCH067-035	C129-12	ND	1	0.5	4.02	0.503	1.01	03/21/1617:55	03/21/1610:30	16MC21015	MC21004	16PLC003S	03/15/1612:15	03/17/16
KCH067-035MS	C129-12M	4.86	1	0.5	4.02	0.503	1.01	03/21/1618:10	03/21/1610:30	16MC21016	MC21004	16PLC003S	03/15/1612:15	03/17/16
KCH067-035MSD	C129-12S	4.86	1	0.5	4.02	0.503	1.01	03/21/1618:39	03/21/1610:30	16MC21018	MC21004	16PLC003S	03/15/1612:15	03/17/16
KCH067-036	C129-13	ND	1	2.3	4.09	0.512	1.02	03/21/1619:37	03/21/1610:30	16MC21022	MC21020	16PLC003S	03/15/1612:30	03/17/16
KCH067-037	C129-14	ND	1	1.6	4.07	0.508	1.02	03/21/1619:52	03/21/1610:30	16MC21023	MC21020	16PLC003S	03/15/1612:40	03/17/16
KCH067-038	C129-15	ND	1	1.3	4.05	0.507	1.01	03/21/1620:07	03/21/1610:30	16MC21024	MC21020	16PLC003S	03/15/1612:50	03/17/16
KCH067-039	C129-16	ND	1	1.1	4.04	0.506	1.01	03/21/1620:21	03/21/1610:30	16MC21025	MC21020	16PLC003S	03/15/1613:00	03/17/16
KCH067-040	C129-17	ND	1	1.0	4.04	0.505	1.01	03/21/1620:36	03/21/1610:30	16MC21026	MC21020	16PLC003S	03/15/1613:05	03/17/16

N051716

METHOD SW6850
PERCHLORATE

Client : KLEINFELDER
Project : NAWS CHINA LAKE, CTO 067
Batch No. : 16C129

Matrix : WATER
InstrumentID : G0

Client SAMPLE ID	EMAX SAMPLE ID	RESULT (ug/L)	DIL'N. FACTOR	MOIST (%)	LOQ (ug/L)	DL (ug/L)	LOD (ug/L)	ANALYSIS DATETIME	PREPARATION DATETIME	DATA FILE ID	CAL REF	PREP BATCH	COLLECTION DATETIME	RECEIVED DATETIME
MBLK1W	PLC006WB	ND	1	NA	0.5	0.1	0.2	03/23/1611:28	NA	16MC23007	MC23004	16PLC006W	NA	NA
LCS1W	PLC006WL	0.588	1	NA	0.5	0.1	0.2	03/23/1611:45	NA	16MC23008	MC23004	16PLC006W	NA	NA
LCD1W	PLC006WC	0.550	1	NA	0.5	0.1	0.2	03/23/1611:59	NA	16MC23009	MC23004	16PLC006W	NA	NA
KCH067-041	C129-18	ND	1	NA	0.5	0.1	0.2	03/23/1613:56	NA	16MC23017	MC23004	16PLC006W	03/15/1614:00	03/17/16
KCH067-042	C129-19	ND	1	NA	0.5	0.1	0.2	03/23/1614:11	NA	16MC23018	MC23004	16PLC006W	03/15/1614:40	03/17/16

RJ 5/7/6

8003

LDC #: 36282C87 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/10/16
SDG #: 16C129 Standard/Full Page: 1 of 2
Laboratory: EMAX Laboratories Inc. Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: LC/MS Perchlorate (EPA SW846 Method 6850)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC/MS Instrument performance check	A	awb tune
III.	Initial calibration/ICV	A / A	r² ICV ≤ 15
IV.	Continuing calibration	A	CCV ≤ 15 LODV ≤ 30
V.	Laboratory Blanks	A	
VI.	Field blanks	ND	EB = 10 SB = 11
VII.	Surrogate spikes	N	not required
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS ID
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Standard validation.
XIII.	Target compound identification	A	Not reviewed for Standard validation.
XIV.	System performance	A	Not reviewed for Standard validation.
XV.	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-032**	16C129-09**	Soil	03/15/16
2	KCH067-033	16C129-10	Soil	03/15/16
3	KCH067-034	16C129-11	Soil	03/15/16
4	KCH067-035	16C129-12	Soil	03/15/16
5	KCH067-036	16C129-13	Soil	03/15/16
6	KCH067-037	16C129-14	Soil	03/15/16
7	KCH067-038	16C129-15	Soil	03/15/16
8	KCH067-039	16C129-16	Soil	03/15/16
9	KCH067-040	16C129-17	Soil	03/15/16
10	KCH067-041 EB	16C129-18	Water	03/15/16
11	KCH067-042 SB	16C129-19	Water	03/15/16
12	KCH067-035MS	16C129-12MS	Soil	03/15/16
13	KCH067-035MSD	16C129-12MSD	Soil	03/15/16

LDC #: 36282C87 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/10/16
SDG #: 16C129 Standard/Full Page: 3 of 2
Laboratory: EMAX Laboratories Inc. Reviewer: F
2nd Reviewer: pl

METHOD: LC/MS Perchlorate (EPA SW846 Method 6850)

	Client ID	Lab ID	Matrix	Date
14				
15				
16				
17				
18				

Notes:

	MBLK1W						
	MBLK1S						

LDC #: 36282c87

VALIDATION FINDINGS CHECKLIST

Page: 1 of 2
Reviewer: EJ
2nd Reviewer: M

Method: Perchlorate (EPA SW 846 Method 6850)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
Were all technical holding times met?	✓			
Was cooler temperature criteria met?	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were the Perchlorate ions within ±0.3 m/z of mass 99,101 and 107?	✓			
IIIa. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20%?			✓	
Was a curve fit used for evaluation? If yes, did the initial calibration meet the curve fit criteria of ≥ 0.990?	✓			
Was the isotope ratio of $^{35}Cl/^{37}Cl$ or m/z 99/101 within 2.3 to 3.8?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 15%?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) of the mid-range continuing calibration ≤ 15%?	✓			
Were all percent differences (%D) of the low-range continuing calibration ≤ 50%?	✓			
Was the isotope ratio of $^{35}Cl/^{37}Cl$ or m/z 99/101 within 2.3 to 3.8?	✓			
V. Laboratory Blanks				
Was a laboratory blank associated with every sample in this SDG?	✓			
Was a laboratory blank analyzed for each matrix and concentration?	✓			
Was there contamination in the laboratory blanks? If yes, please see the Blanks validation completeness worksheet.		✓		
VI. Field blanks				
Were field blanks identified in this SDG?	✓			
Were target compounds detected in the field blanks?		✓		
VIII. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			

LDC #: 36282C87

VALIDATION FINDINGS CHECKLIST

Reviewer: FD
2nd Reviewer: N

Validation Area	Yes	No	NA	Findings/Comments
IX. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
X. Field duplicates				
Were field duplicate pairs identified in this SDG?	✓			
Were target compounds detected in the field duplicates?.	✓			
XI. Internal standards				
Were internal standard area counts within ± 50% of the associated calibration standard?	✓			
Were retention times of m/z 89 ($Cl^{18}O_3^-$) within 0.2 minutes of m/z 83 (ClO_3^-)?	✓			
XII. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and RLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XIII. Target compound identification				
Were relative retention times (RRT's) within 0.98 to 1.02?	✓			
Was the isotope ratio of $^{35}Cl/^{37}Cl$ or m/z 99/101 within 2.3 to 3.8?	✓			
XIV. System performance				
System performance was found to be acceptable.	✓			
XIII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

LDC#: 36282c87
SDG#: see cover

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: FD
2nd Reviewer: AC

Method: LCMS Perchlorate (Method 6850)

Calibration Date	System	Compound	Standard	(Y) Response	(X) Concentration
3/3/2016	LCMS	Perchlorate	1	0.092049784	0.1
			2	0.181001406	0.2
			3	0.473018348	0.5
			4	0.958156512	1
			5	1.944112791	2
			6	4.823551117	5
			7	6.972141437	7.5

Regression Output		*Reported*
Constant	*0.022419*	*-0.002295*
Std Err of Y Est		
R Squared	*0.999451*	*0.999500*
Degrees of Freedom		
X Coefficient(s)	*0.937859*	*0.948471*
Std Err of Coef.		
Correlation Coefficient	*0.999725*	
Coefficient of Determination (r^2)	*0.999451*	*0.999500*

LDC #: 36282c87

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer: M

METHOD: LC/MS Perchlorate (EPA Method 6850)

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

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

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

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	MC21004	3/21/16	Perchlorate	2.0	2.083	2.083	4.15	4.15
2								
3								

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

LDC #: 36282c87

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Page: 1 of 1
Reviewer: FJ
2nd Reviewer:

METHOD: LC/MS perchlorate(EPA Method 6850)

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

% Recovery = 100 * (SSR - SR)/SA Where: SSR = Spiked sample result, SR = Sample result
SA = Spike added

RPD = I MSR - MSDR I * 2/(MSR + MSDR) MSR = Matrix spike percent recovery MSDR = Matrix spike duplicate percent recovery

MS/MSD samples: 12 + 13

Compound	Spike Added (ug/kg)		Sample Concentration (ug/kg)	Spiked Sample Concentration (ug/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		Reported RPD	Recalculated RPD
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	----	----
Perchlorate	4.020	4.020	ND	4.86	4.86	121	121	121	121	0	0

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

LDC #: 36282c87

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: LC/MS Perchlorate (EPA Method 6850)

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

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCS - LCSD I * 2/(LCS + LCSD) LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: lcs10 8012

Compound	Spike Added (ug/kg)		Spiked Sample Concentration (ug/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCSD		LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Perchlorate	4.0	4.0	4.36	4.52	109	109	113	113	4	4

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

LDC #: 36282c87

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: FT
2nd reviewer: M

METHOD: LCMS (EPA SW 846 Method 6850)

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

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

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

Example:

Sample I.D. #1, Perchlorate

Conc. = $\frac{\left(\frac{14409}{135629} + 0.00229468\right)(40)}{(0.948471)(2.007)(0.983}$

=

2.32 ug/kg

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 13, 2016

Parameters: Polychlorinated Dioxins/Dibenzofurans

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 78915

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-005	AZ30248	Soil	03/08/16
KCH067-006	AZ30249	Soil	03/08/16
KCH067-007	AZ30250	Soil	03/08/16
KCH067-008	AZ30251	Soil	03/08/16
KCH067-009	AZ30252	Soil	03/08/16
KCH067-010	AZ30253	Soil	03/08/16
KCH067-011	AZ30254	Soil	03/08/16
KCH067-012	AZ30255	Soil	03/08/16
KCH067-013	AZ30256	Soil	03/08/16
KCH067-014	AZ30257	Soil	03/08/16
KCH067-015	AZ30258	Soil	03/08/16
KCH067-016**	AZ30259**	Soil	03/08/16
KCH067-017	AZ30260	Soil	03/08/16
KCH067-018	AZ30261	Soil	03/08/16
KCH067-019	AZ30262	Water	03/08/16
KCH067-016MS	AZ30259MS	Soil	03/08/16
KCH067-016MSD	AZ30259MSD	Soil	03/08/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review (September 2011). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Dioxins/Dibenzofurans by Environmental Protection Agency (EPA) SW 846 Method 8290A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency.

Retention time windows were established for all homologues. The chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomer was less than or equal to 25%.

The static resolving power was at least 10,000 (10% valley definition).

III. Initial Calibration and Initial Calibration Verification

A five point initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all labeled and unlabeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compounds and labeled compounds for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for unlabeled compounds and less than or equal to 30.0% for labeled compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 20.0% for labeled and less than or equal to 30.0% for unlabeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compounds and labeled compounds for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Laboratory Blank ID	Extraction Date	Compound	Concentration	Associated Samples
160406-MB	04/06/16	OCDD Total HpCDD Total HpCDF Total HxCDF Total PeCDF Total TCDD Total TCDF	1.8 ng/Kg 0.50 ng/Kg 0.25 ng/Kg 0.30 ng/Kg 0.28 ng/Kg 0.088 ng/Kg 0.24 ng/Kg	KCH067-009
160321-MB	03/21/16	1,2,3,4,6,7,8-HpCDD OCDF Total HpCDD Total HxCDF	0.55 ng/Kg 0.36 ng/Kg 0.55 ng/Kg 0.054 ng/Kg	KCH067-005 KCH067-006 KCH067-007 KCH067-008 KCH067-010 KCH067-011 KCH067-012 KCH067-013 KCH067-014 KCH067-015 KCH067-016** KCH067-017 KCH067-018
160318-MB	03/18/16	2,3,4,6,7,8-HxCDF OCDD Total HpCDD Total HpCDF Total HxCDF Total PeCDF Total TCDD Total TCDF	4.2 pg/L 43 pg/L 2.1 pg/L 9.5 pg/L 20 pg/L 1.4 pg/L 1.1 pg/L 2.5 pg/L	All water samples in SDG 78915

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
KCH067-009	Total HpCDD Total TCDD	1.5 ng/Kg 0.29 ng/Kg	1.5J ng/Kg 0.29J ng/Kg
KCH067-005	1,2,3,4,6,7,8-HpCDD Total HpCDD	0.43 ng/Kg 0.56 ng/Kg	0.43U ng/Kg 0.56J ng/Kg
KCH067-006	1,2,3,4,6,7,8-HpCDD Total HpCDD Total HxCDF	0.21 ng/Kg 0.21 ng/Kg 0.21 ng/Kg	0.21U ng/Kg 0.21U ng/Kg 0.21J ng/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
KCH067-007	1,2,3,4,6,7,8-HpCDD OCDF Total HpCDD Total HxCDF	8.1 ng/Kg 7.9 ng/Kg 8.1 ng/Kg 6.2 ng/Kg	8.1J ng/Kg 7.9J ng/Kg 8.1J ng/Kg 6.2J ng/Kg
KCH067-008	1,2,3,4,6,7,8-HpCDD OCDF Total HpCDD Total HxCDF	0.33 ng/Kg 0.22 ng/Kg 0.80 ng/Kg 0.27 ng/Kg	0.33U ng/Kg 0.22U ng/Kg 0.80J ng/Kg 0.27J ng/Kg
KCH067-010	Total HpCDD	0.31 ng/Kg	0.31U ng/Kg
KCH067-011	1,2,3,4,6,7,8-HpCDD Total HpCDD	1.5 ng/Kg 1.5 ng/Kg	1.5J ng/Kg 1.5J ng/Kg
KCH067-012	1,2,3,4,6,7,8-HpCDD Total HpCDD	0.32 ng/Kg 0.32 ng/Kg	0.32U ng/Kg 0.32U ng/Kg
KCH067-014	Total HpCDD Total HxCDF	0.25 ng/Kg 0.27 ng/Kg	0.25U ng/Kg 0.27J ng/Kg
KCH067-015	1,2,3,4,6,7,8-HpCDD Total HpCDD Total HxCDF	0.29 ng/Kg 0.29 ng/Kg 2.3 ng/Kg	0.29U ng/Kg 0.29U ng/Kg 2.3J ng/Kg
KCH067-016**	Total HpCDD	0.32 ng/Kg	0.32U ng/Kg
KCH067-017	1,2,3,4,6,7,8-HpCDD Total HpCDD	5.3 ng/Kg 5.3 ng/Kg	5.3J ng/Kg 5.3J ng/Kg
KCH067-019	OCDD Total HxCDF Total PeCDF	57 pg/L 10 pg/L 7.2 pg/L	57J pg/L 10U pg/L 7.2J pg/L

VI. Field Blanks

Sample KCH067-019 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
KCH067-019	03/08/16	OCDD OCDF Total HxCDF Total PeCDF	57 pg/L 4.0 pg/L 10 pg/L 7.2 pg/L	All soil samples in SDG 78915

Sample KCH067-042 (from SDG 76998) was identified as a source blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
KCH067-042	03/15/16	2,3,4,6,7,8-HxCDF OCDD Total HpCDF Total HxCDF Total HxCDD	2.4 pg/L 25 pg/L 2.8 pg/L 2.4 pg/L 1.9 pg/L	All water samples in SDG 78915

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
KCH067-005	Total PeCDF	12 ng/Kg	12J ng/Kg
KCH067-006	OCDD Total HxCDF	1.6 ng/Kg 0.21 ng/Kg	1.6U ng/Kg 0.21U ng/Kg
KCH067-007	OCDD OCDF Total HxCDF Total PeCDF	139 ng/Kg 7.9 ng/Kg 6.2 ng/Kg 1.0 ng/Kg	139J ng/Kg 7.9J ng/Kg 6.2U ng/Kg 1.0U ng/Kg
KCH067-008	OCDD OCDF Total HxCDF	2.3 ng/Kg 0.22 ng/Kg 0.27 ng/Kg	2.3U ng/Kg 0.22U ng/Kg 0.27U ng/Kg
KCH067-010	OCDD Total PeCDF	3.0 ng/Kg 0.15 ng/Kg	3.0U ng/Kg 0.15U ng/Kg
KCH067-012	Total PeCDF	0.45 ng/Kg	0.45U ng/Kg
KCH067-013	Total PeCDF	0.12 ng/Kg	0.12U ng/Kg
KCH067-014	OCDD Total HxCDF Total PeCDF	1.6 ng/Kg 0.27 ng/Kg 0.23 ng/Kg	1.6U ng/Kg 0.27U ng/Kg 0.23U ng/Kg
KCH067-015	OCDD Total HxCDF	2.4 ng/Kg 2.3 ng/Kg	2.4U ng/Kg 2.3U ng/Kg
KCH067-016**	OCDD Total PeCDF	0.93 ng/Kg 0.35 ng/Kg	0.93U ng/Kg 0.35U ng/Kg
KCH067-017	OCDD Total PeCDF	47 ng/Kg 0.52 ng/Kg	47U ng/Kg 0.52U ng/Kg
KCH067-018	Total PeCDF	0.36 ng/Kg	0.36U ng/Kg

Sample	Compound	Reported Concentration	Modified Final Concentration
KCH067-019	OCDD Total HxCDF	57 pg/L 10 pg/L	57J pg/L 10J pg/L

VII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Internal Standards

All internal standard recoveries (%R) were within QC limits.

XI. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

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

Due to laboratory blank contamination, data were qualified as not detected or estimated in thirteen samples.

Due to equipment blank and source blank contamination, data were qualified as not detected or estimated in thirteen samples.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

China Lake CTO 067
Polychlorinated Dioxins/Dibenzofurans - Data Qualification Summary - SDG 78915

No Sample Data Qualified in this SDG

China Lake CTO 067
Polychlorinated Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG 78915

Sample	Compound	Modified Final Concentration	A or P	Code
KCH067-009	Total HpCDD Total TCDD	1.5J ng/Kg 0.29J ng/Kg	A	7
KCH067-005	1,2,3,4,6,7,8-HpCDD Total HpCDD	0.43U ng/Kg 0.56J ng/Kg	A	7
KCH067-006	1,2,3,4,6,7,8-HpCDD Total HpCDD Total HxCDF	0.21U ng/Kg 0.21U ng/Kg 0.21J ng/Kg	A	7
KCH067-007	1,2,3,4,6,7,8-HpCDD OCDF Total HpCDD Total HxCDF	8.1J ng/Kg 7.9J ng/Kg 8.1J ng/Kg 6.2J ng/Kg	A	7
KCH067-008	1,2,3,4,6,7,8-HpCDD OCDF Total HpCDD Total HxCDF	0.33U ng/Kg 0.22U ng/Kg 0.80J ng/Kg 0.27J ng/Kg	A	7
KCH067-010	Total HpCDD	0.31U ng/Kg	A	7
KCH067-011	1,2,3,4,6,7,8-HpCDD Total HpCDD	1.5J ng/Kg 1.5J ng/Kg	A	7
KCH067-012	1,2,3,4,6,7,8-HpCDD Total HpCDD	0.32U ng/Kg 0.32U ng/Kg	A	7
KCH067-014	Total HpCDD Total HxCDF	0.25U ng/Kg 0.27J ng/Kg	A	7
KCH067-015	1,2,3,4,6,7,8-HpCDD Total HpCDD Total HxCDF	0.29U ng/Kg 0.29U ng/Kg 2.3J ng/Kg	A	7
KCH067-016**	Total HpCDD	0.32U ng/Kg	A	7
KCH067-017	1,2,3,4,6,7,8-HpCDD Total HpCDD	5.3J ng/Kg 5.3J ng/Kg	A	7

Sample	Compound	Modified Final Concentration	A or P	Code
KCH067-019	OCDD Total HxCDF Total PeCDF	57J pg/L 10U pg/L 7.2J pg/L	A	7

China Lake CTO 067
Polychlorinated Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG 78915

Sample	Compound	Modified Final Concentration	A or P	Code
KCH067-005	Total PeCDF	12J ng/Kg	A	6
KCH067-006	OCDD Total HxCDF	1.6U ng/Kg 0.21U ng/Kg	A	6
KCH067-007	OCDD OCDF Total HxCDF Total PeCDF	139J ng/Kg 7.9J ng/Kg 6.2U ng/Kg 1.0U ng/Kg	A	6
KCH067-008	OCDD OCDF Total HxCDF	2.3U ng/Kg 0.22U ng/Kg 0.27U ng/Kg	A	6
KCH067-010	OCDD Total PeCDF	3.0U ng/Kg 0.15U ng/Kg	A	6
KCH067-012	Total PeCDF	0.45U ng/Kg	A	6
KCH067-013	Total PeCDF	0.12U ng/Kg	A	6
KCH067-014	OCDD Total HxCDF Total PeCDF	1.6U ng/Kg 0.27U ng/Kg 0.23U ng/Kg	A	6
KCH067-015	OCDD Total HxCDF	2.4U ng/Kg 2.3U ng/Kg	A	6
KCH067-016**	OCDD Total PeCDF	0.93U ng/Kg 0.35U ng/Kg	A	6
KCH067-017	OCDD Total PeCDF	47U ng/Kg 0.52U ng/Kg	A	6
KCH067-018	Total PeCDF	0.36U ng/Kg	A	6
KCH067-019	OCDD Total HxCDF	57J pg/L 10J pg/L	A	6

EPA 8290A

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Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78915

Sample ID: KCH067-005

APPL ID: AZ30248

Sample Collection Date: 03/08/16

QCG: $829ACTO6-160321-2062

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	0.43 J U(7)	12.5	0.43PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	0.10 U	12.5	0.10PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.056 U	12.5	0.056DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.13 J	12.5	0.13PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.053 U	12.5	0.053DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.043 U	12.5	0.043DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.13 U	12.5	0.13PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.040 U	12.5	0.040DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.062 U	12.5	0.062DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,7,8-PECDD	0.042 U	12.5	0.042DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,7,8-PECDF	0.074 U	12.5	0.074DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	2,3,4,6,7,8-HXCDF	0.13 U	12.5	0.13PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	2,3,4,7,8-PECDF	0.078 U	12.5	0.078DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	2,3,7,8-TCDD	0.076 U	5.0	0.076DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	2,3,7,8-TCDF	0.12 U	5.0	0.12PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	OCDD	2.8 U	25.0	2.8PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	OCDF	0.16 U	25.0	0.16PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL HPCDD	0.56 J J(7)	12.5	0.56PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL HPCDF	0.44 U	12.5	0.44PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL HXCDD	0.17 J	12.5	0.42PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL HXCDF	0.54 U	12.5	0.54PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL PECDD	0.022 U	12.5	0.022DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL PECDF	0.12 J J(6)	12.5	0.64PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL TCDD	0.15 U	5.0	0.15PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL TCDF	0.19 J	5.0	0.57PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	93.1	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	86.6	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	93.4	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	96.7	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	97.3	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	85.3	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	84.2	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	81.3	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	79.8	40-135		%	03/21/16	04/04/16

J = Estimated value.

4/25/16

Quant Method: 160302_8290
Run #: 160404_HR_05
Instrument: Magneto
Sequence: 160404
Dilution Factor: 1
Initials: RP

Printed: 04/08/16 4:59:39 PM
Form 1 - APPL Standard GC - No MC

EPA 8290A

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Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78915

Sample ID: KCH067-006

APPL ID: AZ30249

Sample Collection Date: 03/08/16

QCG: $829ACTO6-160321-2062

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	0.21 J U(7)	12.5	0.21PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	0.023 U	12.5	0.023DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.028 U	12.5	0.028DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.030 U	12.5	0.030DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.027 U	12.5	0.027DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.030 U	12.5	0.030DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.026 U	12.5	0.026DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.029 U	12.5	0.029DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.031 U	12.5	0.031DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,7,8-PECDD	0.044 U	12.5	0.044DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,7,8-PECDF	0.056 U	12.5	0.056DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	2,3,4,6,7,8-HXCDF	0.14 J	12.5	0.14PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	2,3,4,7,8-PECDF	0.059 U	12.5	0.059DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	2,3,7,8-TCDD	0.052 U	5.0	0.052DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	2,3,7,8-TCDF	0.24 J	5.0	0.24PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	OCDD	1.6 J U(6)	25.0	1.6PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	OCDF	0.15 U	25.0	0.15PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL HPCDD	0.21 J U(7)	12.5	0.25PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL HPCDF	0.084 J	12.5	0.15PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL HXCDD	0.037 U	12.5	0.037PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL HXCDF	0.21 J U(7)	12.5(6)	0.21PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL PECDD	0.044 U	12.5	0.044DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL PECDF	0.063 U	12.5	0.063PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL TCDD	0.65 U	5.0	0.65PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL TCDF	0.47 J	5.0	0.97PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	101	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	92.4	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	95.0	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	97.9	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	106	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	90.8	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	95.2	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	92.3	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	91.2	40-135		%	03/21/16	04/04/16

J = Estimated value.

5C051716

Quant Method: 160302_8290
Run #: 160404_HR_06
Instrument: Magneto
Sequence: 160404
Dilution Factor: 1
Initials: RP

Printed: 04/08/16 4:59:40 PM
Form 1 - APPL Standard GC - No MC

EPA 8290A

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Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78915

Sample ID: KCH067-007

APPL ID: AZ30250

Sample Collection Date: 03/08/16

QCG: $829ACTO6-160321-2062

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	8.1 J J(7)	12.5	8.1PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	0.17 U	12.5	0.17DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.20 U	12.5	0.20DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.050 U	12.5	0.050DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.063 U	12.5	0.063DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.17 U	12.5	0.17PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.39 U	12.5	0.39PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.089 U	12.5	0.089PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.074 U	12.5	0.074DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,7,8-PECDD	0.027 U	12.5	0.027DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	1,2,3,7,8-PECDF	0.059 U	12.5	0.059DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	2,3,4,6,7,8-HXCDF	3.3 U	12.5	3.3PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	2,3,4,7,8-PECDF	0.062 U	12.5	0.062DL	ng/Kg	03/21/16	04/04/16
EPA 8290A	2,3,7,8-TCDD	0.15 U	5.0	0.15PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	2,3,7,8-TCDF	0.099 U	5.0	0.099PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	OCDD	139 J(6)	25.0	139PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	OCDF	7.9 J J(6,7)	25.0	7.9PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL HPCDD	8.1 J J(7)	12.5	8.4PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL HPCDF	1.6 J	12.5	5.9PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL HXCDD	0.089 J	12.5	0.37PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL HXCDF	6.2 J UJ(6)	12.5 (7)	6.8PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL PECDD	0.067 U	12.5	0.067PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL PECDF	1.0 J U(6)	12.5	1.6PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL TCDD	0.15 U	5.0	0.15PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	TOTAL TCDF	0.20 J	5.0	0.56PC	ng/Kg	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	96.3	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	79.6	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	85.9	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	99.3	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	93.1	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	86.1	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	86.2	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	84.7	40-135		%	03/21/16	04/04/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	84.7	40-135		%	03/21/16	04/04/16

J = Estimated value.

Quant Method: 160302_8290
Run #: 160404_HR_14
Instrument: Magneto
Sequence: 160404
Dilution Factor: 1
Initials: RP

Printed: 04/08/16 4:59:40 PM
Form 1 - APPL Standard GC - No MC

EPA 8290A

Kleinfelder
1039 Hyland Drive
Evergreen, CO 80439

Attn: Karin Kaiser

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78915

Sample ID: KCH067-008

APPL ID: AZ30251

Sample Collection Date: 03/08/16

QCG: $829ACTO6-160321-2062

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	0.33 J U(7)	12.5	0.33PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	0.029 U	12.5	0.029DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.034 U	12.5	0.034DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.052 U	12.5	0.052DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.032 U	12.5	0.032DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.053 U	12.5	0.053DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.032 U	12.5	0.032DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.050 U	12.5	0.050DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.038 U	12.5	0.038DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDD	0.038 U	12.5	0.038DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDF	0.030 U	12.5	0.030DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,6,7,8-HXCDF	0.069 U	12.5	0.069PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,7,8-PECDF	0.031 U	12.5	0.031DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDD	0.019 U	5.0	0.019DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDF	0.077 U	5.0	0.077PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDD	2.3 J U(6)	25.0	2.3PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDF	0.22 J U(6,7)	25.0	0.22PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDD	0.80 J J(7)	12.5	0.80PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDF	0.071 J	12.5	0.25PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDD	0.17 U	12.5	0.17PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDF	0.27 J UJ(6)	12.5 (7)	0.46PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDD	0.060 U	12.5	0.060PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDF	0.12 U	12.5	0.12PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDD	0.029 J	5.0	0.098PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDF	0.024 J	5.0	0.20PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	108	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	91.8	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	96.6	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	105	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	99.7	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	92.1	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	92.4	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	93.7	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	94.9	40-135		%	03/21/16	04/05/16

J = Estimated value.

Quant Method: 160302_8290
Run #: 160404_HR_15
Instrument: Magneto
Sequence: 160404
Dilution Factor: 1
Initials: RP

Printed: 04/08/16 4:59:40 PM
Form 1 - APPL Standard GC - No MC

EPA 8290A

Kleinfelder
1039 Hyland Drive
Evergreen, CO 80439

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Karin Kaiser

Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78915

Sample ID: KCH067-009

APPL ID: AZ30252

Sample Collection Date: 03/08/16

QCG: $829ACTO6-160406-2066

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	1.5 J	12.5	1.5PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	0.54 U	12.5	0.54PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.13 U	12.5	0.13PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.060 U	12.5	0.060DL	ng/Kg	04/06/16	04/12/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.066 U	12.5	0.066DL	ng/Kg	04/06/16	04/12/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.21 U	12.5	0.21PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.065 U	12.5	0.065DL	ng/Kg	04/06/16	04/12/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.13 U	12.5	0.13PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.13 U	12.5	0.13PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	1,2,3,7,8-PECDD	0.066 U	12.5	0.066DL	ng/Kg	04/06/16	04/12/16
EPA 8290A	1,2,3,7,8-PECDF	0.10 U	12.5	0.10DL	ng/Kg	04/06/16	04/12/16
EPA 8290A	2,3,4,6,7,8-HXCDF	0.16 U	12.5	0.16PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	2,3,4,7,8-PECDF	0.23 U	12.5	0.23PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	2,3,7,8-TCDD	0.052 U	5.0	0.052DL	ng/Kg	04/06/16	04/12/16
EPA 8290A	2,3,7,8-TCDF	0.11 U	5.0	0.11DL	ng/Kg	04/06/16	04/12/16
EPA 8290A	OCDD	9.1 U	25.0	9.1PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	OCDF	0.20 U	25.0	0.20PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	TOTAL HPCDD	1.5 J J(7)	12.5	1.6PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	TOTAL HPCDF	1.4 U	12.5	1.4PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	TOTAL HXCDD	0.23 U	12.5	0.23PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	TOTAL HXCDF	1.5 U	12.5	1.5PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	TOTAL PECDD	0.16 J	12.5	0.45PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	TOTAL PECDF	0.74 U	12.5	0.74PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	TOTAL TCDD	0.29 J J(7)	5.0	0.60PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	TOTAL TCDF	1.3 U	5.0	1.3PC	ng/Kg	04/06/16	04/12/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	77.3	40-135		%	04/06/16	04/12/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	73.3	40-135		%	04/06/16	04/12/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	76.4	40-135		%	04/06/16	04/12/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	74.3	40-135		%	04/06/16	04/12/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	69.8	40-135		%	04/06/16	04/12/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	65.4	40-135		%	04/06/16	04/12/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	66.3	40-135		%	04/06/16	04/12/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	65.9	40-135		%	04/06/16	04/12/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	68.9	40-135		%	04/06/16	04/12/16

J = Estimated value.

Quant Method: 160302_8290
Run #: 160411_HR_18
Instrument: Magneto
Sequence: 160411
Dilution Factor: 1
Initials: RP

4/05/16

Printed: 04/18/16 5:29:53 AM
Form 1 - APPL Standard GC - No MC

EPA 8290A

Kleinfelder
1039 Hyland Drive
Evergreen, CO 80439

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Karin Kaiser

Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78915

Sample ID: KCH067-010

APPL ID: AZ30253

Sample Collection Date: 03/08/16

QCG: $829ACTO6-160321-2062

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	0.33 U	12.5	0.33PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	0.068 U	12.5	0.068PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.065 U	12.5	0.065DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.034 U	12.5	0.034PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.041 U	12.5	0.041DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.030 U	12.5	0.030DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.040 U	12.5	0.040DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.029 U	12.5	0.029DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.058 U	12.5	0.058PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDD	0.033 U	12.5	0.033DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDF	0.034 U	12.5	0.034DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,6,7,8-HXCDF	0.042 U	12.5	0.042DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,7,8-PECDF	0.036 U	12.5	0.036DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDD	0.029 U	5.0	0.029DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDF	0.17 U	5.0	0.17PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDD	3.0 J U(6)	25.0	3.0PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDF	0.20 U	25.0	0.20PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDD	0.31 J U(7)	12.5	0.65PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDF	0.077 J	12.5	0.38PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDD	0.12 J	12.5	0.44PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDF	0.33 U	12.5	0.33PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDD	0.035 J	12.5	0.32PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDF	0.15 J U(6)	12.5	0.82PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDD	0.30 U	5.0	0.30PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDF	0.24 J	5.0	0.41PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	67.2	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	62.1	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	66.3	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	67.7	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	61.6	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	56.7	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	56.5	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	61.8	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	56.9	40-135		%	03/21/16	04/05/16

J = Estimated value.

Quant Method: 160302_8290
Run #: 160404_HR_17
Instrument: Magneto
Sequence: 160404
Dilution Factor: 1
Initials: RP

4/7/16

Printed: 04/08/16 4:59:40 PM
Form 1 - APPL Standard GC - No MC

EPA 8290A

Kleinfelder
1039 Hyland Drive
Evergreen, CO 80439

Attn: Karin Kaiser

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78915

Sample ID: KCH067-011

APPL ID: AZ30254

Sample Collection Date: 03/08/16

QCG: $829ACTO6-160321-2062

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	1.5 J J(7)	12.5	1.5PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	0.11 U	12.5	0.11DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.13 U	12.5	0.13DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.099 U	12.5	0.099DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.17 U	12.5	0.17PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.10 U	12.5	0.10DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.10 U	12.5	0.10DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.096 U	12.5	0.096DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.12 U	12.5	0.12DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDD	0.10 U	12.5	0.10DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDF	0.14 U	12.5	0.14DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,6,7,8-HXCDF	0.12 U	12.5	0.12PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,7,8-PECDF	0.11 U	12.5	0.11PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDD	0.14 U	5.0	0.14PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDF	0.23 U	5.0	0.23PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDD	13 U	25.0	13PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDF	0.45 U	25.0	0.45PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDD	1.5 J J(7)	12.5	1.5PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDF	0.75 U	12.5	0.75PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDD	0.50 U	12.5	0.50PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDF	1.2 U	12.5	1.2PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDD	0.18 U	12.5	0.18PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDF	0.78 U	12.5	0.78PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDD	0.14 U	5.0	0.14PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDF	0.44 J	5.0	2.3PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	57.4	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	58.6	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	61.8	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	60.7	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	55.9	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	53.6	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	54.6	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	51.9	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	49.9	40-135		%	03/21/16	04/05/16

J = Estimated value.

SG 051716

Quant Method: 160302_8290
Run #: 160404_HR_18
Instrument: Magneto
Sequence: 160404
Dilution Factor: 1
Initials: RP

Printed: 04/08/16 4:59:40 PM
Form 1 - APPL Standard GC - No MC

EPA 8290A

Kleinfelder
1039 Hyland Drive
Evergreen, CO 80439

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Karin Kaiser

Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78915

Sample ID: KCH067-012

APPL ID: AZ30255

Sample Collection Date: 03/08/16

QCG: $829ACTO6-160321-2062

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	0.32 J U(7)	12.5	0.32PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	0.046 U	12.5	0.046DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.055 U	12.5	0.055DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.090 U	12.5	0.090DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.040 U	12.5	0.040DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.092 U	12.5	0.092DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.039 U	12.5	0.039DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.14 U	12.5	0.14PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.047 U	12.5	0.047DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDD	0.017 U	12.5	0.017DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDF	0.074 U	12.5	0.074DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,6,7,8-HXCDF	0.15 U	12.5	0.15PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,7,8-PECDF	0.078 U	12.5	0.078DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDD	0.014 U	5.0	0.014DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDF	0.10 U	5.0	0.10PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDD	2.2 U	25.0	2.2PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDF	0.041 U	25.0	0.041DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDD	0.32 J U(7)	12.5	0.44PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDF	0.50 U	12.5	0.50PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDD	0.25 J	12.5	0.56PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDF	0.53 U	12.5	0.53PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDD	0.18 U	12.5	0.18PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDF	0.45 J U(6)	12.5	0.45PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDD	0.067 J	5.0	0.23PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDF	0.22 J	5.0	1.0PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	105	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	97.8	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	98.8	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	104	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	98.1	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	91.3	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	88.3	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	89.6	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	91.2	40-135		%	03/21/16	04/05/16

J = Estimated value.

4/5/16

Quant Method: 160302_8290
Run #: 160404_HR_19
Instrument: Magneto
Sequence: 160404
Dilution Factor: 1
Initials: RP

Printed: 04/08/16 4:59:40 PM
Form 1 - APPL Standard GC - No MC

EPA 8290A

Kleinfelder
1039 Hyland Drive
Evergreen, CO 80439

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Karin Kaiser

Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78915

Sample ID: KCH067-013

APPL ID: AZ30256

Sample Collection Date: 03/08/16

QCG: $829ACTO6-160321-2062

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	0.051 U	12.5	0.051DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	0.20 J	12.5	0.20PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.049 U	12.5	0.049DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.034 U	12.5	0.034DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.047 U	12.5	0.047DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.035 U	12.5	0.035DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.046 U	12.5	0.046DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.033 U	12.5	0.033DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.055 U	12.5	0.055DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDD	0.030 U	12.5	0.030DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDF	0.059 U	12.5	0.059DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,6,7,8-HXCDF	0.049 U	12.5	0.049DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,7,8-PECDF	0.062 U	12.5	0.062DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDD	0.033 U	5.0	0.033DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDF	0.17 U	5.0	0.17PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDD	0.70 U	25.0	0.70PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDF	0.045 U	25.0	0.045DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDD	0.051 U	12.5	0.051DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDF	0.20 J	12.5	0.20PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDD	0.18 U	12.5	0.18PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDF	0.20 U	12.5	0.20PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDD	0.039 U	12.5	0.039PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDF	0.12 J U(6)	12.5	0.52PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDD	0.52 U	5.0	0.52PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDF	0.60 U	5.0	0.60PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	103	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	94.5	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	101	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	106	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	98.0	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	90.6	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	89.3	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	91.4	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	84.4	40-135		%	03/21/16	04/05/16

J = Estimated value.

Quant Method: 160302_8290
Run #: 160404_HR_24
Instrument: Magneto
Sequence: 160404
Dilution Factor: 1
Initials: RP

4/8/16

Printed: 04/08/16 4:59:40 PM
Form 1 - APPL Standard GC - No MC

EPA 8290A

Kleinfelder
1039 Hyland Drive
Evergreen, CO 80439

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Karin Kaiser

Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78915

Sample ID: KCH067-014

APPL ID: AZ30257

Sample Collection Date: 03/08/16

QCG: $829ACTO6-160321-2062

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	0.051 U	12.5	0.051DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	0.037 U	12.5	0.037DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.044 U	12.5	0.044DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.048 U	12.5	0.048DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.042 U	12.5	0.042DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.049 U	12.5	0.049DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.041 U	12.5	0.041DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.046 U	12.5	0.046DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.049 U	12.5	0.049DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDD	0.037 U	12.5	0.037DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDF	0.032 U	12.5	0.032DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,6,7,8-HXCDF	0.13 U	12.5	0.13PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,7,8-PECDF	0.034 U	12.5	0.034DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDD	0.036 U	5.0	0.036DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDF	0.097 U	5.0	0.097PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDD	1.6 J U(6)	25.0	1.6PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDF	0.13 U	25.0	0.13PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDD	0.25 J U(7)	12.5	0.25PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDF	0.47 U	12.5	0.47PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDD	0.14 U	12.5	0.14PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDF	0.27 J U(6,7)	12.5	0.55PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDD	0.077 J	12.5	0.45PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDF	0.23 J U(6)	12.5	0.55PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDD	0.069 U	5.0	0.069PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDF	0.31 U	5.0	0.31PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	84.9	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	72.0	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	78.4	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	85.8	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	79.5	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	70.6	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	73.6	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	71.0	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	75.5	40-135		%	03/21/16	04/05/16

J = Estimated value.

4/5/16

Quant Method: 160302_8290
Run #: 160404_HR_25
Instrument: Magneto
Sequence: 160404
Dilution Factor: 1
Initials: RP

Printed: 04/08/16 4:59:40 PM
Form 1 - APPL Standard GC - No MC

EPA 8290A

Kleinfelder
1039 Hyland Drive
Evergreen, CO 80439

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Karin Kaiser

Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78915

Sample ID: KCH067-015

APPL ID: AZ30258

Sample Collection Date: 03/08/16

QCG: $829ACTO6-160321-2062

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	0.29 J U(7)	12.5	0.29PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	0.14 U	12.5	0.14PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.065 U	12.5	0.065DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.047 U	12.5	0.047DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.092 U	12.5	0.092DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.048 U	12.5	0.048DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.25 U	12.5	0.25PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.046 U	12.5	0.046DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.11 U	12.5	0.11DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDD	0.068 U	12.5	0.068DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDF	0.044 U	12.5	0.044DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,6,7,8-HXCDF	0.52 U	12.5	0.52PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,7,8-PECDF	0.046 U	12.5	0.046DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDD	0.11 U	5.0	0.11DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDF	0.10 U	5.0	0.10PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDD	2.4 J U(6)	25.0	2.4PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDF	0.18 U	25.0	0.18PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDD	0.29 J U(7)	12.5	0.39PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDF	0.59 U	12.5	0.59PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDD	0.11 J	12.5	0.22PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDF	2.3 J UJ(6)	12.5 (7)	3.5PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDD	0.26 U	12.5	0.26PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDF	1.9 U	12.5	1.9PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDD	0.84 U	5.0	0.84PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDF	0.97 U	5.0	0.97PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	107	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	98.7	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	101	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	106	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	102	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	91.9	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	84.7	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	89.1	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	92.5	40-135		%	03/21/16	04/05/16

J = Estimated value.

8/25/16

Quant Method: 160302_8290
Run #: 160404_HR_26
Instrument: Magneto
Sequence: 160404
Dilution Factor: 1
Initials: RP

Printed: 04/08/16 4:59:40 PM
Form 1 - APPL Standard GC - No MC

EPA 8290A

Kleinfelder
1039 Hyland Drive
Evergreen, CO 80439

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Karin Kaiser

Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78915

Sample ID: KCH067-016

APPL ID: AZ30259

Sample Collection Date: 03/08/16

QCG: $829ACTO6-160321-2062

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	0.069 U	12.5	0.069DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	0.052 U	12.5	0.052DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.061 U	12.5	0.061DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.038 U	12.5	0.038PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.045 U	12.5	0.045DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.048 U	12.5	0.048DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.044 U	12.5	0.044DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.046 U	12.5	0.046DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.053 U	12.5	0.053DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDD	0.056 U	12.5	0.056DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDF	0.047 U	12.5	0.047DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,6,7,8-HXCDF	0.11 U	12.5	0.11PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,7,8-PECDF	0.050 U	12.5	0.050DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDD	0.052 U	5.0	0.052DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDF	0.25 U	5.0	0.25PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDD	0.93 J U(6)	25.0	0.93PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDF	0.039 U	25.0	0.039PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDD	0.32 J U(7)	12.5	0.64PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDF	0.058 U	12.5	0.058PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDD	0.12 U	12.5	0.12PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDF	0.11 U	12.5	0.11PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDD	0.24 U	12.5	0.24PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDF	0.35 J U(6)	12.5	0.65PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDD	0.026 U	5.0	0.026DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDF	0.53 U	5.0	0.53PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	82.3	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	73.8	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	78.0	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	80.2	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	84.8	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	74.4	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	73.0	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	70.6	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	71.5	40-135		%	03/21/16	04/05/16

J = Estimated value.

8/25/16

Quant Method: 160302_8290
Run #: 160404_HR_27
Instrument: Magneto
Sequence: 160404
Dilution Factor: 1
Initials: RP

Printed: 04/08/16 4:59:40 PM
Form 1 - APPL Standard GC - No MC

EPA 8290A

Kleinfelder
1039 Hyland Drive
Evergreen, CO 80439

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Karin Kaiser

Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78915

Sample ID: KCH067-017

APPL ID: AZ30260

Sample Collection Date: 03/08/16

QCG: $829ACTO6-160321-2062

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	5.3 J J(7)	12.5	5.3PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	0.40 U	12.5	0.40PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.16 U	12.5	0.16DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.17 U	12.5	0.17DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.19 U	12.5	0.19DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.17 U	12.5	0.17DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.19 U	12.5	0.19DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.16 U	12.5	0.16DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.22 U	12.5	0.22DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDD	0.19 U	12.5	0.19DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	1,2,3,7,8-PECDF	0.093 U	12.5	0.093DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,6,7,8-HXCDF	0.20 U	12.5	0.20DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,4,7,8-PECDF	0.098 U	12.5	0.098DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDD	0.097 U	5.0	0.097DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	2,3,7,8-TCDF	0.20 J	5.0	0.20PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDD	47 U(6)	25.0	47PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	OCDF	0.24 U	25.0	0.24DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDD	5.3 J J(7)	12.5	5.3PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HPCDF	1.8 U	12.5	1.8PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDD	1.1 U	12.5	1.1PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL HXCDF	1.0 U	12.5	1.0PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDD	0.19 U	12.5	0.19DL	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL PECDF	0.52 J U(6)	12.5	0.72PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDD	0.79 U	5.0	0.79PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	TOTAL TCDF	0.43 J	5.0	0.58PC	ng/Kg	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	99.0	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	86.9	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	108	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	103	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	88.3	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	85.6	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	85.0	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	86.6	40-135		%	03/21/16	04/05/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	106	40-135		%	03/21/16	04/05/16

J = Estimated value.

Quant Method: 160302_8290
Run #: 160404_HR_28
Instrument: Magneto
Sequence: 160404
Dilution Factor: 1
Initials: RP

4/5/16

Printed: 04/08/16 4:59:40 PM
Form 1 - APPL Standard GC - No MC

EPA 8290A

Kleinfelder
1039 Hyland Drive
Evergreen, CO 80439

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Karin Kaiser

Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78915

Sample ID: KCH067-018

APPL ID: AZ30261

Sample Collection Date: 03/08/16

QCG: $829ACTO6-160321-2062

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	0.57 U	12.5	0.57PC	ng/Kg	03/21/16	04/06/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	0.045 U	12.5	0.045DL	ng/Kg	03/21/16	04/06/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.065 U	12.5	0.065PC	ng/Kg	03/21/16	04/06/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.042 U	12.5	0.042DL	ng/Kg	03/21/16	04/06/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.070 U	12.5	0.070DL	ng/Kg	03/21/16	04/06/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.043 U	12.5	0.043DL	ng/Kg	03/21/16	04/06/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.068 U	12.5	0.068DL	ng/Kg	03/21/16	04/06/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.041 U	12.5	0.041DL	ng/Kg	03/21/16	04/06/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.081 U	12.5	0.081DL	ng/Kg	03/21/16	04/06/16
EPA 8290A	1,2,3,7,8-PECDD	0.034 U	12.5	0.034DL	ng/Kg	03/21/16	04/06/16
EPA 8290A	1,2,3,7,8-PECDF	0.034 U	12.5	0.034DL	ng/Kg	03/21/16	04/06/16
EPA 8290A	2,3,4,6,7,8-HXCDF	0.073 U	12.5	0.073DL	ng/Kg	03/21/16	04/06/16
EPA 8290A	2,3,4,7,8-PECDF	0.036 U	12.5	0.036DL	ng/Kg	03/21/16	04/06/16
EPA 8290A	2,3,7,8-TCDD	0.019 U	5.0	0.019DL	ng/Kg	03/21/16	04/06/16
EPA 8290A	2,3,7,8-TCDF	0.024 U	5.0	0.024DL	ng/Kg	03/21/16	04/06/16
EPA 8290A	OCDD	3.9 U	25.0	3.9PC	ng/Kg	03/21/16	04/06/16
EPA 8290A	OCDF	0.077 U	25.0	0.077DL	ng/Kg	03/21/16	04/06/16
EPA 8290A	TOTAL HPCDD	0.63 U	12.5	0.63PC	ng/Kg	03/21/16	04/06/16
EPA 8290A	TOTAL HPCDF	0.055 J	12.5	0.43PC	ng/Kg	03/21/16	04/06/16
EPA 8290A	TOTAL HXCDD	0.18 U	12.5	0.18PC	ng/Kg	03/21/16	04/06/16
EPA 8290A	TOTAL HXCDF	0.23 U	12.5	0.23PC	ng/Kg	03/21/16	04/06/16
EPA 8290A	TOTAL PECDD	0.061 J	12.5	0.54PC	ng/Kg	03/21/16	04/06/16
EPA 8290A	TOTAL PECDF	0.36 J U(6)	12.5	0.40PC	ng/Kg	03/21/16	04/06/16
EPA 8290A	TOTAL TCDD	0.20 U	5.0	0.20PC	ng/Kg	03/21/16	04/06/16
EPA 8290A	TOTAL TCDF	0.31 J	5.0	0.51PC	ng/Kg	03/21/16	04/06/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	92.8	40-135		%	03/21/16	04/06/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	76.3	40-135		%	03/21/16	04/06/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	95.7	40-135		%	03/21/16	04/06/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	102	40-135		%	03/21/16	04/06/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	84.3	40-135		%	03/21/16	04/06/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	77.6	40-135		%	03/21/16	04/06/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	84.1	40-135		%	03/21/16	04/06/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	82.6	40-135		%	03/21/16	04/06/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	88.2	40-135		%	03/21/16	04/06/16

J = Estimated value.

Quant Method: 160302_8290
Run #: 160404_HR_29
Instrument: Magneto
Sequence: 160404
Dilution Factor: 1
Initials: RP

8/05/16

Printed: 04/08/16 4:59:40 PM
Form 1 - APPL Standard GC - No MC

EPA 8290A

Kleinfelder
1039 Hyland Drive
Evergreen, CO 80439

Attn: Karin Kaiser

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78915

Sample ID: KCH067-019

APPL ID: AZ30262

Sample Collection Date: 03/08/16

QCG: $829ACTO6-160318-2062

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	3.5 U	125.0	3.5PC	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	0.61 U	125.0	0.61DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	1.3 U	125.0	1.3PC	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.93 U	125.0	0.93DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.52 U	125.0	0.52DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.94 U	125.0	0.94DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.51 U	125.0	0.51DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.90 U	125.0	0.90DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.60 U	125.0	0.60DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,7,8-PECDD	0.82 U	125.0	0.82DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,7,8-PECDF	0.60 U	125.0	0.60DL	pg/L	03/18/16	04/03/16
EPA 8290A	2,3,4,6,7,8-HXCDF	2.7 U	125.0	2.7PC	pg/L	03/18/16	04/03/16
EPA 8290A	2,3,4,7,8-PECDF	0.93 U	125.0	0.93PC	pg/L	03/18/16	04/03/16
EPA 8290A	2,3,7,8-TCDD	0.70 U	50.0	0.70DL	pg/L	03/18/16	04/03/16
EPA 8290A	2,3,7,8-TCDF	0.83 U	50.0	0.83PC	pg/L	03/18/16	04/03/16
EPA 8290A	OCDD	57 J J(6)	250.0 (7)	57PC	pg/L	03/18/16	04/03/16
EPA 8290A	OCDF	4.0 J	250.0	4.0PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL HPCDD	4.1 U	125.0	4.1PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL HPCDF	4.1 U	125.0	4.1PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL HXCDD	0.98 U	125.0	0.98PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL HXCDF	10 J UJ(6)	125.0 (7)	15PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL PECDD	1.6 U	125.0	1.6PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL PECDF	7.2 J J(6)	125.0	12PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL TCDD	0.86 U	50.0	0.86PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL TCDF	0.83 U	50.0	0.83PC	pg/L	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	78.3	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	74.6	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	78.4	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	81.9	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	72.8	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	66.2	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	69.7	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	69.5	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	65.0	40-135		%	03/18/16	04/03/16

J = Estimated value.

SLS 17/16

Quant Method: 160302_8290
Run #: 160403_HR_06
Instrument: Magneto
Sequence: 160403
Dilution Factor: 1
Initials: RP

Printed: 04/08/16 5:12:53 PM
Form 1 - APPL Standard GC - No MC

LDC #: 36282D21
SDG #: 78915
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Standard/Full

Date: 5/12/16
Page: 1 of 2
Reviewer: P
2nd Reviewer: R

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW846 Method 8290A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	% RSD ≤ 20 ICV = 20/30 unlabeled/labeled
IV.	Continuing calibration	A	↓
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	EB = 15 SB= KCH067-042 (78998)
VII.	Matrix spike/Matrix spike duplicates	A	
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Internal standards	A	
XI.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Standard validation.
XII.	Target compound identification	A	Not reviewed for Standard validation.
XIII.	System performance	A	Not reviewed for Standard validation.
XIV.	Overall assessment of data	A	

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

** Indicates sample underwent Full validation

	Client ID	Lab ID	Matrix	Date
1 2	KCH067-005	AZ30248	Soil	03/08/16
2 2	KCH067-006	AZ30249	Soil	03/08/16
3 2	KCH067-007	AZ30250	Soil	03/08/16
4 2	KCH067-008	AZ30251	Soil	03/08/16
5 3	KCH067-009	AZ30252	Soil	03/08/16
6 2	KCH067-010	AZ30253	Soil	03/08/16
7 2	KCH067-011	AZ30254	Soil	03/08/16
8 2	KCH067-012	AZ30255	Soil	03/08/16
9 2	KCH067-013	AZ30256	Soil	03/08/16
10 2	KCH067-014	AZ30257	Soil	03/08/16
11 2	KCH067-015	AZ30258	Soil	03/08/16
12 2	KCH067-016**	AZ30259**	Soil	03/08/16
13 2	KCH067-017	AZ30260	Soil	03/08/16
14 2	KCH067-018	AZ30261	Soil	03/08/16

LDC #: 36282D21
SDG #: 78915
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Standard/Full

Date: 5/12/16

Reviewer: FJ
2nd Reviewer: JK

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW846 Method 8290A)

	Client ID	Lab ID	Matrix	Date
15 1	KCH067-019	AZ30262	Water	03/08/16
16 2	KCH067-016MS	AZ30259MS	Soil	03/08/16
17 2	↓ MSD	↓ MSD	↓	↓
18				
19				
20				
21				

Notes:

1	160318-MB						
2	160321-MB						
3	160406-MB						

LDC #: 36282021

VALIDATION FINDINGS CHECKLIST

Reviewer: EJ
2nd Reviewer: AC

Method: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS Instrument performance check				
Was PFK exact mass 380.9760 verified?	✓			
Were the retention time windows established for all homologues?	✓			
Was the chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomers ≤ 25% ?	✓			
Is the static resolving power at least 10,000 (10% valley definition)?	✓			
Was the mass resolution adequately check with PFK?	✓			
Was the presence of 1,2,8,9-TCDD and 1,3,4,6,8-PeCDF verified?	✓			
IIIa. Initial calibration				
Was the initial calibration performed at 5 concentration levels?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20% for unlabeled compounds and labeled compounds ?	✓			
Did all calibration standards meet the Ion Abundance Ratio criteria?	✓			
Was the signal to noise ratio for each target compound ≥ 2.5 and for each recovery and internal standard ≥ 10?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 20% for unlabeled compounds and ≤ 30% for labeled compounds ?	✓			
IV. Continuing calibration				
Was a contiuning calibration performed at the beginning and end of each 12 hour period?	✓			
Were all percent differences (%D) ≤ 20% for unlabeled compounds and ≤ 30% for labeled compounds ?	✓			
Did all routine calibration standards meet the Ion Abundance Ratio criteria?	✓			
Was the signal to noise ratio for each target compound and for each recovery and internal standard ≥ 10?	✓			
V. Laboratory Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank performed for each matrix and whenever a sample extraction was performed?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet?	✓			
VI. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.	✓			
VII. Matrix spike/Matrix spike duplicates				

LDC #: 36282021

VALIDATION FINDINGS CHECKLIST

Reviewer: EJ
2nd Reviewer: AC

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VIII. Laboratory control samples				
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
X. Internal standards				
Were internal standard recoveries within the 40-135% criteria?	✓			
Was the minimum S/N ratio of all internal standard peaks ≥ 10?	✓			
XI. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. Target compound identification				
For 2,3,7,8 substituted congeners with associated labeled standards, were the retention times of the two quantitation peaks within -1 to 3 sec. of the RT of the labeled standard?	✓			
For 2,3,7,8 substituted congeners without associated labeled standards, were the relative retention times of the two quantitation peaks within 0.005 time units of the RRT measured in the routine calibration?	✓			
For non-2,3,7,8 substituted congeners, were the retention times of the two quantitation peaks within RT established in the performance check solution?	✓			
Did compound spectra contain all characteristic ions listed in the table attached?	✓			
Was the Ion Abundance Ratio for the two quantitation ions within criteria?	✓			
Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?	✓			
Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?	✓			
For PCDF identification, was any signal (S/N ≥ 2.5, at ± seconds RT) detected in the corresponding PCDPE channel?	✓			
Was an acceptable lock mass recorded and monitored?				
XIII. System performance				
System performance was found to be acceptable.	✓			
XIV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:_____

_____

_____

LDC #: 36282D21

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: FJ
2nd Reviewer: R

code = 7

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
Y N N/A Was the method blank contaminated?

Blank extraction date: 4/6/16 **Blank analysis date:** 4/12/16 **Associated samples:** 5
Conc. units: ng/kg

Compound	Blank ID	Sample Identification								
	160406-MB	5								
G	1.8		–							
U	0.50		1.5 J							
Y	0.25		–							
X	0.30		–							
W	0.28		–							
R	0.088		0.29 J							
V	0.24		–							

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 36282D21

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

Y N N/A Were all samples associated with a method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
Y N N/A Was the method blank contaminated?

code = 7

Blank extraction date: 3/21/16 **Blank analysis date:** 4/4/16 **Associated samples:** 1→4, 6→14

Conc. units: ng/kg

Compound	Blank ID	Sample Identification								
	160321-MB	MB	1	2	3	4	5	6	7	8
* F	0.55		0.43 U	0.21 U	8.1 J	0.33 U	1.5 J	-	1.5 J	0.32 U
* Q	0.36				7.9 J	0.22 U	-	-	-	-
* U	0.55		0.56 J	0.21 U	~~7.9 J~~ 8.1 J	0.80 J	~~1.5 J~~	0.31 U	1.5 J	0.32 U
* X	0.054			0.21 J	6.2 J	0.27 J	-	-	-	-
* > EDL										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 36282D1

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: PD
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

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

Y N N/A Were all samples associated with a method blank?

Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?

Y N N/A Was the method blank contaminated?

code = 7

Blank extraction date: 3/21/16 **Blank analysis date:** 4/4/16 **Associated samples:** 1→4, 6→14

Conc. units: ng/kg

Compound	Blank ID	Sample Identification								
	160321-MB	10	11	12	13	~~14~~ F7				
* F	0.55	-	0.29U	-	5.3J					
* Q	0.36	-	-	-	-					
* U	0.55	0.25U	0.29U	0.32U	5.3J					
* X	0.05U	0.27J	2.3J	-	-					
* 7 EDL										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 36282D21

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)
Please see qualifications below for all questions answered "N". Not applicable questions are identified as "N/A".

code = 7

Y N N/A Were all samples associated with a method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
Y N N/A Was the method blank contaminated?

Blank extraction date: 3/18/16 **Blank analysis date:** 4/3/16 **Associated samples:** all water

Conc. units: pg/L

Compound	Blank ID	Sample Identification								
	160318-MB	LCS								
* M	4.2	-								
* G	43	57 J								
* U	2.1	-								
* Y	9.5	-								
* X	20	104								
* W	1.4	7.2 J								
* R	1.1	-								
* V	2.5	-								
* > EDL										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 36282021

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

Y N N/A Were field blanks identified in this SDG? Circle = 6

Blank units: pg/L **Associated sample units:** ng/kg
Sampling date: 3/8/16
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All soils

Compound	Blank ID	Sample Identification								
	15	1	2	3	4	5	8	9	10	11
G	57	-	1.6U	139 J	2.3U	3.0U			1.6U	2.4U
Q	4.0	~~0.36U~~	-	7.9J	0.22U	-			-	-
X	10	-	0.21U	6.2U	0.27U	-			0.27U	2.3U
W	7.2	12 J	-	1.0U	-	0.15U	0.45U	0.12U	0.23U	-
CRQL										

Blank units: pg/L **Associated sample units:** ng/kg
Sampling date: 3/8/16
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All soils

Compound	Blank ID	Sample Identification								
	15		12	13	14	7 (ND)				
G	57		0.93U	47U						
Q	40		-	-						
X	10		-	-						
W	7.2		0.35U	0.52U	0.36U					
CRQL										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with compound concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 36282021

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: PP
2nd Reviewer: AK

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

SB = KCH067-042

Cond = 6

(Y) N N/A Were field blanks identified in this SDG?
Blank units: pg/L **Associated sample units:** pg/L
Sampling date: 3/15/16
Field blank type: (circle one) Field Blank / Rinsate / Other: SB Associated Samples: all water (#15)

Compound	Blank ID	Sample Identification								
	SB		15							
M	2.4									
G	25		57 J							
Y	2.8									
X	2.4		10 J							
T	1.9									
CRQL										

Blank units: _____ **Associated sample units:** _____
Sampling date: _____
Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								
CRQL										

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with compound concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 36282D21

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 8290)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = $(A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported RRF (CS-3 std)	Recalculated RRF (CS-3 std)	Reported %RSD	Recalculated %RSD
1	IGAL	3/2/16	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	0.951858	0.951858	0.91456	0.91456	3.29222	3.29222
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.07768	1.07768	1.09162	1.09162	5.022	5.022
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	1.05456	1.05456	1.02152	1.02152	2.30779	2.30779
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	0.990196	0.990196	0.96245	0.96245	3.63217	3.63217
			OCDF (^{13}C-OCDD)	1.21618	1.21618	1.18811	1.18811	5.75034	5.75034
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						

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

LDC #: 36282D 21

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Reviewer: FD
2nd Reviewer: X

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

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

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

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

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	160404_HR_02 ccv	4/4/16	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	0.951858	0.826	0.826	13.2	13.2
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.07768	1.025	1.025	4.9	4.9
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	1.05456	0.990	0.990	6.1	6.1
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	0.990196	0.975	0.975	1.5	1.5
			OCDF (^{13}C-OCDD)	1.21618	1.175	1.175	3.4	3.4
2	160404_HR_41 ccv	4/6/16	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)		0.825	0.825	13.4	13.4
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)		1.028	1.028	4.7	4.7
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)		1.053	1.053	0.2	0.2
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)		0.976	0.976	1.4	1.4
			OCDF (^{13}C-OCDD)	↓	1.190	1.190	2.2	2.2
3	160404 HR_21 ccv	4/5/16	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)		0.791	0.791	17.0	17.0
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)		0.969	0.969	10.1	10.1
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)		1.014	1.014	3.9	3.9
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	↓	0.950	0.950	4.0	4.0
			OCDF (^{13}C-OCDD)	↓	1.148	1.148	5.6	5.6

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

LDC #: 36282D21

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: FR
2nd Reviewer: AC

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

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

% Recovery = 100 * (SSR - SR)/SA Where: SSR = Spiked sample result, SR = Sample result
SA = Spike added

RPD = I MSR - MSDR I * 2/(MSR + MSDR) MSR = Matrix spike percent recovery MSDR = Matrix spike duplicate percent recovery

MS/MSD samples: 16 + 17

Compound	Spike Added (ng/kg)		Sample Concentration (ng/kg)	Spiked Sample Concentration (ng/kg)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		MS/MSD RPD	
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	Reported	Recalc
2,3,7,8-TCDD	33.4	33.3 4	ND	32.3	34.7	96.7	96.7	104	104	7.2	7.2
1,2,3,7,8-PeCDD	83.6	83.6		81.6	85.4	97.6	97.6	102	102	4.6	4.6
1,2,3,4,7,8-HxCDD	83.6	83.6		72.8	73.6	87.1	87.1	88.0	88.0	1.1	1.1
1,2,3,4,7,8,9-HpCDF	83.6	83.6		66.2	67.8	79.2	79.2	81.1	81.1	2.4	2.4
OCDF	167	167		127	134	76	76	80.2	80.2	5.4	5.4

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

LDC #: 36282D21

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: EJ
2nd Reviewer: AC

METHOD: GC/MS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

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

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCS - LCSD I * 2/(LCS + LCSD) LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: 160321-LCS

Compound	Spike Added (ng/kg)		Spiked Sample Concentration (ng/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalc
2,3,7,8-TCDD	49.8	NA	43.8	NA	88.0	88.0				
1,2,3,7,8-PeCDD	124		109		87.9	87.9				
1,2,3,4,7,8-HxCDD	124		99.6		80.3	80.3				
1,2,3,4,7,8,9-HpCDF	124		89.5		72.2	72.2				
OCDF	249	↓	187	↓	75.1	75.1	NA			

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

LDC #: 36282D2J

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: EJ
2nd reviewer: A

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

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

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

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

RRF = Relative Response Factor (average) from the initial calibration

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. #12, OCDD:

Conc. = $\frac{(2.996940 \times 10^2 + 3.040940 \times 10^2)(200)(0.05)(1000)}{(1.912105 \times 10^5 + 2.155929 \times 10^5)(1.07099)(15.33)(0.972)}$

0.93 ng/kg

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 13, 2016

Parameters: Polychlorinated Dioxins/Dibenzofurans

Validation Level: Level III & IV

Laboratory: APPL, Inc.

Sample Delivery Group (SDG): 78998

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-032**	AZ30748**	Soil	03/15/16
KCH067-033	AZ30749	Soil	03/15/16
KCH067-041	AZ30750	Water	03/15/16
KCH067-042	AZ30751	Water	03/15/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Chlorinated Dibenzo-p-Dioxins (CDDs) and Chlorinated Dibenzofurans (CDFs) Data Review (September 2011). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Polychlorinated Dioxins/Dibenzofurans by Environmental Protection Agency (EPA) SW 846 Method 8290A

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. HRGC/HRMS Instrument Performance Check

Instrument performance was checked at the required daily frequency.

Retention time windows were established for all homologues. The chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomer was less than or equal to 25%.

The static resolving power was at least 10,000 (10% valley definition).

III. Initial Calibration and Initial Calibration Verification

A five point initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 20.0% for all labeled and unlabeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compounds and labeled compounds for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 20.0% for unlabeled compounds and less than or equal to 30.0% for labeled compounds.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

All of the continuing calibration percent differences (%D) between the initial calibration RRF and the continuing calibration RRF were less than or equal to 20.0% for labeled and less than or equal to 30.0% for unlabeled compounds.

The ion abundance ratios for all PCDDs and PCDFs were within validation criteria.

The minimum S/N ratio was greater than or equal to 10 for each unlabeled compounds and labeled compounds for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Laboratory Blank ID	Extraction Date	Compound	Concentration	Associated Samples
160321-MB	03/21/16	1,2,3,4,6,7,8-HpCDD OCDF Total HpCDD Total HxCDF	0.55 ng/Kg 0.36 ng/Kg 0.55 ng/Kg 0.054 ng/Kg	All soil samples in SDG 78998
160318-MB	03/18/16	2,3,4,6,7,8-HxCDF OCDD Total HpCDD Total HpCDF Total HxCDF Total PeCDF Total TCDD Total TCDF	4.2 pg/L 43 pg/L 2.1 pg/L 9.5 pg/L 20 pg/L 1.4 pg/L 1.1 pg/L 2.5 pg/L	All water samples in SDG 78998

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
KCH067-032**	1,2,3,4,6,7,8-HpCDD OCDF Total HpCDD Total HxCDF	51 ng/Kg 4.5 ng/Kg 51 ng/Kg 6.7 ng/Kg	51J ng/Kg 4.5J ng/Kg 51J ng/Kg 6.7J ng/Kg
KCH067-033	1,2,3,4,6,7,8-HpCDD Total HpCDD Total HxCDF	3.3 ng/Kg 3.3 ng/Kg 0.43 ng/Kg	3.3J ng/Kg 3.3J ng/Kg 0.43J ng/Kg
KCH067-041	Total TCDD Total TCDF	0.87 pg/L 12 pg/L	0.87U pg/L 12U pg/L
KCH067-042	2,3,4,6,7,8-HxCDF OCDD Total HpCDF Total HxCDF	2.4 pg/L 25 pg/L 2.8 pg/L 2.4 pg/L	2.4U pg/L 25U pg/L 2.8U pg/L 2.4U pg/L

VI. Field Blanks

Sample KCH067-041 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
KCH067-041	03/15/16	Total TCDD Total TCDF	0.87 pg/L 12 pg/L	All soil samples in SDG 78998

Sample KCH067-042 was identified as a source blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
KCH067-042	03/15/16	2,3,4,6,7,8-HxCDF OCDD Total HpCDF Total HxCDF Total HxCDD	2.4 ng/L 25 ng/L 2.8 ng/L 2.4 ng/L 1.9 ng/L	KCH067-041

Sample concentrations were compared to concentrations detected in the field blanks. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated field blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
KCH067-032**	Total TCDD Total TCDF	0.095 ng/Kg 2.5 ng/Kg	0.095U ng/Kg 2.5U ng/Kg
KCH067-033	Total TCDF	0.51 ng/Kg	0.51U ng/Kg

VII. Matrix Spike/Matrix Spike Duplicates

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

VIII. Laboratory Control Samples

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

IX. Field Duplicates

No field duplicates were identified in this SDG.

X. Internal Standards

All internal standard recoveries (%R) were within QC limits.

XI. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. Overall Assessment of Data

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

Due to laboratory blank contamination, data were qualified as not detected or estimated in four samples.

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

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

China Lake CTO 067
Polychlorinated Dioxins/Dibenzofurans - Data Qualification Summary - SDG 78998

No Sample Data Qualified in this SDG

China Lake CTO 067
Polychlorinated Dioxins/Dibenzofurans - Laboratory Blank Data Qualification Summary - SDG 78998

Sample	Compound	Modified Final Concentration	A or P	Code
KCH067-032**	1,2,3,4,6,7,8-HpCDD OCDF Total HpCDD Total HxCDF	51J ng/Kg 4.5J ng/Kg 51J ng/Kg 6.7J ng/Kg	A	7
KCH067-033	1,2,3,4,6,7,8-HpCDD Total HpCDD Total HxCDF	3.3J ng/Kg 3.3J ng/Kg 0.43J ng/Kg	A	7
KCH067-041	Total TCDD Total TCDF	0.87U pg/L 12U pg/L	A	7
KCH067-042	2,3,4,6,7,8-HxCDF OCDD Total HpCDF Total HxCDF	2.4U pg/L 25U pg/L 2.8U pg/L 2.4U pg/L	A	7

China Lake CTO 067
Polychlorinated Dioxins/Dibenzofurans - Field Blank Data Qualification Summary - SDG 78998

Sample	Compound	Modified Final Concentration	A or P	Code
KCH067-032**	Total TCDD Total TCDF	0.095U ng/Kg 2.5U ng/Kg	A	6
KCH067-033	Total TCDF	0.51U ng/Kg	A	6

EPA 8290A

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APPL Inc.
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Attn: Karin Kaiser

Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78998

Sample ID: KCH067-032

APPL ID: AZ30748

Sample Collection Date: 03/15/16

QCG: $829ACTO6-160321-2062

Method	Analyte	Result		PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	51	J(7)	12.5	51PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	1.5 U		12.5	1.5PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.27 U		12.5	0.27DL	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.29 J		12.5	0.29PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.24 J		12.5	0.24PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,6,7,8-HXCDD	1.6 J		12.5	1.6PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.15 U		12.5	0.15PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.72 U		12.5	0.72PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.70 U		12.5	0.70PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,7,8-PECDD	0.14 U		12.5	0.14DL	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,7,8-PECDF	0.28 U		12.5	0.28PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	2,3,4,6,7,8-HXCDF	3.5 U		12.5	3.5PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	2,3,4,7,8-PECDF	0.34 U		12.5	0.34PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	2,3,7,8-TCDD	0.20 U		5.0	0.20PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	2,3,7,8-TCDF	0.70 U		5.0	0.70PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	OCDD	437		25.0	437PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	OCDF	4.5 J	J(7)	25.0	4.5PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	TOTAL HPCDD	51	↓	12.5	53PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	TOTAL HPCDF	3.6 U		12.5	3.6PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	TOTAL HXCDD	12 J		12.5	13PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	TOTAL HXCDF	6.7 J	J(7)	12.5	8.9PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	TOTAL PECDD	0.38 J		12.5	2.6PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	TOTAL PECDF	1.7 U		12.5	1.7PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	TOTAL TCDD	0.095 J	U(6)	5.0	0.73PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	TOTAL TCDF	2.5 J	↓	5.0	5.1PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	90.0		40-135		%	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	76.9		40-135		%	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	79.9		40-135		%	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	88.3		40-135		%	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	83.4		40-135		%	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	73.9		40-135		%	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	72.5		40-135		%	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	73.2		40-135		%	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	71.5		40-135		%	03/21/16	04/07/16

J = Estimated value.

4/05/16

Quant Method: 160302_8290
Run #: 160404_HR_45
Instrument: Magneto
Sequence: 160404
Dilution Factor: 1
Initials: RP

Printed: 04/08/16 5:21:04 PM
Form 1 - APPL Standard GC - No MC

EPA 8290A

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Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78998

Sample ID: KCH067-033

APPL ID: AZ30749

Sample Collection Date: 03/15/16

QCG: $829ACTO6-160321-2062

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	3.3 J J(7)	12.5	3.3PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	3.0 J	12.5	3.0PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.079 U	12.5	0.079DL	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.20 U	12.5	0.20PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.14 U	12.5	0.14PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.065 U	12.5	0.065DL	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.11 U	12.5	0.11PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.062 U	12.5	0.062DL	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.068 U	12.5	0.068DL	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,7,8-PECDD	0.061 U	12.5	0.061DL	ng/Kg	03/21/16	04/07/16
EPA 8290A	1,2,3,7,8-PECDF	0.14 U	12.5	0.14DL	ng/Kg	03/21/16	04/07/16
EPA 8290A	2,3,4,6,7,8-HXCDF	0.43 U	12.5	0.43PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	2,3,4,7,8-PECDF	0.14 U	12.5	0.14DL	ng/Kg	03/21/16	04/07/16
EPA 8290A	2,3,7,8-TCDD	0.038 U	5.0	0.038DL	ng/Kg	03/21/16	04/07/16
EPA 8290A	2,3,7,8-TCDF	0.11 U	5.0	0.11PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	OCDD	27	25.0	27PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	OCDF	1.6 U	25.0	1.6PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	TOTAL HPCDD	3.3 J J(7)	12.5	3.7PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	TOTAL HPCDF	3.0 J	12.5	3.0PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	TOTAL HXCDD	0.60 U	12.5	0.60PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	TOTAL HXCDF	0.43 J J(7)	12.5	2.1PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	TOTAL PECDD	0.42 U	12.5	0.42PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	TOTAL PECDF	0.39 J	12.5	0.73PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	TOTAL TCDD	0.65 U	5.0	0.65PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	TOTAL TCDF	0.51 J U(6)	5.0	1.2PC	ng/Kg	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	87.2	40-135		%	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	78.0	40-135		%	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	88.7	40-135		%	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	95.0	40-135		%	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	90.1	40-135		%	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	81.5	40-135		%	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	86.6	40-135		%	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	86.3	40-135		%	03/21/16	04/07/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	68.4	40-135		%	03/21/16	04/07/16

J = Estimated value.

4/25/16

Quant Method: 160302_8290
Run #: 160404_HR_46
Instrument: Magneto
Sequence: 160404
Dilution Factor: 1
Initials: RP

Printed: 04/08/16 5:21:05 PM
Form 1 - APPL Standard GC - No MC

EPA 8290A

Kleinfelder
1039 Hyland Drive
Evergreen, CO 80439

Attn: Karin Kaiser

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78998

Sample ID: KCH067-041

APPL ID: AZ30750

Sample Collection Date: 03/15/16

QCG: $829ACTO6-160318-2062

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	5.2 U	125.0	5.2PC	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	0.52 U	125.0	0.52DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.61 U	125.0	0.61DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.71 U	125.0	0.71DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.78 U	125.0	0.78DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.73 U	125.0	0.73DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.76 U	125.0	0.76DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.69 U	125.0	0.69DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.91 U	125.0	0.91DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,7,8-PECDD	0.80 U	125.0	0.80DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,7,8-PECDF	1.2 U	125.0	1.2DL	pg/L	03/18/16	04/03/16
EPA 8290A	2,3,4,6,7,8-HXCDF	1.9 U	125.0	1.9PC	pg/L	03/18/16	04/03/16
EPA 8290A	2,3,4,7,8-PECDF	1.3 U	125.0	1.3DL	pg/L	03/18/16	04/03/16
EPA 8290A	2,3,7,8-TCDD	0.94 U	50.0	0.94PC	pg/L	03/18/16	04/03/16
EPA 8290A	2,3,7,8-TCDF	0.61 U	50.0	0.61DL	pg/L	03/18/16	04/03/16
EPA 8290A	OCDD	24 U	250.0	24PC	pg/L	03/18/16	04/03/16
EPA 8290A	OCDF	3.4 U	250.0	3.4PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL HPCDD	14 U	125.0	14PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL HPCDF	3.8 U	125.0	3.8PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL HXCDD	1.6 U	125.0	1.6PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL HXCDF	4.9 U	125.0	4.9PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL PECDD	2.0 U	125.0	2.0PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL PECDF	9.0 U	125.0	9.0PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL TCDD	0.87 J U(7)	50.0	7.1PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL TCDF	12 J ↓	50.0	18PC	pg/L	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	79.7	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	77.3	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	77.8	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	84.0	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	74.4	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	69.0	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	71.7	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	71.3	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	66.9	40-135		%	03/18/16	04/03/16

J = Estimated value.

8/5/16

Quant Method: 160302_8290
Run #: 160403_HR_07
Instrument: Magneto
Sequence: 160403
Dilution Factor: 1
Initials: RP

Printed: 04/08/16 5:21:39 PM
Form 1 - APPL Standard GC - No MC

EPA 8290A

Kleinfelder
1039 Hyland Drive
Evergreen, CO 80439

APPL Inc.
908 North Temperance Avenue
Clovis, CA 93611

Attn: Karin Kaiser

Project: 479811.67.07.09.AC CTO067 China Lake

ARF: 78998

Sample ID: KCH067-042

APPL ID: AZ30751

Sample Collection Date: 03/15/16

QCG: $829ACTO6-160318-2062

Method	Analyte	Result	PQL	EDL/EMPC	Units	Ext Date	Analysis Date
EPA 8290A	1,2,3,4,6,7,8-HPCDD	1.2 U	125.0	1.2DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,4,6,7,8-HPCDF	1.1 U	125.0	1.1PC	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,4,7,8,9-HPCDF	0.53 U	125.0	0.53DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,4,7,8-HXCDD	0.60 U	125.0	0.60DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,4,7,8-HXCDF	0.59 U	125.0	0.59DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,6,7,8-HXCDD	0.61 U	125.0	0.61DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,6,7,8-HXCDF	0.58 U	125.0	0.58DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,7,8,9-HXCDD	0.58 U	125.0	0.58DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,7,8,9-HXCDF	0.69 U	125.0	0.69DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,7,8-PECDD	0.75 U	125.0	0.75DL	pg/L	03/18/16	04/03/16
EPA 8290A	1,2,3,7,8-PECDF	0.72 U	125.0	0.72DL	pg/L	03/18/16	04/03/16
EPA 8290A	2,3,4,6,7,8-HXCDF	2.4 J U(7)	125.0	2.4PC	pg/L	03/18/16	04/03/16
EPA 8290A	2,3,4,7,8-PECDF	0.76 U	125.0	0.76DL	pg/L	03/18/16	04/03/16
EPA 8290A	2,3,7,8-TCDD	0.70 U	50.0	0.70DL	pg/L	03/18/16	04/03/16
EPA 8290A	2,3,7,8-TCDF	0.50 U	50.0	0.50DL	pg/L	03/18/16	04/03/16
EPA 8290A	OCDD	25 J U(7)	250.0	25PC	pg/L	03/18/16	04/03/16
EPA 8290A	OCDF	2.4 U	250.0	2.4PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL HPCDD	0.87 U	125.0	0.87PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL HPCDF	2.8 J U(7)	125.0	7.7PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL HXCDD	1.9 J	125.0	1.9PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL HXCDF	2.4 J U(7)	125.0	3.7PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL PECDD	1.5 U	125.0	1.5PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL PECDF	9.2 U	125.0	9.2PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL TCDD	3.9 U	50.0	3.9PC	pg/L	03/18/16	04/03/16
EPA 8290A	TOTAL TCDF	4.8 U	50.0	4.8PC	pg/L	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDD (S	75.0	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,6,7,8-HPCDF (S	70.7	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,4,7,8-HXCDF (S)	72.0	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,6,7,8-HXCDD (S)	78.6	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDD (S)	67.2	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-1,2,3,7,8-PECDF (S)	61.7	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDD (S)	65.0	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-2,3,7,8-TCDF (S)	65.2	40-135		%	03/18/16	04/03/16
EPA 8290A	SURROGATE: 13C-OCDD (S)	62.2	40-135		%	03/18/16	04/03/16

J = Estimated value.

4/5/16

Quant Method: 160302_8290
Run #: 160403_HR_08
Instrument: Magneto
Sequence: 160403
Dilution Factor: 1
Initials: RP

Printed: 04/09/16 10:07:05 AM
Form 1 - APPL Standard GC - No MC

LDC #: 36282E21
SDG #: 78998
Laboratory: APPL, Inc.

VALIDATION COMPLETENESS WORKSHEET
Standard/Full

Date: 5/11/16
Page: 1 of 1
Reviewer: EJ
2nd Reviewer: AL

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW846 Method 8290A)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A /A	
II.	HRGC/HRMS Instrument performance check	A	
III.	Initial calibration/ICV	A /A	%D RSD ≤ 20 ICV ≤ 20/30 unlabeled labeled
IV.	Continuing calibration	A	CCV ≤ 20/30
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	EB = 3 SB = 4
VII.	Matrix spike/Matrix spike duplicates	N	CS
VIII.	Laboratory control samples	A	LCS
IX.	Field duplicates	N	
X.	Internal standards	A	
XI.	Compound quantitation RL/LOQ/LODs	A	Not reviewed for Standard validation.
XII.	Target compound identification	A	Not reviewed for Standard validation.
XIII.	System performance	A	Not reviewed for Standard validation.
XIV.	Overall assessment of data	A	

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

** Indicates sample underwent Full validation

	Client ID	Lab ID	Matrix	Date
1 2	KCH067-032**	AZ30748**	Soil	03/15/16
2 N	KCH067-033	AZ30749	Soil	03/15/16
3 1	KCH067-041	AZ30750	Water	03/15/16
4 1	KCH067-042	AZ30751	Water	03/15/16
5				
6				
7				
8				
9				
10				
11				

Notes:

+1	160318-MB						
+2	160321 - MB						

LDC #: 36282 E21

VALIDATION FINDINGS CHECKLIST

Reviewer: F2
2nd Reviewer: AC

Method: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. GC/MS Instrument performance check				
Was PFK exact mass 380.9760 verified?	✓			
Were the retention time windows established for all homologues?	✓			
Was the chromatographic resolution between 2,3,7,8-TCDD and peaks representing any other unlabeled TCDD isomers ≤ 25% ?	✓			
Is the static resolving power at least 10,000 (10% valley definition)?	✓			
Was the mass resolution adequately check with PFK?	✓			
Was the presence of 1,2,8,9-TCDD and 1,3,4,6,8-PeCDF verified?	✓			
IIIa. Initial calibration				
Was the initial calibration performed at 5 concentration levels?	✓			
Were all percent relative standard deviations (%RSD) ≤ 20% for unlabeled compounds and labeled compounds ?	✓			
Did all calibration standards meet the Ion Abundance Ratio criteria?	✓			
Was the signal to noise ratio for each target compound ≥ 2.5 and for each recovery and internal standard ≥ 10?	✓			
IIIb. Initial Calibration Verification				
Was an initial calibration verification standard analyzed after each initial calibration for each instrument?	✓			
Were all percent differences (%D) ≤ 20% for unlabeled compounds and ≤ 30% for labeled compounds ?	✓			
IV. Continuing calibration				
Was a contiuning calibration performed at the beginning and end of each 12 hour period?	✓			
Were all percent differences (%D) ≤ 20% for unlabeled compounds and ≤ 30% for labeled compounds ?	✓			
Did all routine calibration standards meet the Ion Abundance Ratio criteria?	✓			
Was the signal to noise ratio for each target compound and for each recovery and internal standard ≥ 10?	✓			
V. Laboratory Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank performed for each matrix and whenever a sample extraction was performed?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet?	✓			
VI. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.	✓			
VII. Matrix spike/Matrix spike duplicates				

LDC #: 36282E2

VALIDATION FINDINGS CHECKLIST

Reviewer: FJ
2nd Reviewer: [illegible]

Validation Area	Yes	No	NA	Findings/Comments
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.			✓	
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?			✓	
VIII. Laboratory control samples				
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
IX. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
X. Internal standards				
Were internal standard recoveries within the 40-135% criteria?	✓			
Was the minimum S/N ratio of all internal standard peaks ≥ 10?	✓			
XI. Compound quantitation				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XII. Target compound identification				
For 2,3,7,8 substituted congeners with associated labeled standards, were the retention times of the two quantitation peaks within -1 to 3 sec. of the RT of the labeled standard?	✓			
For 2,3,7,8 substituted congeners without associated labeled standards, were the relative retention times of the two quantitation peaks within 0.005 time units of the RRT measured in the routine calibration?	✓			
For non-2,3,7,8 substituted congeners, were the retention times of the two quantitation peaks within RT established in the performance check solution?	✓			
Did compound spectra contain all characteristic ions listed in the table attached?	✓			
Was the Ion Abundance Ratio for the two quantitation ions within criteria?	✓			
Was the signal to noise ratio for each target compound and labeled standard ≥ 2.5?	✓			
Does the maximum intensity of each specified characteristic ion coincide within ± 2 seconds (includes labeled standards)?	✓			
For PCDF identification, was any signal (S/N ≥ 2.5, at ± seconds RT) detected in the corresponding PCDPE channel?	✓			
Was an acceptable lock mass recorded and monitored?	✓			
XIII. System performance				
System performance was found to be acceptable.	✓			
XIV. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			

VALIDATION FINDINGS WORKSHEET

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

A. 2,3,7,8-TCDD	F. 1,2,3,4,6,7,8-HpCDD	K. 1,2,3,4,7,8-HxCDF	P. 1,2,3,4,7,8,9-HpCDF	U. Total HpCDD
B. 1,2,3,7,8-PeCDD	G. OCDD	L. 1,2,3,6,7,8-HxCDF	Q. OCDF	V. Total TCDF
C. 1,2,3,4,7,8-HxCDD	H. 2,3,7,8-TCDF	M. 2,3,4,6,7,8-HxCDF	R. Total TCDD	W. Total PeCDF
D. 1,2,3,6,7,8-HxCDD	I. 1,2,3,7,8-PeCDF	N. 1,2,3,7,8,9-HxCDF	S. Total PeCDD	X. Total HxCDF
E. 1,2,3,7,8,9-HxCDD	J. 2,3,4,7,8-PeCDF	O. 1,2,3,4,6,7,8-HpCDF	T. Total HxCDD	Y. Total HpCDF

Notes:_____

LDC #: 36282E21

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: EM
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

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

Code = 7

Y N N/A Were all samples associated with a method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
Y N N/A Was the method blank contaminated?

Blank extraction date: 3/21/16 **Blank analysis date:** 4/4/16 **Associated samples:** all soils

Conc. units: ng/kg

Compound	Blank ID	Sample Identification								
	160321-MB	1		2						
F	0.55	51J		3.3J						
Q	0.36	4.5J								
U	0.55	51J		3.3J						
X	0.054	6.7J		0.43J						

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 36282E21

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: B
2nd Reviewer: M

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

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

Y N N/A Were all samples associated with a method blank?
Y N N/A Was a method blank performed for each matrix and whenever a sample extraction was performed?
Y N N/A Was the method blank contaminated?

code = 7

Blank extraction date: 3/18/16 **Blank analysis date:** 4/3/16 **Associated samples:** all water

Conc. units: pg/L

Compound	Blank ID	Sample Identification								
	160318-	MB	3	4						
M	4.2			2.4 U						
G	43			25 U						
U	2.1									
Y	9.5			2.8 U						
X	20			2.4 U						
W	1.4									
R	1.1		0.87 U							
V	2.5		12 U							

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
All contaminants within five times the method blank concentration were qualified as not detected, "U".

LDC #: 36282E21

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

(Y) N N/A Were field blanks identified in this SDG?
Blank units: pg/L **Associated sample units:** ng/kg
Sampling date: 3/15/16
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All SOILS

wdle = 6

Compound	Blank ID	Sample Identification									
	3		1		2						
R	0.87		0.095 U								
Y	12		2.5 U		0.51 U						
CRQL											

Blank units: ng/L **Associated sample units:** ng/L
Sampling date: 3/15/16
Field blank type: (circle one) Field Blank / Rinsate / Other: SB Associated Samples: 3 (ND)

Compound	Blank ID	Sample Identification									
	4										
M	2.4										
G	25										
Y	2.8										
X	2.4										
T	1.9										
CRQL											

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Samples with compound concentrations within five times the associated field blank concentration are listed above, these sample results were qualified as not detected, "U".

LDC #: 36282E21

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: JG
2nd Reviewer: R

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA Method 8290)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = $(A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs,

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard
X = Mean of the RRFs

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported RRF (CS-3 std)	Recalculated RRF (CS-3 std)	Reported %RSD	Recalculated %RSD
1	IGAL	3/2/16	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	0.951858	0.951858	0.91456	0.91456	3.29222	3.29222
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.07768	1.07768	1.09162	1.09162	5.022	5.022
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	1.05456	1.05456	1.02152	1.02152	2.30779	2.30779
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	0.990196	0.990196	0.96245	0.96245	3.63217	3.63217
			OCDF (^{13}C-OCDD)	1.21618	1.21618	1.18811	1.18811	5.75034	5.75034
2			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)						
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)						
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)						
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)						
			OCDF (^{13}C-OCDD)						

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

LDC #: 36282E21

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Page: 1 of 1
Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

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

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

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

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	160404_HR_02 ccv	4/4/16	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)	0.951858	0.826	0.826	13.2	13.2
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)	1.07768	1.025	1.025	4.9	4.9
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)	1.05456	0.990	0.990	6.1	6.1
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)	0.990196	0.975	0.975	1.5	1.5
			OCDF (^{13}C-OCDD)	1.21618	1.175	1.175	3.4	3.4
2	160404_HR_41 ccv	4/6/16	2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)		0.825	0.825	13.4	13.4
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)		1.028	1.028	4.7	4.7
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)		1.053	1.053	0.2	0.2
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)		0.976	0.976	1.4	1.4
			OCDF (^{13}C-OCDD)		1.190	1.190	2.2	2.2
3			2,3,7,8-TCDF (^{13}C-2,3,7,8-TCDF)					
			2,3,7,8-TCDD (^{13}C-2,3,7,8-TCDD)					
			1,2,3,6,7,8-HxCDD (^{13}C-1,2,3,6,7,8-HxCDD)					
			1,2,3,4,6,7,8-HpCDD (^{13}C-1,2,4,6,7,8,-HpCDD)					
			OCDF (^{13}C-OCDD)					

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

LDC #: 36282E21

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: EJ
2nd Reviewer: AK

METHOD: GC/MS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

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

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration
SA = Spike added

RPD = I LCS - LCSD I * 2/(LCS + LCSD) LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: 160321 - LCS1D

Compound	Spike Added (ng/kg)		Spiked Sample Concentration (ng/kg)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCS	LCSD	LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalc
2,3,7,8-TCDD	49.8	NA	43.8	NA	88.0	88.0				
1,2,3,7,8-PeCDD	124		105		84.7	84.7				
1,2,3,4,7,8-HxCDD	124		99.6		80.3	80.3				
1,2,3,4,7,8,9-HpCDF	124		89.5		72.2	72.2				
OCDF	249		187		75.1	75.1	NA			

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

LDC #: 36282E21

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: EJ
2nd reviewer: [illegible]

METHOD: HRGC/HRMS Dioxins/Dibenzofurans (EPA SW 846 Method 8290)

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

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

A_x = Area of the characteristic ion (EICP) for the compound to be measured

A_{is} = Area of the characteristic ion (EICP) for the specific internal standard

I_s = Amount of internal standard added in nanograms (ng)

V_o = Volume or weight of sample extract in milliliters (ml) or grams (g).

RRF = Relative Response Factor (average) from the initial calibration

Df = Dilution Factor.

%S = Percent solids, applicable to soil and solid matrices only.

Example:

Sample I.D. #1, OCDD:

Conc. = $\frac{(1.325662 \times 10^5 + 1.494042 \times 10^5)(200)(0.05)(1000)}{(2.193651 \times 10^5 + 2.436840 \times 10^5)(1.07099)(13.00)}$

= 437 ng/kg

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 13, 2016

Parameters: Perfluorinated Alkyl Acids

Validation Level: Level III & IV

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): K1602494

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-009	K1602494-001	Soil	03/08/16
KCH067-010	K1602494-002	Soil	03/08/16
KCH067-011	K1602494-003	Soil	03/08/16
KCH067-012	K1602494-004	Soil	03/08/16
KCH067-013	K1602494-005	Soil	03/08/16
KCH067-014	K1602494-006	Soil	03/08/16
KCH067-015	K1602494-007	Soil	03/08/16
KCH067-016**	K1602494-008**	Soil	03/08/16
KCH067-019	K1602494-009	Water	03/08/16
KCH067-016MS	K1602494-008MS	Soil	03/08/16
KCH067-016MSD	K1602494-008MSD	Soil	03/08/16

**Indicates sample underwent Level IV validation

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluorinated Alkyl Acids by Environmental Protection Agency (EPA) Method 537

All sample results were subjected to Level III data validation, which comprises an evaluation of quality control (QC) summary results. Samples appended with a double asterisk on the cover page were subjected to Level IV data validation, which is comprised of the QC summary forms as well as the raw data, to confirm sample quantitation and identification.

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked as applicable.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 25.0%.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 25.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 25.0%.

The percent differences (%D) of the ending CCVs were less than or equal to 25.0%.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Extraction Date	Compound	Concentration	Associated Samples
KQ1602477-03	03/17/16	Perfluorooctanoic acid	0.48 ng/L	All water samples in SDG K1602494

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
KCH067-019	Perfluorooctanoic acid	0.47 ng/L	0.80U ng/L

VI. Field Blanks

Sample KCH067-019 was identified as an equipment blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
KCH067-019	03/08/16	Perfluorooctanoic acid	0.47 ng/L	All soil samples in SDG K1602494

Sample KCH067-042 (from SDG K1602709) was identified as a source blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
KCH067-042	03/15/16	Perfluorooctanoic acid	0.39 ng/L	KCH067-019

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

Sample	Compound	Reported Concentration	Modified Final Concentration
KCH067-019	Perfluorooctanoic acid	0.47 ng/g	0.80U ng/g
KCH067-009	Perfluorooctanoic acid	0.35 ng/g	0.35U ng/g
KCH067-011	Perfluorooctanoic acid	0.29 ng/g	0.29U ng/g
KCH067-012	Perfluorooctanoic acid	0.27 ng/g	0.27U ng/g
KCH067-014	Perfluorooctanoic acid	0.21 ng/g	0.21U ng/g
KCH067-015	Perfluorooctanoic acid	0.27 ng/g	0.27U ng/g
KCH067-016**	Perfluorooctanoic acid	0.24 ng/g	0.24U ng/g

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits with the following exceptions:

Sample	Surrogate	%R (Limits)	Affected Compound	Flag	A or P
KCH067-009	Perfluoro-n-[1,2,3,4-13C4] octanoic acid	65 (70-130)	Perfluorinated alkyl acids	J (all detects) UJ (all non-detects)	P
KCH067-011	Perfluoro-n-[1,2,3,4-13C4] octanoic acid	65 (70-130)	Perfluorinated alkyl acids	J (all detects) UJ (all non-detects)	P

Additionally, surrogate recoveries (%R) were not within QC limits for sample KCH067-013. No data were qualified for samples analyzed at greater than or equal to 5X dilution.

VIII. Matrix Spike/Matrix Spike Duplicates

Matrix spike (MS) and matrix spike duplicate (MSD) sample analysis was performed on an associated project sample. Percent recoveries (%R) were within QC limits. Relative percent differences (RPD) were within QC limits.

IX. Laboratory Control Samples

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

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

All compound quantitations met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

All target compound identifications met validation criteria for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XIV. System Performance

The system performance was acceptable for samples which underwent Level IV validation. Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

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

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

Due to laboratory blank contamination, data were qualified as not detected in one sample.

Due to equipment blank and source blank contamination, data were qualified as not detected in seven samples.

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

China Lake CTO 067
Perfluorinated Alkyl Acids - Data Qualification Summary - SDG K1602494

Sample	Compound	Flag	A or P	Reason (Code)
KCH067-009 KCH067-011	Perfluorinated alkyl acids	J (all detects) UJ (all non-detects)	P	Surrogate spikes (%R) (13)

China Lake CTO 067
Perfluorinated Alkyl Acids - Laboratory Blank Data Qualification Summary - SDG K1602494

Sample	Compound	Modified Final Concentration	A or P	Code
KCH067-019	Perfluorooctanoic acid	0.80U ng/L	A	7

China Lake CTO 067
Perfluorinated Alkyl Acids - Field Blank Data Qualification Summary - SDG K1602494

Sample	Compound	Modified Final Concentration	A or P	Code
KCH067-019	Perfluorooctanoic acid	0.80U ng/g	A	6
KCH067-009	Perfluorooctanoic acid	0.35U ng/g	A	6
KCH067-011	Perfluorooctanoic acid	0.29U ng/g	A	6
KCH067-012	Perfluorooctanoic acid	0.27U ng/g	A	6
KCH067-014	Perfluorooctanoic acid	0.21U ng/g	A	6
KCH067-015	Perfluorooctanoic acid	0.27U ng/g	A	6
KCH067-016**	Perfluorooctanoic acid	0.24U ng/g	A	6

Client:	Kleinfelder	**Service Request:**	K1602494
Project:	CCTO-067 - China Lake	**Date Collected:**	03/08/16 14:00
Sample Matrix:	Soil	**Date Received:**	03/10/16 10:00
Sample Name:	KCH067-009	**Units:**	ng/g
Lab Code:	K1602494-001	**Basis:**	Dry

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3550B

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluorobutane Sulfonate	ND U UJ	1.0 (13)	0.20	0.092	1	04/19/16 00:02	3/16/16	
Perfluorooctanoic Acid	**0.35 J** UJ	1.0	0.21 (6)	0.21	1	04/19/16 00:02	3/16/16	
Perfluorooctane Sulfonate	**0.41 J** J	1.0	0.20	0.061	1	04/19/16 00:02	3/16/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Sodium perfluoro-1-hexane[18O2]sulfonate	74	70 - 130	04/19/16 00:02	
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	65	70 - 130	04/19/16 00:02	*
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate	80	70 - 130	04/19/16 00:02	

4/29/16

REVISED
9:19 am, Apr 29, 2016

Client:	Kleinfelder	**Service Request:**	K1602494
Project:	CCTO-067 - China Lake	**Date Collected:**	03/08/16 14:05
Sample Matrix:	Soil	**Date Received:**	03/10/16 10:00
Sample Name:	KCH067-010	**Units:**	ng/g
Lab Code:	K1602494-002	**Basis:**	Dry

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3550B

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluorobutane Sulfonate	ND U	0.95	0.20	0.090	1	04/19/16 00:12	3/16/16	
Perfluorooctanoic Acid	ND U	0.95	0.20	0.20	1	04/19/16 00:12	3/16/16	
Perfluorooctane Sulfonate	ND U	0.95	0.20	0.060	1	04/19/16 00:12	3/16/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Sodium perfluoro-1-hexane[18O2]sulfonate	83	70 - 130	04/19/16 00:12	
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	73	70 - 130	04/19/16 00:12	
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate	88	70 - 130	04/19/16 00:12	

4/5/16

REVISED
9:19 am, Apr 29, 2016

Client:	Kleinfelder	**Service Request:**	K1602494
Project:	CCTO-067 - China Lake	**Date Collected:**	03/08/16 14:10
Sample Matrix:	Soil	**Date Received:**	03/10/16 10:00
Sample Name:	KCH067-011	**Units:**	ng/g
Lab Code:	K1602494-003	**Basis:**	Dry

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3550B

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluorobutane Sulfonate	ND U UJ	0.92 (13)	0.20	0.090	1	04/19/16 00:22	3/16/16	
Perfluorooctanoic Acid	**0.29 J** UJ	0.92 ↓	0.20 (6)	0.20	1	04/19/16 00:22	3/16/16	
Perfluorooctane Sulfonate	**0.44 J** J	0.92 ↓	0.20	0.060	1	04/19/16 00:22	3/16/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Sodium perfluoro-1-hexane[18O2]sulfonate	75	70 - 130	04/19/16 00:22	
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	65	70 - 130	04/19/16 00:22	*
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate	82	70 - 130	04/19/16 00:22	

Ca51716

REVISED
9:19 am, Apr 29, 2016

Client:	Kleinfelder	**Service Request:**	K1602494
Project:	CCTO-067 - China Lake	**Date Collected:**	03/08/16 14:20
Sample Matrix:	Soil	**Date Received:**	03/10/16 10:00
Sample Name:	KCH067-012	**Units:**	ng/g
Lab Code:	K1602494-004	**Basis:**	Dry

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3550B

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluorobutane Sulfonate	ND U	0.95	0.20	0.090	1	04/19/16 00:33	3/16/16	
Perfluorooctanoic Acid	**0.27 J** U (6)	0.95	0.20	0.20	1	04/19/16 00:33	3/16/16	
Perfluorooctane Sulfonate	**0.24 J**	0.95	0.20	0.060	1	04/19/16 00:33	3/16/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Sodium perfluoro-1-hexane[18O2]sulfonate	86	70 - 130	04/19/16 00:33	
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	77	70 - 130	04/19/16 00:33	
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate	87	70 - 130	04/19/16 00:33	

4/29/16

REVISED
9:19 am, Apr 29, 2016

Client:	Kleinfelder	**Service Request:**	K1602494
Project:	CCTO-067 - China Lake	**Date Collected:**	03/08/16 14:25
Sample Matrix:	Soil	**Date Received:**	03/10/16 10:00
Sample Name:	KCH067-013	**Units:**	ng/g
Lab Code:	K1602494-005	**Basis:**	Dry

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3550B

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluorobutane Sulfonate	ND U	9.8	2.0	0.90	10	04/19/16 14:10	3/16/16	
Perfluorooctanoic Acid	ND U	9.8	2.0	2.0	10	04/19/16 14:10	3/16/16	
Perfluorooctane Sulfonate	ND U	9.8	2.0	0.60	10	04/19/16 14:10	3/16/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Sodium perfluoro-1-hexane[18O2]sulfonate	142	70 - 130	04/19/16 14:10	*
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	147	70 - 130	04/19/16 14:10	*
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate	153	70 - 130	04/19/16 14:10	*

5/5/16

REVISED
9:19 am, Apr 29, 2016

Client:	Kleinfelder	**Service Request:**	K1602494
Project:	CCTO-067 - China Lake	**Date Collected:**	03/08/16 14:30
Sample Matrix:	Soil	**Date Received:**	03/10/16 10:00
Sample Name:	KCH067-014	**Units:**	ng/g
Lab Code:	K1602494-006	**Basis:**	Dry

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3550B

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluorobutane Sulfonate	ND U	0.97	0.20	0.090	1	04/19/16 00:53	3/16/16	
Perfluorooctanoic Acid	**0.21 J** U(6)	0.97	0.20	0.20	1	04/19/16 00:53	3/16/16	
Perfluorooctane Sulfonate	**0.10 J**	0.97	0.20	0.060	1	04/19/16 00:53	3/16/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Sodium perfluoro-1-hexane[18O2]sulfonate	82	70 - 130	04/19/16 00:53	
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	85	70 - 130	04/19/16 00:53	
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate	91	70 - 130	04/19/16 00:53	

051716

REVISED
9:19 am, Apr 29, 2016

Client:	Kleinfelder	**Service Request:**	K1602494
Project:	CCTO-067 - China Lake	**Date Collected:**	03/08/16 14:50
Sample Matrix:	Soil	**Date Received:**	03/10/16 10:00
Sample Name:	KCH067-015	**Units:**	ng/g
Lab Code:	K1602494-007	**Basis:**	Dry

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3550B

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluorobutane Sulfonate	ND U	1.0	0.20	0.093	1	04/19/16 14:41	3/16/16	
Perfluorooctanoic Acid	**0.27** J U(6)	1.0	0.21	0.21	1	04/19/16 14:41	3/16/16	
Perfluorooctane Sulfonate	**1.6**	1.0	0.20	0.062	1	04/19/16 14:41	3/16/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Sodium perfluoro-1-hexane[18O2]sulfonate	81	70 - 130	04/19/16 14:41	
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	90	70 - 130	04/19/16 14:41	
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate	81	70 - 130	04/19/16 14:41	

5/17/16

REVISED
9:19 am, Apr 29, 2016

Client:	Kleinfelder	**Service Request:**	K1602494
Project:	CCTO-067 - China Lake	**Date Collected:**	03/08/16 15:00
Sample Matrix:	Soil	**Date Received:**	03/10/16 10:00
Sample Name:	KCH067-016	**Units:**	ng/g
Lab Code:	K1602494-008	**Basis:**	Dry

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3550B

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluorobutane Sulfonate	**0.10 J**	0.95	0.20	0.090	1	04/19/16 01:33	3/16/16	
Perfluorooctanoic Acid	**0.24 J** U(6)	0.95	0.20	0.20	1	04/19/16 01:33	3/16/16	
Perfluorooctane Sulfonate	**0.37 J**	0.95	0.20	0.060	1	04/19/16 01:33	3/16/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Sodium perfluoro-1-hexane[18O2]sulfonate	76	70 - 130	04/19/16 01:33	
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	77	70 - 130	04/19/16 01:33	
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate	80	70 - 130	04/19/16 01:33	

4/25/16

REVISED
9:19 am, Apr 29, 2016

Analytical Report

Client:	Kleinfelder	**Service Request:**	K1602494
Project:	CCTO-067 - China Lake	**Date Collected:**	03/08/16 17:35
Sample Matrix:	Water	**Date Received:**	03/10/16 10:00
Sample Name:	KCH067-019	**Units:**	ng/L
Lab Code:	K1602494-009	**Basis:**	NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluorobutane Sulfonate	ND U	4.3	1.2	0.41	1	03/17/16 23:52	3/17/16	
Perfluorooctanoic Acid	**0.47** J 0.804	4.3 (6.7)	0.80	0.27	1	03/17/16 23:52	3/17/16	
Perfluorooctane Sulfonate	ND U	4.3	1.2	0.60	1	03/17/16 23:52	3/17/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Sodium perfluoro-1-hexane[18O2]sulfonate	82	20 - 128	03/17/16 23:52	
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	83	13 - 142	03/17/16 23:52	
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate	82	11 - 131	03/17/16 23:52	

4/25/16

Superset Referen

REVISED
9:19 am, Apr 29, 2016

LDC #: 36282F96 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/10/16
SDG #: K1602494 Standard/Full Page: 1 of 1
Laboratory: ALS Environmental Reviewer: EJ
2nd Reviewer: K

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A /Δ	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A Δ	%RSD ≤ 25 ICV ≤ 25
IV.	Continuing calibration / closing ccv	Δ	CCV ≤ 25
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	FB = 9 SB = KCH067-042 (K1602709)
VII.	Surrogate spikes	SW	
VIII.	Matrix spike/Matrix spike duplicates	A	
IX.	Laboratory control samples	A	LCS/D
X.	Field duplicates	N	
XI.	Internal standards	Δ	
XII.	Compound quantitation RL/LOQ/LODs	Δ	Not reviewed for Standard validation.
XIII.	Target compound identification	Δ	Not reviewed for Standard validation.
XIV.	System performance	Δ	Not reviewed for Standard validation.
XV.	Overall assessment of data	A	

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

** Indicates sample underwent Full validation

	Client ID	Lab ID	Matrix	Date
1	KCH067-009	K1602494-001	Soil	03/08/16
2	KCH067-010	K1602494-002	Soil	03/08/16
3	KCH067-011	K1602494-003	Soil	03/08/16
4	KCH067-012	K1602494-004	Soil	03/08/16
5	KCH067-013	K1602494-005	Soil	03/08/16
6	KCH067-014	K1602494-006	Soil	03/08/16
7	KCH067-015	K1602494-007	Soil	03/08/16
8	KCH067-016**	K1602494-008**	Soil	03/08/16
9	KCH067-019	K1602494-009	Water	03/08/16
10	KCH067-016MS	K1602494-008MS	Soil	03/08/16
11	KCH067-016MSD	K1602494-008MSD	Soil	03/08/16
12				
13	KQ1602426-04			
14	KQ1602477-03			

LDC #: 36282 F96 **VALIDATION FINDINGS CHECKLIST** Page: 1 of 2
Reviewer: F2
2nd Reviewer: M

Method: LC/MS/MS Perfluorinated Alkyl Acids(EPA Method 537)

Validation Area	Yes	No	NA	Findings/Comments
I. Technical holding times				
All technical holding times were met.	✓			
Cooler temperature criteria was met.	✓			
II. LC/MS Instrument performance check				
Were the instrument performance reviewed and found to be within the specified criteria?	✓			
Were all samples analyzed within the 12 hour clock criteria?	✗	✓	✓	
III. Initial calibration				
Did the laboratory perform a 5 point calibration prior to sample analysis?	✓			
Were all percent relative standard (%RSD)≤ 25%?	✓			
Was a curve fit used for evaluation?		✓		
Did the initial calibration meet the curve fit acceptance criteria of ≥ 0.990?			✓	
Were all percent differences (%D) ≤ 25?	✓			
Were the RT windows properly established?	✓			
IV. Continuing calibration				
Was a continuing calibration analyzed daily?	✓			
Were all percent differences (%D) < 25%?	✓			
Were all the retention times within the acceptance windows?	✓			
V. Blanks				
Was a method blank associated with every sample in this SDG?	✓			
Was a method blank analyzed for each matrix and concentration?	✓			
Was there contamination in the method blanks? If yes, please see the Blanks validation completeness worksheet.	✓			
VI. Matrix spike/Matrix spike duplicates				
Were a matrix spike (MS) and matrix spike duplicate (MSD) analyzed for each matrix in this SDG? If no, indicate which matrix does not have an associated MS/MSD. Soil / Water.	✓			
Was a MS/MSD analyzed every 20 samples of each matrix?	✓			
Were the MS/MSD percent recoveries (%R) and the relative percent differences (RPD) within the QC limits?	✓			
VII. Laboratory control samples				
Was an LCS analyzed for this SDG?	✓			
Was an LCS analyzed per extraction batch?	✓			
Were the LCS percent recoveries (%R) and relative percent difference (RPD) within the QC limits?	✓			
VIII. Internal standards				
Were internal standard area counts within50-150% from the average areas measured during initial calbration?	✓			

LDC #: 36282F96

VALIDATION FINDINGS CHECKLIST

Reviewer: FJ
2nd Reviewer: M

Validation Area	Yes	No	NA	Findings/Comments
Were retention times within ± 30 seconds from the associated calibration standard?	✓			
IX. Target compound identification				
Were relative retention times (RRT's) within ± 0.06 RRT units of the standard?	✓			
Did compound spectra meet specified EPA "Functional Guidelines" criteria?	✓			
Were chromatogram peaks verified and accounted for?	✓			
X. Compound quantitation/CRQLs				
Were the correct internal standard (IS), quantitation ion and relative response factor (RRF) used to quantitate the compound?	✓			
Were compound quantitation and CRQLs adjusted to reflect all sample dilutions and dry weight factors applicable to level IV validation?	✓			
XI. System performance				
System performance was found to be acceptable.	✓			
XII. Overall assessment of data				
Overall assessment of data was found to be acceptable.	✓			
XIII. Field duplicates				
Field duplicate pairs were identified in this SDG.		✓		
Target compounds were detected in the field duplicates.			✓	
XIV. Field blanks				
Field blanks were identified in this SDG.	✓			
Target compounds were detected in the field blanks.	✓			

LDC #: 36282F96

VALIDATION FINDINGS WORKSHEET
Blanks

Page: 1 of 1
Reviewer: FT
2nd Reviewer: [illegible]

METHOD: HPLC/MS (EPA Method 537)

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

Y N N/A Was a method blank analyzed for each matrix?
Y N N/A Was a method blank analyzed for each concentration preparation level?
Y N N/A Was a method blank associated with every sample?
Y N N/A Was the blank contaminated? If yes, please see qualification below.

Code = 7

Blank extraction date: 3/17/16 **Blank analysis date:** 3/17/16
Conc. units: ng/L Associated Samples: all water

Compound	Blank ID	Sample Identification							
[redacted]	KQ160277-03	9							
Perfluorooctanoic Acid	0.48		0.47/0.80U						

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 36282F96

VALIDATION FINDINGS WORKSHEET
Field Blanks

Page: 1 of 1
Reviewer: FT
2nd Reviewer: AC

SB = KCH067-042

METHOD: HPLC/MS (EPA Method 537)

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

code = 6

Blank units: ng/L **Associated sample units:** ng/L
Sampling date: 3/15/16
Field blank type: (circle one) Field Blank / Rinsate / Other: SB Associated Samples: 9

Compound	Blank ID	Sample Identification								
	SB		9							
Perfluorooctanoic Acid	0.39		0.47 /0.80U							

Blank units: ng/L **Associated sample units:** ng/g
Sampling date: 3/8/16
Field blank type: (circle one) Field Blank / Rinsate / Other: EB Associated Samples: All soils

code = 6

Compound	Blank ID	Sample Identification								
	9	1	3	4	6	7	8			
Perfluorooctanoic Acid	0.47	0.35U	0.29U	0.27U	0.21 J U F1	0.27U	0.24U			

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 36282F96

VALIDATION FINDINGS WORKSHEET
Surrogate Recovery

Page: 1 of 1
Reviewer: FT
2nd Reviewer: AC

METHOD: LCMS (EPA Method 537)

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

Y (N) N/A Were percent recoveries (%R) for surrogates within QC limits?

Y (N) N/A If any %R was less than 10 percent, was a reanalysis performed to confirm %R?

code = 13

#	Sample ID	Surrogate	%R (Limits)	Qualifications
	1	*	65 (70-130)	J/UJ/P ND + Det
			( )	
			( )	
	3	*	65 (↓)	↓
			( )	
			( )	
			( )	
	5	all surrogates	outside limit)	no qual 10X DL
			( )	
			( )	
			( )	
			( )	
			( )	
			( )	
			( )	
			( )	
			( )	
			( )	
			( )	
	* Perfluoro-n-[1,2,3,4-13C4] octanoic acid		( )	
			( )	
			( )	
			( )	
			( )	
			( )	
			( )	
			( )	

LDC #: 36282F96

VALIDATION FINDINGS WORKSHEET
Initial Calibration Calculation Verification

Page: 1 of 1
Reviewer: FT
2nd Reviewer:

METHOD: HP/LC/MS Perfluorinated Alkyl Acids(EPA Method 537)

The Relative Response Factor (RRF), average RRF, and percent relative standard deviation (%RSD) were recalculated for the compounds identified below using the following calculations:

RRF = $(A_x)(C_{is})/(A_{is})(C_x)$
average RRF = sum of the RRFs/number of standards
%RSD = 100 * (S/X)

A_x = Area of compound,
C_x = Concentration of compound,
S = Standard deviation of the RRFs
X = Mean of the RRFs

A_{is} = Area of associated internal standard
C_{is} = Concentration of internal standard

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Reported RRF (5.0 std)	Recalculated RRF (5.0 std)	Reported Average RRF (initial)	Recalculated Average RRF (initial)	Reported %RSD	Recalculated %RSD
1	ICAL	4/18/16	Perfluorobutane Sulfonate	2.707	2.707	2.782	2.782	11.31	11.31
			Perfluorooctanoic Acid	0.5171	0.5171	0.539	0.539	16.12	16.12
			Perfluorooctane Sulfonate	0.9702	0.9702	0.990	0.990	10.70	10.70
2									
3									
4									

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

LDC #: 36282F96

VALIDATION FINDINGS WORKSHEET
Routine Calibration Results Verification

Page: 1 of 1
Reviewer: PD
2nd Reviewer:

METHOD: HP/LC/MS Perfluorinated Alkyl Acids (EPA Method 537)

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

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

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

#	Standard ID	Calibration Date	Compound (Reference Internal Standard)	Average RRF (initial)	Reported RRF (CC)	Recalculated RRF (CC)	Reported %D	Recalculated %D
1	041816/2020 CCV	4/18/16	Perfluorobutane Sulfonate	~~20.0~~ F1 2.782	2.824	2.824	1.5	1.5
			Perfluorooctanoic Acid	0.539	0.584	0.584	8.2	8.2
			Perfluorooctane Sulfonate	0.990	1.007	1.007	1.7	1.7
2	041816/2032 CCV	4/19/16	↓	2.782	2.760	2.760	0.8	0.8
			↓	↓	0.495	0.495	8.2	8.2
			↓	↓	0.971	0.971	1.9	1.9
3								

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

LDC #: 36282F96

VALIDATION FINDINGS WORKSHEET
Surrogate Results Verification

Reviewer: FT
2nd reviewer: A

METHOD: HPLC/MS Perfluorinated Alkyl Acids (EPA Method 537)

The percent recoveries (%R) of surrogates were recalculated for the compounds identified below using the following calculation:

% Recovery: SF/SS * 100

Where: SF = Surrogate Found
SS = Surrogate Spiked

Sample ID: 8

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference
Sodium – sulfonate	20.0	15.200	76	76	0
Perfluoro – octanoic	↓	15.3390	77	77	↓
Sodium – octanesulfonate	↓	16.0810	80	80	↓

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

Sample ID:

	Surrogate Spiked	Surrogate Found	Percent Recovery Reported	Percent Recovery Recalculated	Percent Difference

LDC #: 36282F96

VALIDATION FINDINGS WORKSHEET
Matrix Spike/Matrix Spike Duplicates Results Verification

Reviewer: [illegible]
2nd Reviewer: [illegible]

METHOD: HPLC/MS Perfluorinated Alkyl Acids(EPA Method 537)

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

% Recovery = 100 * (SSR - SR)/SA Where: SSR = Spiked sample result, SR = Sample result
SA = Spike added

RPD = I MSR - MSDR I * 2/(MSR + MSDR) MSR = Matrix spike percent recovery MSDR = Matrix spike duplicate percent recovery

MS/MSD samples: 10 + 11

Compound	Spike Added (ng/g)		Sample Concentration (ng/g)	Spiked Sample Concentration (ng/g)		Matrix Spike Percent Recovery		Matrix Spike Duplicate Percent Recovery		Reported RPD	Recalculated RPD
	MS	MSD	------	MS	MSD	Reported	Recalc	Reported	Recalc	----	----
Perfluorobutane	37.5	39.2	0.10	~~85~~		~~93~~	85	93	93	9	9
Sulfonate				31.9	36.4	85					

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

LDC #: 36282F96

VALIDATION FINDINGS WORKSHEET
Laboratory Control Sample Results Verification

Reviewer: FT
2nd Reviewer: AK

METHOD: HPLC/MS Perfluorinated Alkyl Acids (EPA Method 537)

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

% Recovery = 100 * SSC/SA Where: SSC = Spiked sample concentration
SA = Spike added

RPD = | LCS - LCSD | * 2/(LCS + LCSD) LCS = Laboraotry control sample percent recovery LCSD = Laboratory control sample duplicate percent recovery

LCS ID: KQ1602426-03

Compound	Spike Added (ng/g)		Spiked Sample Concentration (ng/g)		LCS Percent Recovery		LCSD Percent Recovery		LCS/LCSD RPD	
	LCSD		LCS	LCSD	Reported	Recalc	Reported	Recalc	Reported	Recalculated
Perfluorobutane Sulfonate	40.0	NA	33.9	NA	85	85				

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

LDC #: 36282F96

VALIDATION FINDINGS WORKSHEET
Sample Calculation Verification

Reviewer: FT
2nd reviewer: M

METHOD: LC/MS/MS Perfluorinated Alkyl Acids(EPA Method 537)

Y N N/A Were all reported results recalculated and verified for all level IV samples?

Y N N/A Were all recalculated results for detected target compounds agree within 10.0% of the reported results?

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

A_x	=	Area of the characteristic ion (EICP) for the compound to be measured
A_{is}	=	Area of the characteristic ion (EICP) for the specific internal standard
I_s	=	Amount of internal standard added in nanograms (ng)
RRF	=	Relative response factor of the calibration standard.
V_o	=	Volume or weight of sample pruged in milliliters (ml) or grams (g).
Df	=	Dilution factor.
%S	=	Percent solids, applicable to soils and solid matrices only.

Example: 2/1.0800

Sample I.D. #1, Perfluorobutane Sulfonate

Conc. = $\frac{27576\ (20)\ (2)}{(3674365)(2.782)(1.08)}$

= 0.100 ng/g

#	Sample ID	Compound	Reported Concentration ( )	Calculated Concentration ( )	Qualification

Laboratory Data Consultants, Inc.
Data Validation Report

Project/Site Name: China Lake CTO 067

LDC Report Date: May 18, 2016

Parameters: Perfluorinated Alkyl Acids

Validation Level: Level III

Laboratory: EMAX Laboratories, Inc.

Sample Delivery Group (SDG): K1602709

Sample Identification	Laboratory Sample Identification	Matrix	Collection Date
KCH067-042	K1602709-001	Water	03/15/16

Introduction

This Data Validation Report (DVR) presents data validation findings and results for the associated samples listed on the cover page. Data validation was performed in accordance with the Final Sampling and Analysis Plan (Field Sampling Plan and Quality Assurance Project Plan) Groundwater and Soil Investigation at Installation Restoration Program Sites 22, 23, 31, 32, 43, and PLOU and Soil Investigation at Areas of Concern 166, 230, and 235, Naval Air Weapons Station China Lake, California (February 2016), the U.S. Department of Defense (DoD) Quality Systems Manual (QSM) for Environmental Laboratories, Version 5.0 (July 2013), and a modified outline of the USEPA National Functional Guidelines (NFG) for Superfund Organic Methods Data Review (August 2014). Where specific guidance was not available, the data has been evaluated in a conservative manner consistent with industry standards using professional experience.

The analyses were performed by the following method:

Perfluorinated Alkyl Acids by Environmental Protection Agency (EPA) Method 537

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

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

J+ (Estimated, High Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying high bias, due to non-conformances discovered during data validation.

J- (Estimated, Low Bias): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated, displaying low bias, due to non-conformances discovered during data validation.

J (Estimated, Bias Indeterminate): The compound or analyte was analyzed for and positively identified by the laboratory; however the reported concentration is estimated due to non-conformances discovered during data validation. Bias is indeterminate.

U (Non-detect): The compound or analyte was analyzed for and positively identified by the laboratory; however the analyte should be considered non-detect at the reported concentration due to the presence of contaminants detected in the associated blank(s).

UJ (Non-detected estimated): The compound or analyte was reported as not detected by the laboratory; however the reported quantitation/detection limit is estimated due to non-conformances discovered during data validation.

R (Rejected): The sample results were rejected due to gross non-conformances discovered during data validation. Data qualified as rejected is not usable.

NA (Not Applicable): The non-conformance discovered during data validation demonstrates a high bias, while the affected compound in the associated sample(s) was reported as not detected by the laboratory and did not warrant the qualification of the data.

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

Qualification Codes

1 Holding Times
2 Sample Preservation (Cooler Temp)
3 Sample Custody
4 Missing Deliverables
5 Calibration
6 Field Blanks
7 Laboratory Blanks
8 Matrix Spike (%)
9 Matrix Spike Duplicate (RPD or Duplicate Sample Analysis)
10 Laboratory Control Sample
11 ICP Interference Check
12 RPD Between Two Columns
13 Surrogates
14 Field Duplicates
15 Furnace QC
16 Serial Dilution
17 Chemical Recoveries
18 Trip Blanks
19 Internal Standards
20 Linear Range Exceeded
21 Potential False Positives
22 Do not use, other result more technically sound
23 Other

I. Sample Receipt and Technical Holding Times

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

All technical holding time requirements were met.

II. LC/MS Instrument Performance Check

Instrument performance was checked as applicable.

All ion abundance requirements were met.

III. Initial Calibration and Initial Calibration Verification

An initial calibration was performed as required by the method.

The percent relative standard deviations (%RSD) were less than or equal to 25.0%.

The percent differences (%D) of the initial calibration verification (ICV) standard were less than or equal to 25.0%.

IV. Continuing Calibration

Continuing calibration was performed at the required frequencies.

The percent differences (%D) were less than or equal to 25.0%.

The percent differences (%D) of the ending CCVs were less than or equal to 25.0%.

V. Laboratory Blanks

Laboratory blanks were analyzed as required by the method. No contaminants were found in the laboratory blanks with the following exceptions:

Blank ID	Extraction Date	Compound	Concentration	Associated Samples
KQ1602838-04	03/28/16	Perfluorooctanoic acid	0.35 ng/L	KCH067-042

Sample concentrations were compared to concentrations detected in the laboratory blanks. The sample concentrations were either not detected or were significantly greater than the concentrations found in the associated laboratory blanks with the following exceptions:

Sample	Compound	Reported Concentration	Modified Final Concentration
KCH067-042	Perfluorooctanoic acid	0.39 ng/L	0.80U ng/L

VI. Field Blanks

Sample KCH067-042 was identified as a source blank. No contaminants were found with the following exceptions:

Blank ID	Collection Date	Compound	Concentration	Associated Samples
KCH067-042	03/15/16	Perfluorooctanoic acid	0.39 ng/L	No associated samples in this SDG

VII. Surrogates

Surrogates were added to all samples as required by the method. All surrogate recoveries (%R) were within QC limits.

VIII. Matrix Spike/Matrix Spike Duplicates

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

IX. Laboratory Control Samples

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

X. Field Duplicates

No field duplicates were identified in this SDG.

XI. Internal Standards

All internal standard areas and retention times were within QC limits.

XII. Compound Quantitation

Raw data were not reviewed for Level III validation.

XIII. Target Compound Identifications

Raw data were not reviewed for Level III validation.

XIV. System Performance

Raw data were not reviewed for Level III validation.

XV. Overall Assessment of Data

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

Due to laboratory blank contamination, data were qualified as not detected in one sample.

The quality control criteria reviewed, other than those discussed above, were met and are considered acceptable. Based upon the data validation all other results are considered valid and usable for all purposes.

China Lake CTO 067
Perfluorinated Alkyl Acids - Data Qualification Summary - SDG K1602709

No Sample Data Qualified in this SDG

China Lake CTO 067
Perfluorinated Alkyl Acids - Laboratory Blank Data Qualification Summary - SDG K1602709

Sample	Compound	Modified Final Concentration	A or P	Code
KCH067-042	Perfluorooctanoic acid	0.80U ng/L	A	7

China Lake CTO 067
Perfluorinated Alkyl Acids - Field Blank Data Qualification Summary - SDG K1602709

No Sample Data Qualified in this SDG

Analytical Report

Client:	Kleinfelder	**Service Request:**	K1602709
Project:	CCTO-067 - China Lake	**Date Collected:**	03/15/16 14:40
Sample Matrix:	Water	**Date Received:**	03/17/16 10:20
Sample Name:	KCH067-042	**Units:**	ng/L
Lab Code:	K1602709-001	**Basis:**	NA

Perfluorinated Sulfonic Acids and Perfluorinated Carboxylic Acids by HPLC/MS

Analysis Method: PFC/537M
Prep Method: EPA 3535A

Analyte Name	Result	LOQ	LOD	MDL	Dil.	Date Analyzed	Date Extracted	Q
Perfluorobutane Sulfonate	ND U	4.3	1.2	0.41	1	03/30/16 16:11	3/28/16	
Perfluorooctanoic Acid	**0.39 J** 0.80U	4.3 (7)	0.80	0.27	1	03/30/16 16:11	3/28/16	
Perfluorooctane Sulfonate	ND U	4.3	1.2	0.60	1	03/30/16 16:11	3/28/16	

Surrogate Name	% Rec	Control Limits	Date Analyzed	Q
Sodium perfluoro-1-hexane[18O2]sulfonate	84	20 - 128	03/30/16 16:11	
Perfluoro-n-[1,2,3,4-13C4] octanoic acid	88	13 - 142	03/30/16 16:11	
Sodium perfluoro-1-[1,2,3,4-13C4] octanesulfonate	87	11 - 131	03/30/16 16:11	

ML 051716

LDC #: 36282G96 **VALIDATION COMPLETENESS WORKSHEET** Date: 5/10/16
SDG #: K1602709 Standard Page: 1 of 1
Laboratory: ALS Environmental Reviewer: FT
2nd Reviewer: M

METHOD: LC/MS Perfluorinated Alkyl Acids (EPA Method 537)

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

	Validation Area		Comments
I.	Sample receipt/Technical holding times	A / A	
II.	GC/MS Instrument performance check	A	
III.	Initial calibration/ICV	A / A	%RSD ≤ 25 ICV ≤ 25
IV.	Continuing calibration (closing ccv)	A	ccv ≤ 25
V.	Laboratory Blanks	SW	
VI.	Field blanks	SW	SB = 1
VII.	Surrogate spikes	A	
VIII.	Matrix spike/Matrix spike duplicates	N	QC sample
IX.	Laboratory control samples	A	LCS
X.	Field duplicates	N	
XI.	Internal standards	A	
XII.	Compound quantitation RL/LOQ/LODs	N	
XIII.	Target compound identification	N	
XIV.	System performance	N	
XV.	Overall assessment of data	A	

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

	Client ID	Lab ID	Matrix	Date
1	KCH067-042	K1602709-001	Water	03/15/16
2				
3				
4				
5				
6				
7				
8				
9				

Notes:

	K1602838-04						

LDC #: 36282 Q96

VALIDATION FINDINGS WORKSHEET
Blanks

Reviewer: FT
2nd Reviewer: [illegible]

METHOD: HPLC/MS (EPA Method 537)

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

Y N N/A Was a method blank analyzed for each matrix?
Y N N/A Was a method blank analyzed for each concentration preparation level?
Y N N/A Was a method blank associated with every sample?
Y N N/A Was the blank contaminated? If yes, please see qualification below.

code = 7

Blank extraction date: 3/28/16 **Blank analysis date:** 3/30/16

Conc. units: ng/L Associated Samples: 1

Compound	Blank ID	Sample Identification							
[redacted]	KQ1602838-04			1					
Perfluorooctanoic Acid	0.35			0.39 J 0.80 U					

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated method blank concentration were qualified as not detected, "U". Other contaminants within five times the method blank concentration were also qualified as not detected, "U".

LDC #: 36282G96

VALIDATION FINDINGS WORKSHEET
Field Blanks

Reviewer: FT
2nd Reviewer: A

METHOD: HPLC/MS (EPA Method 537)

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

Blank units: ng/L **Associated sample units:** NA
Sampling date: 3/15/16
Field blank type: (circle one) Field Blank / Rinsate / Other: SB Associated Samples: none

Compound	Blank ID	Sample Identification								
	1									
Perfluorooctanoic Acid	0.39									

Blank units: _____ **Associated sample units:** _____
Sampling date: _____
Field blank type: (circle one) Field Blank / Rinsate / Other: _____ Associated Samples: _____

Compound	Blank ID	Sample Identification								

CIRCLED RESULTS WERE NOT QUALIFIED. ALL RESULTS NOT CIRCLED WERE QUALIFIED BY THE FOLLOWING STATEMENT:
Common contaminants such as the phthalates and TICs noted above that were detected in samples within ten times the associated field blank concentration were qualified as not detected, "U". Other contaminants within five times the field blank concentration were also qualified as not detected, "U".

LDC #: 76282

EDD POPULATION COMPLETENESS WORKSHEET

Date: 5.25.16
Page: 1 of 1
2nd Reviewer: JG

The LDC job number listed above was entered by (W).

	EDD Process		Comments/Action
I.	EDD Completeness	-	
Ia.	- All methods present?	✓	
Ib.	- All samples present/match report?	✓	
Ic.	- All reported analytes present?	✓	
Id.	-10% or 100% verification of EDD?	✓	
II.	EDD Preparation/Entry	-	
IIa.	- Carryover U/J?	✓	
IIb.	- Reason Codes used? If so, note which codes	✓	LDC.
IIc.	-Additional Information (QC Level, Validator, Date, Validated Y/N, etc.)	✓	
III.	Reasonableness Checks	-	
IIIa.	- Do all qualified ND results have ND qualifier (i.e. UJ)?	✓	
IIIb.	- Do all qualified detect results have detect qualifier (i.e. J)?	✓	
IIIc.	- If reason codes used, do all qualified results have reason code field populated?	✓	
IIId.	-Does the detect flag require changing for blank qualifiers? If so, are all U results marked ND?	N/A ✓	
IIIe.	- Do blank concentrations in report match EDD, where data was qualified due to blank?	✓	
IIIf.	- Were any results rejected for overall assessment? If so, were results changed to nonreportable?	N/A ✓	
IIIg.	- Is the readme complete? If applicable, were edits or discrepancies listed in the readme?	✓	

Notes: _____

The attached zipped file contains eight files:

File	Format	Description	
1) Readme_ChinaLake_052516.doc	MS Word 2003	A "Readme" file (this document).	
	MS Excel 2007	A spreadsheet for the following SDG(s):	
2) EFW2LabRES.xlsx		16C070	36282A
3) 16C074_EFW2LabRESvalidated.xlsx		16C074	36282B
4) 16C129_EFW2LabRESvalidated.xlsx		16C129	36282C
5) 78915.EFW2LabRESvalidated.xlsx		78915	36282D
6) 78998.EFW2LabRESvalidated.xlsx		78998	36282E
7) K1602494_EFW2LabRESvalidated.xlsx		K1602494	36282F
8) K1602709_EFW2LabRESvalidated.xlsx		K1602709	36282G

No discrepancies were observed between the hardcopy data packages and the electronic data deliverables during EDD population of validation qualifiers. A 100% verification of the EDD was not performed.

Please contact Pei Geng at (760) 827-1100 if you have any questions regarding this electronic data submittal.